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Optimization of biomass and lipid production from a local *Chlorella* isolates using response surface methodology and artificial neural network

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The exhaustion of the world's fossil fuel supplies and global warming are driving the search for renewable sources of fuel. Microalgae have received great interest as an alternative to fossil fuels due to their fast growth rates and high photosynthetic efficiencies. This study focuses on the optimization of biomass and lipid yield from an indigenous *Chlorella* isolate using the Response Surface Method. The input parameters consisted of $NaNO_3$, $NaHCO_3$ and NaCl within the ranges of 0.05-2.0 g/l, 0.5-3.0 g/l and 0-10 mM respectively. Data from 17 experiments with varied culture conditions was used to develop a polynomial model. Analysis of variance (ANOVA) of the model gave a coefficient of determination (R^2) of 0.72. The predicted optimum conditions for biomass formation were 1.55 g/l $NaNO_3$, 3.0 $NaHCO_3$ and 0 mM NaCl. The response graphs showing the interaction of $NaHCO_3$ and $NaNO_3$ on algal growth revealed that an increase in $NaNO_3$ and $NaHCO_3$ medium concentration enhanced the biomass formation whereas NaCl did not impact on biomass formation. These findings revealed that under optimal conditions the indigenous *Chlorella* isolate could be a potential strain for high biomass formation required for biodiesel production.

Biography

Zanenhlanhla Gumbi has completed her Bachelor of Science degree at the University of KwaZulu Natal and is currently pursuing MSc at the same institution. She is a Member of the Golden Key Honors Society and her key research interests lie in the fields of microalgal biotechnology and renewable energy.

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