

Abstract

The Utilisation of Rum Distillery waste by *Cryptococcus curvatus* for the Production of Cocoa Butter Equivalent (CBE) Microbial Oil

Kisha Jadine McLeod

Over the last few years the use of *Cryptococcus curvatus* to treat carbon rich agro-industrial waste to produce potentially valuable end product has shown some promise. In this research project the use of *C. curvatus* to treat dunder and to produce lipids were examined.

In Jamaica dunder is a major environmental pollutant because of its high COD (chemical oxygen demand) and the large volume that is disposed of per annum. Analysis performed indicates that dunder contains between 36 - 60 g/l of sugar and 3.25 - 3.75 g/l of total nitrogen, along with various quantities of mineral elements. This high nutrient content also accounts for dunder's high COD (68,000 mg/l – 110,000 mg/l), which makes it a suitable substrate for microbial oil production.

In this study growth and lipid production of *C. curvatus*, using shake flask culture, occurred at concentrations of $\leq 30\%$ (v/v) dunder. With nutrient supplementation growth and lipid yields improved by as much as 50%, when compared with the yields obtained in dunder media not supplemented with additional nutrients.

In order to utilize as much waste as possible a concentration of 30% (v/v) dunder was used for a shake flask experiment to determine the feasibility of the process. The experiment indicated that *C. curvatus* would accumulate 0.909 g/l of lipid after 72 hrs of fermentation and that the organism could reduce the COD of the dunder media by as much as 50%. Reverse phase HPLC analysis of the lipid indicated that *C. curvatus* grown on dunder had a fatty acid profile with increased stearic acid (C 18:0) levels.