STUDY OF THE

PHYSIOCHEMICAL AND FERMENTATIVE CHARACTERISTICS OF CANE SUGAR MOLASSES

BY

GAMARALLAGE CHANDRASENA B.Sc., M.Phil (Sri Lanka)

Dissertation submitted to the
University of Kelaniya, Kelaniya,
Sri Lanka in partial fulfilment of
the requirements for the degree of
Master of Science (Microbiology).

August 1990.

ABSTRACT

A study on physiochemical and fermentative characteristics of molasses from the Sevanagala sugar factory was carried out at the Sugarcane Research Institute, Uda Walawe, Sri Lanka.

Composite molasses samples were collected fortnightly and water contents, total solids, pH values, total sugars, sucrose, unfermentable sugars, ash content and composition were determined using the standard laboratory methods. Bacteria, yeast and fungi counts were made on special media.

Yeast in waste contaminated molasses and other sources in and around the sugar factory and distillery were isolated in an attempt to obtain better strains of yeast which could give higher yields of alcohol during fermentation.

The physiochemical parameters were uniform throughout the particular crushing season. Most of the samples were contaminated with bacteria, yeast and fungi. Molasses samples were fermented for 48 hours using the yeast isolates. Isolate SL-SRI-C-111 yielded 10.6 % V/V alcohol with 87 % fermentation efficiency and the yeast SL-SRI-C-121 showed 9.5 % V/V alcohol production with 81 % efficiency.

Laboratory identification revealed that the isolates are species of Saccharomyces cerevisiae. The isolates were further tested for their alcohol tolerance, acid tolerance, sugar utilization and response to added nutrients. The isolate SL-SRI-C-111 moderately tolerant to alcohol up to a concentration of 8 % W/V and it was also observed that the utilization of glucose was not affected even at the pH of

3.5. However, a significant alcohol production was recorded when the medium was enriched with 0.14 % nitrogen and 0.7 % phosphorous.