BIOETHANOL PRODUCTION FROM PALMYRAH MOLASSES USING *Saccharomyces* spp.

A dissertation submitted to the

Faculty of Animal Science and Export Agriculture

Uva Wellassa University

In partial fulfillment of the requirements for the award of

Bachelor of Science in Palm & Latex Technology and Value Addition

By

SIVALUXE SINNARASA

Palm & Latex Technology and Value Addition Degree Programme

Faculty of Animal Science and Export Agriculture

Uva Wellassa University of Sri Lanka

2018

ABSTRACT

Molasses is the waste material obtained from the production of palmyrah sugar candy could be used for alcohol production through fermentation process there by it reduces the production cost of sugar candy. The aim of the study was to select the suitable yeast species and optimize the fermentation conditions to produce ethanol from molasses. The best yeast strain for fermentation was selected according to their alcohol tolerance and growth on molasses using cell density. Molasses was undergone for the chemical analysis (brix, total sugar, reducing sugar, pH, total acidity and alcohol) which was used as fermentation medium .Optimization of fermentation was carried out with different initial brix (5, 10, 20, 30, 40 ^{o}Brix), inoculum size (1, 2, 3, 4 ml), pH (4, 4.5, 5, 5.5, 6, 6.5) and temperature (30, 35, 45, 55 ^{o}C), Each treatments were conducted with triplicate under controlled environment. The absorbance 1.016 and 1.576 were obtained as highest cell density per ml for 8.5 % of alcohol and growth on molasses respectively, the selected best yeast strain was used for the fermentation study. The initial brix, pH, total sugar and reducing sugar of the raw molasses was 58.73 ^{o}Brix 4.5, 62.39 and 8.06 % respectively while the alcohol content was nil. Significantly Brix 10^{o} and inoculum size of 3 ml were selected as optimum at 3rd and 6th day of fermentation with mean value of alcohol percentage 2.6 and 4.4 respectively among the different treatment. Significantly highest alcohol percentage of 4.6, 4.8 was obtained at 5th, 4th day of fermentation at optimum pH 4.5 and temperature 35 ^{o}C respectively. There were significant decreases in total solids during the fermentation of all the treatments. Bioethanol production from palmyrah molasses could be enhanced by the optimization of fermentation condition using the selected yeast strain.

Key Words: Ethanol, Molasses, Palmyrah, Yeast, Fermentation