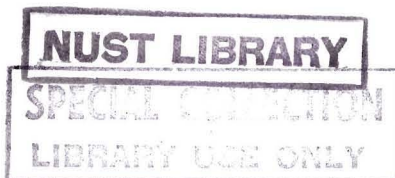


# National University of Science and Technology Zimbabwe



## FACULTY OF APPLIED SCIENCES

## DEPARTMENT OF APPLIED CHEMISTRY

**TITLE: INVESTIGATING THE POSSIBILITY OF PRODUCING METHANE FROM VINASSE.**

**STUDENT NAME: NHLANHLA NDEBELE**

**REGISTRATION NUMBER: N002 1130M**

**PROJECT SUPERVISOR: MR V. SITHOLE**

*A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR: -*

**BACHELOR OF SCIENCE HONOURS DEGREE IN APPLIED CHEMISTRY**



**MAY 2006.**



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## Abstract

Unmanaged molasses from a sugar-refining factory causes plant pollution and may degrade in the environment and methane emitted from its decomposition may contribute to global climate change. Anaerobic digestion provides not only pollution prevention but can also convert a disposal problem into a new profit center. The main objective of the project was to investigate optimum conditions for recovery of a fuel, methane, from vinasse and other valuable co-products. This research conducted at Zimbabwe Sugar Refinery Bulawayo also consisted of determining flame characteristics of methane gas through combustion tests. It was found out that the best conditions for anaerobic digestion of vinasse lies between a pH range of 6.5 – 8.0 and temperature range of 30 -40°C and that methane burns with a blue flame when sufficient oxygen is available. The use of molasses as a substrate for ethanol production was also investigated. The effect of temperature and pH on alcoholic yield was investigated. The effect of molasses brix and variation of yeast quantity on alcoholic yield were also investigated. From the results of the experiments carried out, it was found that fermentation is favourable at a temperature of 25°C, pH range of 4.5- 5.0 and molasses brix of 23. From the results, the amount of yeast catalyst needed for 1litre of molasses is 0.40g. A brix of 45-50 and pH of 6 were found to be best for heat treatment of molasses before fermentation was carried out.

As a general conclusion, the results of this research shows that the ethanol production out of molasses is feasible and so is production of methane gas from vinasse.