

ABSTRACT

STUDY ON THE POTENTIAL OF TARO TUBER AS ALTERNATIVE RAW MATERIALS FOR BIOETHANOL INDUSTRY

By

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This research studied the potential of primary and secondary tuber of taro plant as alternative raw materials for bioethanol production, based on starch content, concentration of reducing sugar resulted from the hydrolysis, and the concentration of bioethanol produced. Determination of starch was carried out using UV-Vis spectrophotometry with iodine reaction. A series of hydrolysis was undertaken to investigate the effect of pHs, times, temperatures, and the concentration of reducing sugar was determined using UV-Vis spectrophotometry. The concentration of bioethanol was determined using UV-Vis spectrophotometry and confirmed by gas chromatography. The results showed that the starch content of primary tuber is 74.5 %, and that of secondary tuber is 46 %. The highest reducing sugar concentration (929.7 mg/L) was produced from the primary tuber under optimum conditions of pH 2, for 5 hours, at temperature of 70 °C. For secondary tubers, the highest reducing sugar concentration (585.9 mg / L) resulted from hydrolysis with pH 2, for 1 hour, at temperature 80 °C. Fermentation revealed that the highest concentration of bioethanol (23.08 %) was produced from the primary tuber using *Saccharomyces cerevisiae* and 17.81 % from secondary tuber using the same fermenting agent. Fermentation using the bark or raru plant was found to produce bioethanol with the concentration of 7.01 % from the primary tuber and 5.58 % from the secondary tuber. Overall, the results showed that the tubers of taro plant have a fairly high potential and the same is true for the bark of raru plant.

Key words: *Taro, starch, hydrolysis, fermentation, raru plant, Saccharomyces cerevisiae.*