

## ABSTRACT

### THE PRODUCTION OF BIOETHANOL FROM BANANA SKIN THROUGH SULFATE ACID HYDROLYSIS

By

ASIH SUKOWATI

Banana fruit is one of main product of Lampung Province. Banana is commonly utilized as raw material of banana chip production and its skin can be converted into bioethanol. The banana skin has to be hydrolyzed into reduced sugar before bioethanol fermentation with *Saccharomyces cerevisiae*.

Objectives of this study were to find out optimum treatments of hydrolysis and fermentation for producing bioethanol. Two steps, namely hydrolysis and fermentations, were carried out in this study. In hydrolysis step, two treatments - H<sub>2</sub>SO<sub>4</sub> concentration and hydrolysis duration – were implemented. The H<sub>2</sub>SO<sub>4</sub> concentration treatment consisted of five degrees (0, 0.025, 0.050, 0.075, and 0,100 M); and the hydrolysis period treatment consisted of two degrees (15 dan 30 minutes). Bioethanol fermentation was carried out at room temperature for 72 hours with *Saccharomyces cerevisiae* as starter at concentration of 0%, 5%, 10%, and 15% (w/v). The treatments were arranged in Randomized Complete Block Design (RCBD) with three replications. Before and after hydrolysis, cellulose, hemicellulose, and lignin contents of skin banana were determined. Reduced sugar concentrations were measured after hydrolysis, and bioethanol concentrations were measured after fermentation. Data of the cellulose, hemicellulose, lignin, reduced sugar, and bioethanol measurements were tabulated and analyzed descriptively.

Results of this study showed that the optimum treatment for hydrolysis was H<sub>2</sub>SO<sub>4</sub> solution at a concentration of 0.050 M at 121<sup>0</sup>C for 15 minutes. The treatment yielded reduced sugar at a concentration of 11,26mg/100. The optimum treatment for fermentation was a starter concentration of 10% (w/v) which produced bioethanol at a concentration of 0.03% (v/v).

Key words : banana skin, hydrolysis, H<sub>2</sub>SO<sub>4</sub>, reduced sugar, bioethanol.