EFFECT ENZYME HYDROLYSIS IN THE MAKING ETHANOL FROM ONGGOK
(SOLID WASTE TAPIOCA FLOUR)

Name: 1. Sidha Rahmasari (2307 100 037)
       2. Khaula Permana P. (2307 100 153)
Department: Chemical Engineering
Faculty of Industrial Technology-ITS
Advisor: Ir. Mulyanto, MT.

ABSTRACT

Onggok is solid waste from industrial processing of tapioca flour, obtained from pressing process that can cause environmental pollution. Onggok utilization is still limited to animal feed, additives sauce, and paper industry is still low economic value. Besides that, the utilization of onggok as a waste or byproduct not interfere the food security program. Therefore, onggok can be used as raw material for making ethanol. This is because Ethanol is one of the alternative fuel blending premium, otherwise it can save on fuel usage. The purpose of this research was to determine and compare the effect of the use of four types of the enzyme, alpha-amylase, glukoamylase, cellulases and pektinase on the enzyme hydrolysis process and to know and compare the effect of varying the concentration of each enzyme to enzyme hydrolysis.

Raw materials used in this research is onggok as much as 150 grams of hydrolyzed with 500 ml (1:2 w/v). On the enzyme hydrolysis process, onggok added with various variables of the enzyme 0.6 units / gram and 24 units / gram for the enzyme alpha-amylase and Glukoamylase, and 10 units / gram and 15 units / gram for the cellulase enzymes and enzyme Pektinase. then the results of hydrolysis (hydrolyzate) is separated from his cake. Then performed in a batch fermentation with temperature 30°C.
incubator shaker speed of 150 rpm using the yeast Saccharomyces Cerevisae for 60 hours, after which the sample per 15 hours in the analysis of cell number, Sugar Reduction, Ethanol Concentration, and pH. Analysis of cell number calculated by the method of using the tool Haemacytometer Counting Chamber, Sugar Reductions were analyzed using spectrophotometric method with a solution of DNS, whereas ethanol products were analyzed by the method Chromatografi Gas (GC).

From the results of this research was obtained that the enzyme hydrolysis, the largest concentration of glucose at 24 hours was 0.6 Glukoamylase enzyme units / gram of 115.859 g / L, while for a time of 2 hours is the enzyme Pektinase 18 units / gram at 29.4 g / L. Cerevisae Saccharomyces yeast growth curve reached a logarithmic at the 22, 24, 24, and 24 hours for the substrate alpha-amylase enzyme, glucoamylase, cellulases, and pektinase, so that the starter before fermentation done that hour. Results optimum batch fermentation process, ethanol concentration achieved at variable enzyme hydrolyzate Pektinase 15 units / gram that is equal to 14.98 g / L for the enzyme hydrolysis of 2 hours, while a 24-hour hidrolizat glucoamylase 0.6 enzyme units / g 18.35 g / L. The greater the concentration of ethanol produced, the greater the reduction of sugar consumed.

Keyword; Batch Fermentation, Saccharomyces Cerevisae, Onggok, Enzyme