

ABSTRACT

EFFECT OF ALKALI PRETREATMENT AND ENZYMATIC HYDROLYSIS ON REDUCING SUGAR CONTENT OF EMPTY PALM FRUIT BUNCH

By

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Empty palm fruit bunch (EPFB) is a solid waste of palm oil industry and contains high lignocellulose consisting of 50,13% cellulose, 24,32% hemicelluloses, and 24,15% lignin. EPFB can be converted into bioethanol after pretreatment with bases, hydrolysis with enzymes, and fermentation with microbes. The objective of this research was to find out the best condition of alkali pretreatment at a temperature of 100⁰C and the best condition of EPFB enzymatic hydrolysis for generating reduced sugar. After drying and grounding, EPFB was submersed into 1,0 and 2,0 M NaOH solution at 100⁰C for 30, 45 and 60 minutes. The solution was then filtered and the residue was analyzed to determine its holocellulose (cellulose and hemicellulose), and lignin contents as well as its degree lignin degradation. Holocellulose resulting from the alkali treatments was then hydrolyzed with 15 FPU cellulase enzyme at pH 4,8, temperatures of 40⁰C, 45⁰C, and 50⁰C, and shaking at 0, 100, 125, and 150 rpm for 24 hours. The best condition of alkali pretreatment was summertion into 1,0

M NaOH solution at 100⁰C for 30 minutes which yielding 93,46% lignin degradation. Enzymatic hydrolysis of EPFB at a temperature of 40⁰C and shaking at a speed of 150 rpm still worked properly so that this condition can be applied for producing bioethanol using SSF method with *saccharomyces cerevisiae*.

Keywords : empty palm fruit bunch, lignocellulose, pretreatment, sodium hydroxida, reduced sugar.