

**COMPARISON OF HYDROLYSIS CONDITIONS TO RECOVER  
REDUCING SUGAR FROM OIL PALM FRONDS AND RICE  
STRAW**

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## **ABSTRACT**

### **COMPARISON OF HYDROLYSIS CONDITIONS TO RECOVER REDUCING SUGAR FROM OIL PALM FRONDS AND RICE STRAW**

A process for determining reducing sugar concentration from oil palm fronds and rice straw was developed. Reducing sugar of oil palm fronds and rice straw were determined in order to compare the hydrolysis conditions. In this study, oil palm frond and rice straw were pretreated with 2 M NaOH in order to obtain alkaline pretreated materials. Alkaline pretreated materials were then hydrolyzed with 1.0, 5.0 and 10.0% (v/v) sulfuric acid at 111 °C and 121 °C for 15 min and 30 min, respectively. The hydrolysate were analyzed for reducing sugar concentration by UV-Vis Spectrophotometer. The result showed that the maximum reducing sugar concentration of rice straw at 78.80 µg/ml was obtained after pretreatment with 2.0 M NaOH and hydrolysis with 1.0% (v/v) sulfuric acid at 111 °C for 30 min. Meanwhile, maximum reducing sugar concentration of oil palm frond was obtained at 81.11 µg/ml after pretreatment with 2.0 M NaOH and hydrolysis with 10%(v/v) at 121 °C for 30 min. In comparison, rice straw showed high reducing sugar concentration at low concentration of sulfuric acid. In contrast, oil palm frond showed high reducing sugar concentration at high concentration of sulfuric acid.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of study and problem statement

Agriculture has played and will continue to play an economic role in Malaysia. Malaysian agriculture is traditionally based on crop production, particularly rubber, palm oil, cocoa, pepper, rice and pineapple. Malaysia is an agricultural country and a lot of agricultural wastes are available every year. Agricultural residue such as rice straw, corn hull, corn stover, bagasse and vetiver grass contain lignocelluloses are the major component. Lignocelluloses are the most abundant organic compounds in nature and represent an important resource for producing valuable product.

Oil palm (*Elaeis guineensis* Jacq.) fronds (OPF) are produced worldwide as a by-product of the palm oil industries and represent another abundant raw material in Malaysia. In Malaysia, the oil palm industry generates 36 million tones of pruned and felled fronds (Wan Zahari *et al.*, 2004) and is generally considered as waste.