

**ACID HYDROLYSIS OF HEMICELLULOSE FROM OIL PALM
FROND**

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ABSTRACT

ACID HYDROLYSIS OF HEMICELLULOSE FROM OIL PALM FROND

Hydrolysis of hemicellulose from oil palm frond was studied in order to determine the optimal condition for the hydrolysis. In this study, hemicellulose was extracted using 3 M potassium hydroxide solution. In order to determine the optimal condition of hydrolysis, hemicellulose was then hydrolysed at different time (0, 20, 40, 80 min), different hemicellulose concentration (0.5%, 1.0%, 2.0%) and different acid concentration (0.05 M, 0.1 M, 0.2 M). The hydrolysates were analyzed for reducing sugar concentration by using UV-Vis spectrophotometer. The hemicellulose yield was 24.6% which is high content of hemicellulose makes this waste adequate for acid hydrolysis. The optimal condition was 2% of hemicellulose with 0.05 M H_2SO_4 at 40 min. The longer reaction times and higher concentration of acid led to decreased oligosaccharide production and enhanced concentrations of monosaccharide. Each of the optimal condition obtained the highest reducing sugar concentration which indicates the production of oligosaccharide.

CHAPTER 1

INTRODUCTION

1.1 Background of study and problem statement

Agriculture has played and will continue to play an important economic role in Malaysia. Malaysian agriculture is traditionally based on crop production, rubber, palm oil, cocoa, pepper, rice and pineapple. The oil palm tree (*Elaeis guineensis* Jacq.), the first commercial planting took place in Tennamaran Estate in Selangor, laying the foundations for the vast oil palm plantations and the palm oil industry in Malaysia. The oil palm has an average economic life of about 25 years. Generally, oil palm tree start producing fruits for oil at the age of three years after field planting and achieve the maximum yield at the age of 9 – 10 years. Palm trees may grow up to sixty feet and more in height. The trunks of young and mature trees are wrapped in fronds which give them a rather rough appearance. The older trees have smoother trunks apart from the scars left by the fronds which have withered and fallen off (MPOPC, 2009).

Oil palm tree is a monocotyledonous plant without branches, similar to the coconut palm with long pinnate leaves. The leaves are found at the top of the plant arranged as a crown which may contain 40 or more fronds. Each palm frond has 20 to over 150 pairs of roughly 2.5 cm wide leaflets arranged in two rows along each side of the petiole.