### PULPING OF OIL PALM FRONDS BY USING SODA AQ: THE EFFECTS OF PROPERTIES OF PAPER ACCORDING TO 15, 20, 25 % ACTIVE ALKALI

By

Nazifah Binti Jazulli

Final Project Paper Submitted in Fulfillment for the Diploma in Wood Industry Faculty of Applied Science, Universiti Teknologi MARA

**NOVEMBER 2005** 

### ACKNOWLEDGEMENT

Thank God, I have given chance and guidance to complete this project on the given time.

Special thank to Miss Junaiza, because of her kindly heart giving me advice, encouragement and assisting I have finish my project as one of the compulsory subjects taken by Part 6 students easier than from that I think before. It is also, one of the purposes to complete our diploma program.

We also like to extent our gratitude to Mr. Sardey Idris for his support and co operation in providing us the material and technical assistance during the pulping process till the testing...

Besides, a real thank you to my partner, Zuraida Mohd Noor who involved directly in this projects.

Not forgotten, special thanks to my best friend Fairuziana who was helped me a lot.

Last but not least, to everybody who was involved indirectly in my thesis, especially my classmate and all of the Woodtech lecturer and staff in the completion of this final project.

Thanks for everything!

iv

# TABLE OF CONTENT

# Page

APPROVAL SHEET	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	v
LIST OF PLATES	vi
LIST OF FIGURES	vii
ABSTRACT	X
ABSTRAK	xi

## CHAPTER

1	INTRODUCTION1
	1.1 Objectives

2	LITERATURE REVIEW	4
	2.1 Oil palm trees	4
	2.2 Oil palm fronds	6
	2.3 Pulping	6
	2.4 Chemical Pulping	8
	2.5 Soda Pulping with AQ	9
	2.6 Fiber bonding	10
	2.7 Effect of lignin on fiber bonding	11
	2.8 Yield	12

## 3 MATERIAL AND METHOD

# 3.1 Pulp and Paper

3.1.1	Raw Material15
3.1.2	Chemical preparation14
3.1.3	Cooking16
3.1.4	Hand sheet paper making18
3.1.5	Paper testing22
3.2 Fiber Mor	phology29
3.2.1	Fiber morphology preparation29
3.2.2	Slide preparation

## 4 RESULT AND DISCUSSION

4.1 Pulp And Paper Testing	35
4.1.1 Yield	34
4.1.2 Freeness	37
4.1.3 Tensile Indices	
4.1.4 Burst indices	40
4.1.5 Folding Endurance	41
4.1.6 Tearing indices	42
4.2 Fiber Morphology	43
<ul><li>4.1.5 Folding Endurance</li><li>4.1.6 Tearing indices</li><li>4.2 Fiber Morphology</li></ul>	41 42 43

5	CONCLUSION	45
REFEREN	CES	47
VITA		48

### ABSTRACT

### PULPING OF OIL PALM FRONDS BY USING SODA AQ: THE EFFECT OF PROPERTIES OF PAPER ACCORDING TO 15, 20, 25% ACTIVE ALKALI

#### By

#### NAZIFAH BINTI JAZULLI

#### **NOVEMBER 2005**

Alkaline pulping is including Soda Pulping and Kraft Pulping. In this study, 3 differences of active alkali (AA),15%, 20%, and 25% are used in this chemical pulping. The purpose of this study is to determine the suitability of these 3 differences of AA by using the oil palm fronds as a raw material. While the AQ is need for lower the rate of reaction between chemical and lignin. The cooking was done by using Rotary digester with 160°C for 3 and the half hours. The paper testing was followed by TAPPI standard to determine the mechanical properties of paper. Between the AA, the 25% was the better than other in determine the yield (25.068%). While 25% AA, was better for the mechanical properties of paper. As the conclusion the more the AA will give better result because the more lignin will be dissolved.