

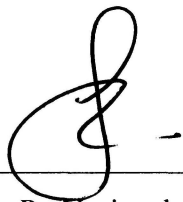
# **PYROLYSIS OF PALM OIL SHELL**

**MASTURA BINTI JUNUS**

**Final Year Project Report Submitted in Partial Fulfillment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Physics in the Faculty of Applied Sciences  
University Technology MARA**

**MAY 2009**

This final Year Project entitled “**Pyrolysis of Oil Palm Shell**” was submitted by Mastura binti Junus, in partial fulfillment of the requirement for a Degree of Bachelor of Sciences (Hons.) Applied Chemistry in Faculty of Applied Science, and was approved by



---

Pn Norjanah Yuri

Supervisor

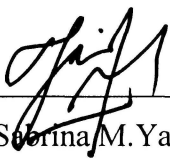
B.Sc. (Hons.) Applied Chemistry

Faculty of Applied Science

Univesiti Teknologi MARA

40450 Shah Alam

Selangor



---

Miss Sorina M. Yahya

Project Coordinator

B.Sc. (Hons.) Applied Chemistry

Faculty of Applied Science

Univesiti Teknologi MARA

40450 Shah Alam

Selangor



---

Dr Yusairie Mohd

Head of Programme

B.Sc. (Hons.) Applied Chemistry

Faculty of Applied Science

Univesiti Teknologi MARA

40450 Shah Alam

Selangor

Date: \_\_\_\_\_

## ACKNOWLEDGEMENTS

Alhamdulillah, I am highly grateful to Allah S.W.T as permission given, my thesis which entitle '**Pyrolysis of Palm Oil Shell**' has been successfully submitted as planned.

Firstly, I would like to express my special thanks to my supervisor, **Madam Norjanah Yury** who has given her trust and confidence to do my thesis. She always guides and gives good advice upon numerous drafts of this thesis. She also gives encouragement in order to finish this thesis. This special thanks also goes to Mr. Rizuan Razlan for his advices, explanation and encouragement while I'm doing my thesis.

I also would like to express my real appreciation and thanks especially to Nurhayati, Nadiatul Azira and Hasnilshazurin for their good cooperation's and supports in doing this thesis. Last but not least, special appreciation dedicated to my family that gives continuous support and encouragement. Thank you.

## TABLE OF CONTENTS

	Page
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATIONS</b>	viii
<b>ABSTRACT</b>	ix
<b>ABSTRAK</b>	x
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background	1
1.1 Problem Statements	2
1.2 Significant of Study	4
1.3 Objectives of Study	5
<b>CHAPTER 2: LITERATURE REVIEW</b>	
2.1 Pyrolysis	6
2.1.1 Principle	7
2.1.2 Types of Pyrolysis	8
2.1.3 Process Flow	10
2.1.4 Pyrolysis Reaction	11
2.1.5 Pyrolysis Technology	14
2.2 Biomass	16
2.2.1 Pyrolysis of Biomass	17
2.2.2 Biomass fuels and the Future	20
2.4 Biofuels	21
2.5 Thermal Conversion	22

## ABSTRACT

In this project, the use of technology such as pyrolyzer can recovery the product yield of biomass such as oil, char, and gas. In this research also, oil palm shell waste was pyrolyzed by using fast pyrolysis reactor the temperature 350°C, 400°C, 450°C and 500°C. This sample was used to characterized the raw and char sample produced by proximate and ultimate analysis. Maximum pyrolytic oil produced was found to be at 22.47 wt% at 400°C. The liquid was characterized by Gas Chromatography Mass Spectrometer was found to contain a very high concentration of phenol of total liquid oil. Factors that contribute in the distribution of pyrolytic oil produced in pyrolysis process were temperature of the pyrolysis reactor at 400°C, the solid residence time for four hours, 0.5mm particles size of biomass sample and the 8°C /min of gas flow rate utilized. This research only study about the effect of pyrolysis reactor playing an important role in distribution of product yield. The percentage of product yield was different in different temperature of pyrolysis reactor.