UNIVERSITI TEKNOLOGI MARA

PROXIMATE AND ULTIMATE ANALYSIS OF EMPTY FRUIT BUNCH AND SHOREA SP. WOODS

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ABSTRACT

This project aimed to analyse and characterize the empty fruit bunch(EFB) of oil palm and *shorea sp*. wood in the area under study through the proximate and ultimate analysis. The proximate analysis consists of analytical evaluation of properties such as moisture content, fixed carbon, volatile matter and ash content of the EFB. Based on the recent study, the moisture content in the unprocessed EFB of oil palm ranges around 67% while moisture content for processed EFB ranges between 30% to 50% (Salman zafar, 2015).The volatile matter varies from 71.2% to 79.7%, the ash content ranges between 3.02 – 7.54% and the fixed carbon content ranges between 8.65 – 18.3% (Rozita Omar, 2011). The ultimate analysis is quantitative analysis of various elements present in a sample, such as carbon, hydrogen, sulphur, oxygen, and nitrogen (Ultimate and Proximate Coal Analysis, n.d.).The concentration of carbon for EFB ranges between 45 – 48.8% , the oxygen content varies from 40.2 – 47.3%, hydrogen ranges between 6.4 – 7.33%, nitrogen ranges between 0.0 – 0.25% and the sulphur content varies from 0.68 to 1.06% (Rozita Omar, 2011). Moreover, the proximate and ultimate analyses when interpreted in detail may form an effective tool to characterize the EFB.

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TABLE OF CONTENTS

		Page
PLAGIRISM FORM		i
AUTHOR'S DECLARATION		ii
ABSTRACT		iii
ACKNOWLEDGEMENT		iv
TABLE OF CONTENTS		v
LIST OF TABLES		vi
LIST OF FIGURES		vii
LIST OF SYMBOLS		viii
LIST OF ABBREVIATIONS		ix
CHAPTER ONE: INTRODUCTION		
1.1	Research Background	1
1.2	Problem Statement	4
1.3	Objectives	5
1.4	Scope of Research	6
1.5	Organization of Thesis	7
CHAPTER TWO: LITERATURE REVIEW		
2.1	Introduction to Energy	8
2.2	Thin Film	10
	2.2.1 Comparison Between Thin Film Solar Cells and Silicon Wafer Solar Cells	12
2.3	Titanium Dioxide (TiO_2)	16

CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Biomass is fuel that is made from organic materials, a renewable and sustainable source of energy to create power as it is abundant ,environmental friendly and carbon dioxide neutral (ReEnergy Holdings LLC, 2011).Biomass can be classified into four groups ; agricultural residues, wood residues, dedicated energy crops and municipal solid waste. The most viable and sustainable form of biomass is agricultural residues, as it is one of the largest primary energy sources after oil and coal (Muafah Abd Aziz, 2011).In 2008, Malaysia is the second world's largest producer and exporter of oil palm with 41% of the total world supply (Muafah Abd Aziz, 2011). Empty fruit bunch is one of the most abundance agricultural residues as it is produced from plantation and milling in palm oil industry.

Empty Fruit Bunch (EFB) is the by-product produced from crude palm oil mill which having small economic value before its application being introduced. EFB are available in abundance as fibrous material and it is free from foreign elements such as gravel, nails, wood residues, waste etc. However, it is saturated with water due to the biological growth combined with the steam sterilization at the mill (Salman zafar, 2015).Before latest application being developed, the major application of EFB is to extract the fibre for others industry (Hoong Chan Trading, 2009). However, the recent application about EFB is it can be utilized as fuel to generate electricity (Mannan, 2016) .The analysis and characterization of EFB is important to learn and enlarge the application of EFB in many industries. The characterization of EFB is important to determine its potential utilization for application in other industries. EFB can be found in large quantities and it