



اَوْنُو تِكْنُوْلُوجِي مَارَا  
UNIVERSITI  
TEKNOLOGI  
MARA

Cawangan Terengganu  
Kampus Bukit Besi

## **TITLE:**

COMPARISON OF NATURAL PLANT WASTE DYE FROM ACALYPHA  
LEAVES USING SOLVENTS FOR PHOTODEGRADATION PROCESS FOR  
DSSC APPLICATIONS

## **SUPERVISOR:**

DR. NORAINI BINTI RAZALI  
DR. NURUL HUDA KAMRULZAMAN

**SCHOOL OF CHEMICAL ENGINEERING  
COLLEGE OF ENGINEERING**

**2023**

## **AUTHOR'S DECLARATION**

“ I hereby declare that this report is the resof my own work except for quotations and summaries which have been duly acknowledged.”

Name of Student : Samihah Binti Hasbullah

Student I.D. No. : 2022840822

Programme : Diploma in Chemical Engineering

College/School : College of Engineering/School of Chemical Engineering

Signature of Student : .....

Date : 12 February 2025

## ABSTRACT

The dye synthetic solar cell (DSSC) is now significant research to address this problem due to low-cost, promising efficient solar energy conversion, and ease of production. The natural dye is one of the main components that influence the cell's performance. The natural dye extracted from natural plant waste such as *Acalypha Wilkesiana* leaves have been used as sensitizer can lower the cost, easy extraction process and environmentally friendly. The main objectives of this research are to extract the dye from *acalypha* leaves by using water and methanol as solvents for 1 day, 3 days and 5 days, to analysis the colour degradation after the photodegradation process and to observe the conductivity of extracted natural dye from plant waste before and after photodegradation. The method use is extraction of natural dye from plant waste which is fresh *acalypha* leaves using water and methanol as solvents. The physical observation for colour of the dye and conductivity value was measured. The conductivity reading show that extraction for 5 days with 4.56mS/cm for water and 1174 $\mu$ S/cm for methanol is the highest while the lowest conductivity value is extracted for 1 day with 4.53mS/cm for water and 997 $\mu$ S/cm for methanol. From this result, it can be concluded that the extracted natural dye for 5 days is the darkest colour compare to others due to longer time of extracted natural dye and have the highest of conductivity value due to well absorption ability of sunlight.

# TABLE OF CONTENTS

	<b>Page</b>
<b>AUTHOR'S DECLARATION</b>	<b>2</b>
<b>ABSTRACT</b>	<b>3</b>
<b>TABLE OF CONTENTS</b>	<b>4</b>
 <b>CHAPTER ONE BACKGROUND</b>	 <b>6</b>
1.1 Introduction	6
1.2 Literature Review	8
1.2.1 Natural Dye as Sensitizer	9
1.2.2 Photodegradation	10
1.3 Problem Statement	11
1.4 Objectives	11
1.5 Scope of Study	12
 <b>CHAPTER TWO METHODOLOGY</b>	 <b>13</b>
2.1 Introduction	13
2.2 Materials	14
2.3 Method/synthesis	14
 <b>CHAPTER THREE RESULT AND DISCUSSION</b>	 <b>17</b>
3.1 Result of extraction of natural dye	<b>Error! Bookmark not defined.</b>
3.1.1 Discussion	<b>Error! Bookmark not defined.</b>
3.2 Result of photodegradation process	<b>Error! Bookmark not defined.</b>
3.2.1 Discussion	20
 <b>CHAPTER FOUR CONCLUSION AND RECOMMENDATION</b>	 <b>22</b>
4.1 Conclusion	22
4.2 Recommendation	23

