

**PRODUCTION OF BIODIESEL FROM PALM OIL USING
POTASSIUM IODIDE (KI) SUPPORTED ON ALUMINA BEADS**

NIK AZIRA BINTI MOHD NOR

**Final Year Project Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA**

JANUARY 2019

ABSTRACT

PRODUCTION OF BIODIESEL FROM PALM OIL USING POTASSSIUM IODIDE (KI) SUPPORTED ON ALUMINA BEADS

The growing demands for alternative fuels with the environmental problems motivate the research to create biodiesel fuel from non-renewable sources. The process of transforming palm oil into biodiesel is called transesterification reaction. Transesterification is a process where three mole of alcohol (methanol) and one mole of triglyceride to produce one mole of glycerol and three mole of fatty acid methyl ester. Transesterification of palm oil was carried out over potassium iodide supported by alumina beads with addition of nickel-dopant (Ni/KI/Al₂O₃) and without addition of nickel-dopant (KI/Al₂O₃). The objectives of this study are to produce biodiesel from palm oil catalyzed by potassium iodide supported (KI) by alumina beads with addition of nickel-dopant (Ni/KI/Al₂O₃) and without addition of nickel-dopant (KI/Al₂O₃) and to determine the effect of mass of catalysts on the yield of biodiesel produced from palm oil. The higher percentage FAME yield was obtained by Ni/KI/Al₂O₃. The optimum percentage FAME yield of Ni/KI/Al₂O₃ was 42.1% from 4 g mass of catalyst, while for KI/Al₂O₃ was 40.4% from 5 g mass of catalyst, reaction temperature 65°C for 5 hours. The addition of nickel-dopant on catalyst support was enhanced the catalytic activity. The types of fatty acid methyl ester in palm oil were determined by using GC-MS which is lauric acid (C12:0), myristic acid (C14:0) and palmitic acid (C16:0). It can be concluded that Ni/KI/Al₂O₃ has higher percentage FAME yield than KI/Al₂O₃.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACK	ix
ABSTRAK	x
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Objectives of the study	3
1.3 Problem statement	3
1.4 Significant of study	4
CHAPTER 2 LITERATURE VIEW	
2.1 Biodiesel	6
2.2 Palm oil	7
2.3 Palm oil industry in Malaysia	8
2.4 Transesterification reaction	9
2.5 Type of catalysts	10
2.6 Alumina beads	12
2.7 Addition of Nickel dopant	14
2.8 Gas Chromatography-Mass Spectrometry (GC-MS)	17
CHAPTER 3 METHODOLOGY	
3.1 Materials	19
3.1.1 Raw chemicals and reagents	19
3.1.2 Apparatus	19
3.1.3 Instrumentations	19
3.2 Preparation of catalysts	20
3.3 Transesterification reaction	20
3.4 Characterization of biodiesel	22
CHAPTER 4 RESULT AND DISCUSSION	
4.1 Catalytic activities of catalysts	23
4.2 Effect of mass of catalyst	24
4.3 Effect of Nickel-dopant on catalyst	26
4.4 Fatty acid methyl ester (FAME) composition	27

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS	
5.1 Conclusion	32
5.2 Recommendations	33
CITED REFERENCES	34
APPENDICES	38
<i>CURRICULUM VITAE</i>	46

LIST OF TABLES

Table	Caption	Page
2.1	Effect of the catalyst properties and reaction condition in the yield	16
4.1	Composition of palm oil in biodiesel	29