

BLENDING BIODIESEL-DIESEL FROM SOYBEAN OIL

MOHAMMAD DANISH AHNAF BIN FAIZUL AZLAN

**BACHELOR OF SCIENCE (Hons.) CHEMISTRY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

JANUARY 2020

TABLE OF CONTENTS

	Page
Acknowledgments	iii
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	ix
ABSTRACT	xi
ABSTRAK	xii
CHAPTER 1 INTRODUCTION	1
1.1 Background of the study	1
1.2 Problem statement	4
1.3 Significant of study	5
1.4 Objectives of the study	5
CHAPTER 2 LITERATURE REVIEW	7
2.1 New Renewable Sources	7
2.1.1 Biodiesel	8
2.2 Biodiesel properties	11
CHAPTER 3 METHODOLOGY	14
3.1 Sample	14
3.2 Chemical	14
3.3 Preparation of Biodiesel	15
3.4 Washing Of Biodiesel	16
3.5 Drying Of Biodiesel	17
3.6 Blending Of Diesel-Biodiesel	17
3.7 Characterization Of Diesel-Biodiesel Blends	18
3.7.1 Acidity Test	18
3.7.2 Peroxide Value Test	20
3.7.3 Moisture Content	21
3.7.4 Flash Point	22
3.7.5 Viscosity	22
3.7.6 Density	22
3.8 Instrumental Analysis	23
3.8.1 Gas Chromatography Analysis	23

3.8.2	Inductively Coupled Plasma Optical Emission Spectrometry Analysis	24
CHAPTER 4 RESULTS AND DISCUSSION		25
4.1	Qualitative Analysis	25
4.1.1	GC Analysis	25
4.1.2	ICP-OES As Metal Analyzer	26
4.2	Characterization Of Diesel-Biodiesel Blends	28
4.2.1	Acidity Test	28
4.2.2	Peroxide Value Test	30
4.2.3	Moisture Content	32
4.2.4	Flash Point	33
4.2.5	Viscosity	35
4.2.6	Density	36
4.2.7	Summarize Of Result	38
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS		39
5.1	Summary	39
5.2	Future research	40
CITED REFERENCES		42
APPENDICES		46
CURRICULUM VITAE		47

LIST OF TABLES

Table	Caption	Page
1.1	Common FAME produced from palm oil	10
3.1	Volume of biodiesel and diesel for blends	20
4.1	K ⁺ Analysis in sample blending biodiesel	26
4.2	Volume potassium hydroxide used in titration	28
4.3	Volume sodium thiosulphate used in titration	30
4.4	Summary of Result	38

ABSTRACT

BLENDING BIODIESEL-DIESEL FROM SOYBEAN OIL

Biodiesel is a substitute with is a toxic-free with small outflow profile, biodegradable and does not commit to environmental pollution. Biodiesel is characterized as a fuel that comprises of mono-alkyl esters of long-chain unsaturated fats acquired from sustainable sources which pursues the determinations as per American Standard Testing Material D6751 before it is assigned as B100 or unadulterated biodiesel. Generation of biodiesel usually utilized base-catalyzed transesterification process. The response temperature is steady at 60 °C all through the procedure. The most efficiency condition which delivered the best return of 85.8 % FAME substance was 9:1 methanol to oil proportion with catalyst loading of 1.5 wt.% and response time of 60 min. A progression of diesel-biodiesel mixes of B5, B7, B10, B15 and B20 is then arranged by blending the biodiesel arranged with unadulterated diesel. Each mix is then tested to decide its acidity, peroxide value, density, viscosity, moisture content and flash point. As for the acidity test, the B20 has the highest value of 0.31 mgKOH/g and as the biodiesel content increase in each blend, the acid value also increase accordingly. Peroxide value test also points out that B20 has the highest value of 8.60 meq/kg and the peroxide cost increase as the biodiesel content material in each blend increase. As for moisture content, flash point, viscosity and density, B20 have the best possible value of 0.07%, 90 °C, 2.5758 m²/s, and 0.8497 g/cm³ respectively. B5, B7, B10, B15, and B20 indicates increment in the value of each blend as the biodiesel content increase. The correlation coefficient of the relationship between acid value, peroxide value, moisture content, density and viscosity are 0.9325, 0.9046, 0.9613, 0.6462 and 0.6401 respectively. The pure diesel shows a lower value in acidity, peroxide value, density and viscosity in contrast to other blending biodiesel-diesel.