

**ENRICHMENT OF UNSATURATED FATTY ACIDS FROM
PALM OIL BY MEANS OF SOLUBILITY DIFFERENCE**

NOOR AZMIRA BINTI MOHD ALWI

**Final Year Project Report 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**

JULY 2019

TABLE OF CONTENTS

	Page
TABLE OF CONTENTS	IV
LIST OF TABLES	VI
LIST OF FIGURES	VII
LIST OF ABBREVIATIONS	VIII
ABSTRACT	IX
ABSTRAK	X
CHAPTER 1 INTRODUCTION	1
1.1 Background of study	1
1.2 Problem statement	3
1.3 Significant of study	4
1.4 Objective of study	4
CHAPTER 2 LITERATURE REVIEW	5
2.1 Composition of fatty acids	5
2.1.1 Palm oil	5
2.1.2 Rapeseed oil/ Canola oil	7
2.2 Uses of unsaturated fatty acids	8
2.3 Techniques for purification of fatty acids	9
CHAPTER 3 METHODOLOGY	11
3.1 Raw materials	11
3.2 Chemical	11
3.3 Apparatus	11
3.4 Instrument	12
3.5 Method	12
3.5.1 Sample	12
3.5.2 Saponification of palm oil	12
3.5.3 Methanol crystallisation	12
3.5.4 Preparation of methyl esters	13
3.5.5 Analysis with GC-MS	14
CHAPTER 4 RESULTS AND DISCUSSION	15
4.1 Determination of fatty acids in FFA	15
4.2 Separation of unsaturated fatty acids	17
4.3 Unsaturated fatty acid composition	20

CHAPTER 5 CONCLUSION AND RECOMMENDATION	22
5.1 Conclusion	22
5.2 Recommendation	23
CITED REFFERENCES	24
APPENDICES	27
CURRICULUM VITAE	33

LIST OF TABLES

Table	Caption	Page
4.1	Standard retention time	16
4.2	Fatty acid composition (%) of palm oil	17
4.3	Composition of saturated and unsaturated in ratio FFA with 10g methanol 9w/w)	19
4.4	Peak area of FFA in palm oil	27
4.5	Percentage of FFA in palm oil	28
4.6	Average percentage of FFA in palm oil	28

ABSTRACT

ENRICHMENT OF UNSATURATED FATTY ACIDS FROM PALM OIL BY MEANS OF SOLUBILITY DIFFERENCE

Palm oil undergo saponification process with ethanolic sodium hydroxide to break the triglycerides into free fatty acids (FFA) and glycerol. Then, the FFA was crystallize with methanol by using methanol crystallisation method based on one parameter which is solubility difference. The crystallisation of FFA with methanol (w/w) varies in ratio starting from 0.5:10 (g/g), 1.0:10 (g/g), 1.5:10(g/g), 2.0:10 (g/g) and 2.5:10 (g/g). The mixture was crystallise in refrigerator with temperature -5°C until -8°C . After that, the mixture was separated using Buchner funnel in reduced pressure. The solution part was collected and dried in fume hood before undergo methylation technique. FFA was converted into FAME by methylation and analyse with GC-MS to obtain percentage of fatty acid. Based on the ratio, the optimum condition for FFA to soluble in methanol was 1.5:10 (g/g). The major unsaturated fatty acid that contain in palm oil were oleic acid and linoleic with percentage of 61.71% and 15.79% respectively. Besides that, the minor amount of saturated fatty acids also observed with percentage 20.77% for palmitic acid and 1.73% for stearic acid.