

**EXTRACTION AND CHARACTERIZATION
OF LIPASE FROM SEED OF
*ARACHIS HYPOGAEA L.***

SITI NOR ZULAIHA BT ZAKARIYA

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirement for the
Degree of Bachelor of Science (Hons.) Chemistry
In the Faculty of Applied Science
Universiti Teknologi Mara**

JANUARY 2017

ABSTRACT

Production cost of microbial lipase enzyme is high and industrial scale is still limited due to high production costs. Seeds are commonly productive in triacylglycerols, which act as compact source of energy for the fresh nascent plant. Therefore, seed lipase from *Arachis hypogaea L* was introduced as biocatalyst due to low cost. Germinated and ungerminated *Arachis hypogaea L*. seeds is use to determine the enzyme activity and selectivity by using a mix substrate (coconut oil and cooking oil). Base-methylation and acid methylation process were used to convert the free fatty acid (FFA) to fatty acid methyl ester before analyze with gas chromatography (GC-MS). Particularly, the eight dominant fatty acids in both seed show a change in percent of fatty acids after hydrolyze and it prove that the enzyme in the both seeds are selective. Both of the seeds shows that their enzyme selectivity is more toward oleic acid which have high percent change after hydrolyze. Fatty acid shows the highest percentage in germinate seed compare to ungerminated seed. Enzyme activity of peanut seed lipase show that the lipase more active in germinate seed compare to ungerminated seed. Germinate seed lipase shows a great enzyme activity because rate controlling of lipase in the middle of germination and the activity of the lipase is great during that time.

TABLE OF CONTENT

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENT	iv
LIST OF TABLES	vii
LIST OF FIGURE	viii
LIST OF ABBREVIATIONS	iv
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.0 Background of study	1
1.1 Problem statement	2
1.2 Significant of study	2
1.3 Objectives of study	2
CHAPTER 2 LITERATURE REVIEW	3
2.1 Relative activity	6
2.2 Extraction and Characterization of lipase from various seed	7

CHAPTER 3 METHODOLOGY

3.0 Materials	10
3.1 Apparatus	11
3.2 Raw materials	11
3.3 Instrument	11
3.4 Sampling method	12
3.5 Preparation of substrate	12
3.6 Preparation of lipase powder extracts	12
3.7 Standardization of 0.05 mol NaOH solution	12
3.8 Determination of lipase activity	14
3.9 Determination of acid profile of FFAs	16
3.9.1 Extraction and separation of FFAs	16
3.9.2 Preparation of FAME	
i) base-methylation	17
ii) acid-methylation	18
3.9.3 Gas chromatography (GC) analysis	18

CHAPTER 4 RESULT AND DISCUSSION

4.1 Characterization of lipase	
4.1 Lipase activity in hydrolysis of oil	20
4.2 Lipase selectivity	22
4.3 Average percentage of FFA in mix oil substrate	25

CHAPTER 5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion 27

5.2 Recommendation 28

CITE REFERENCES 31

APPENDICES 34

CURRICULUM VITAE 39