

ENZYMATIC HYDROLYSIS EXTRACTION AND
QUALITY ASSESSMENT OF FISH OIL FROM PATIN
CATFISH (*PANGASIUS HYPOPHthalmus*)

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2018

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by

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Report submitted in partial fulfillment
of the requirements for the degree
of Bachelor of Chemical Engineering Technology



MARCH 2007

ACKNOWLEDGEMENT

First and foremost, I would like to express my deepest thanks to my supervisor Madam Nur Izzati Bte Iberahim for her continuous guidance, knowledge, motivation and support in every part of my final year project which is “Enzymatic hydrolysis extraction and quality assessment of fish oil from Patin catfish (*Pangasius hypophthalmus*)”. Without her willingness to guide and help me in finishing my whole report, I will not be able to start the project. I am so grateful to have her as my mentor sharing her experiences throughout my final year project.

Besides, a sincere gratitude to Madam Amira Farzana Binti Samat, a coordinator for my project giving me guidance for the thesis and proposal writings. Furthermore, I would like to thank Dr. Noorulnajwa Diyana bt Yaacob, Madam Nur Zatul ‘Iffah bt Zakaria and Mr. Johan Ariff Mohtar as my research panel. The precious guidance from them in correcting my mistakes for the proposal are extremely valuable to deepen my knowledge in this project.

Lastly, I would like to thank all my family members especially Mr. and Mrs. Indera, my inspiration; Aiman Sanusi and my friends; Amalin ‘Aisyah, Zulaikha Hanim, Amirah Farah and Amirah Adilah for their fully support and encouragement to finish my project.

APPROVAL AND DECLARATION SHEET

This project report titled Enzymatic Hydrolysis Extraction and Quality Assessment of Fish Oil From Patin catfish (*Pangasius hypophthalmus*) was prepared and submitted by Nur Izzaidah binti Muhammad Indera (Matrix Number: 151282525) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Chemical Engineering Technology (Industrial Biotechnology) (Hons) in Universiti Malaysia Perlis (UniMAP).

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December 2018

PENGEKSTRAKAN ENZIMATIK HIDROLISIS DAN PENILAIAN KUALITI MINYAK IKAN DARIPADA IKAN PATIN (*Pangasius hypophthalmus*)

ABSTRAK

Enzimatik hidrolisis merujuk kepada hidrolisis proses dimana ikatan di dalam molekul mudah dipisahkan oleh enzim dengan adanya bantuan daripada air. Alcalase telah digunakan sebagai sumber enzim untuk mendapatkan peratus minyak yang terhasil. Parameter yang dipilih ialah kepekatan enzim (0.5%-1.5% v/v), suhu (35°C-75°C) dan masa tindak balas (1 jam-3 jam). Proses pemulihan minyak daripada ikan Patin (*Pangasius hypophthalmus*) dioptimum menggunakan enzimatik hidrolisis dibantu oleh perisian multifaktor eksprimen, Reka bentuk Eksperimen (DoE) menghasilkan kondisi optimum untuk peratus minyak yang terhasil pada 55.3°C dengan menggunakan 1.2% kepekatan enzim selama 3 jam. Peratus minyak yang terhasil ialah 10.90%. Minyak ikan tersebut seterusnya dicirikan menggunakan analisis FTIR pada 4000-700cm⁻¹. Penyelidikan terhadap kualiti minyak ikan telah dibuat berdasarkan ujian analisis. Nilai asid memberikan 2.24 mg KOH/g, nilai peroksida pada 4 meq/kg, *p*-anisidin memberikan 0.895 dan nilai komposisi asid lemak sebanyak 0.81%

ABSTRACT

Enzymatic hydrolysis refers to the process of hydrolysis where bonding in molecules are cleaved easily by enzymes with the aid of water elements. In this research, Alcalase was used as the source of enzyme to obtain the oil yield percent. The selected parameters were the concentration of enzyme (0.5%-1.5% v/v), the temperature (35°C-55°C) and the reaction time (1 hour-3 hours). The optimization of the recovery process of Patin catfish (*Pangasius hypophthalmus*) oil using enzymatic hydrolysis technique was done with the aid of a multifactor experiments software, Design of Experiments (DoE) giving an optimum condition for the oil yield percent at 55.3°C with 1.2% enzyme concentration for 3 hours long. The percent of oil yield obtained was 10.90%. The fish oil were further characterized by FTIR spectroscopy analysis at 4000-700cm⁻¹. The investigation of the quality of the oil were conducted based on analysis test. The acid value test gives 2.24 mg KOH/g, peroxide with 4 meq/kg, *p*-anisidine analysis leads to 0.895 and value for fatty acid composition was 0.81%.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	i
APPROVA AND DECLARATION SHEET	ii
ABSTRAK	iii
ABSTRACT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER 1 INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Research Objectives	5
1.3.1 General Objective	5
1.3.2 Specific Objectives	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Overview	6
2.2 Patin catfish (<i>Pangasius hypophthalmus</i>)	7
2.3 Fish Oil	8
2.3.1 Alpha-linolenic Acid	9
2.3.2 Docosahexaenoic Acid	10

2.3.3	Eicosapentaenoic Acid	10
2.4	Extraction Methods	10
2.4.1	Enzymatic Hydrolysis	10
2.4.2	Supercritical Fluid Extraction	12
2.4.3	Microwave-Assisted Extraction	13
2.4.4	Ultrasonic-Assisted Extraction	14
2.4.5	Conventional Extraction	14
2.4.6	Traditional Method	15
2.5	Parameters affecting enzymatic hydrolysis	19
2.5.1	Reaction Time	19
2.5.2	Concentration of Alcalase	19
2.5.3	Temperature	20
2.6	Optimization	21
2.7	Quality Analysis	22
2.7.1	Acid Value	22
2.7.2	Peroxide Value	22
2.7.3	<i>p</i> -Anisidine Value	23
2.7.4	Fatty Acid Composition	24

CHAPTER 3 METHODOLOGY

3.1	Flowchart	25
3.2	Experimental Material	26
3.2.1	Fish Sample	26
3.2.2	Description of Apparatus	26
3.2.3	Description of Equipment	27
3.2.4	Description of Enzyme	28
3.2.5	Description of Chemical and Reagent	28
3.3	Experimental Procedure	30
3.3.1	Sample Preparation	31
3.3.2	Enzymatic Hydrolysis of Fish Oil	31

3.4	Optimization of Oil Yield Extraction	32
3.5	Experimental Analysis	33
3.5.1	Determination of Acid Value	33
3.5.2	Determination of Peroxide Value	34
3.5.3	Determination of Lipid Yield	35
3.5.4	Determination of <i>p</i> -anisidine Value	35
3.5.5	Determination of Fatty Acid Composition	36
3.5.6	FTIR Spectroscopic Analysis	37

CHAPTER 4 RESULTS AND DISCUSSION

4.1	Statistical Analysis for Optimization Study	38
4.1.1	Development of Regression Model	40
4.1.2	Optimal Response Condition and Validation Test	48
4.2	Fourier Transform Infrared (FTIR) Spectroscopy Analysis	49
4.3	Determination of oil quality analysis	53
4.3.1	Acid Value	53
4.3.2	Peroxide Value	53
4.3.3	<i>p</i> -Anisidine Value	54
4.3.4	Fatty Acid Composition	54

CHAPTER 5 CONCLUSION

5.1	Summary	55
5.2	Future Recommendation	56
5.3	Commercialization Potential	57

REFERENCES	58
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APPENDICES

Appendix A	62
Appendix B	63

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LIST OF TABLES

Tables No.		Page
2.1	Taxonomic Hierarchy of <i>P. hypophthalmus</i> .	7
2.2	Extraction methods, advantages and disadvantages	16
3.1	Apparatus and functions	26
3.2	Equipment and functions	27
3.3	Enzyme and function	28
3.4	Chemical, reagent and functions	28
3.5	The ranges of parameters	32
4.1	Actual and coded values of the process parameter CCD	39
4.2	Complete design matrix and its response of parameters in CCD	39
4.3	ANOVA for Response Surface Quadratic model	42
4.4	The predicted and experimental value of optimum condition for validation test	48
4.5	Functional groups presence in fish oil sample using FTIR	52
4.6	Summary of the analysis value	54

LIST OF FIGURES

Figures No.	Page
2.1 Physical appearance of <i>Pangasius hypophthalmus</i> .	7
3.1 Overall flow of the fish oil extraction process.	25
3.2 Enzymatic hydrolysis for the extraction of fish oil.	30
4.1 The graph of predicted VS actual value.	40
4.2 (a) 2-Dimensional response surface graph on enzymatic hydrolysis using Alcalase for oil extraction as a function of concentration of enzyme (%) and temperature (°C) at constant reaction hour.	45
(b) 3-Dimensional response surface graph on enzymatic hydrolysis using Alcalase for oil extraction as a function of concentration of enzyme (%) and temperature (°C) at constant reaction hour.	46
4.3 3-dimensional response surface graph of extraction of Patin catfish oil yield percent as a function of reaction hour (hr) and temperature using constant enzyme concentration.	47
4.4 FTIR spectrum of Patin catfish oil.	51