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

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by

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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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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 analysis 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%.

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