SCREENING FOR LIPASE ACTIVITY FROM MD 018

BACTERIA ISOLATED FROM SOIL SAMPLES

NUR AZIAN BT AHMAD

FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU
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SCREENING FOR LIPASE ACTIVITY FROM MD018 BACTERIA ISOLATED FROM CORAL MUCUS

By

Nuur Aziani Bt Ahmad

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **SCREENING FOR LIPASE ACTIVITY FROM MD018 BACTERIA ISOLATED FROM CORAL MUCUS** oleh **NUUR AZIANI BINTI AHMAD**, no. matrik: **UK 9938** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah **SARJANA MUDA SAINS (SAINS BIOLOGI),** Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

Disahkan oleh: / Verified by:

.....

Penyelia Utama / *Main Supervisor*

Nama: DR. MARIAM TAIB
Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu.

Cop Rasmi

Tarikh: 10/5/07

.....

Penyelia Kedua (jika ada) / *Co-Supervisor (if applicable)*

Nama: DR. AZIZ AHMAD
Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu.

Cop Rasmi

Tarikh: .....

.....

Ketua Jabatan Sains Biologi /*Head, Department of Biological Sciences*

Nama:

Cop Rasmi: DR. AZIZ BIN AHMAD
Ketua
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Tarikh: 10/5/2007

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LIST OF ABBREVIATIONS

cm	-	Centimeter
FFA	-	Free fatty acid
g	-	Gram
ml	-	Milliliter
mm	-	Millimeter
M	-	Molar
NaCl	-	Sodium chloride
NaOH	-	Sodium hydroxide
OD	-	Optical density
rpm	-	Rotation per minute
sp	-	Species
w/v	-	Weight/volume
µg	-	Microgram
µl	-	Microliter
°C	-	Celcius
%	-	Percentage

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ABSTRACT

The study of lipase enzyme has received vast attention because of its significance for efficient bioconversion of lipase residues into useful products in industries. At the moment, there are very few studies focusing on lipid-degrading enzymatic activities of marine bacteria. In this study, the ability to produce this enzyme by marine bacteria MD018, which was isolated from the mucus of *Aeropora cervicornis* coral at Bidong Island, Terengganu was investigated was confirmed the identification of the bacteria by several biochemical tests based on their morphological and phenotypic characteristics were carried out. The results suggested that the bacteria is *Citrobacter* sp. Three different media have been tested to determine the best culture medium for induction: Nutrient Broth in distilled water; Nutrient Broth in sea water and ZoBell's Modified Broth medium. ZoBell's Modified Broth medium was found to promote the highest bacterial growth. The induction of lipase was carried out using olive oil as substrate. Several reaction parameters on lipase activity such as incubation time, temperature and amount of substrate were investigated. Free fatty acids released after 24 hours incubation was significantly higher ($p<0.05$) compared to other incubation times. There were no significant differences observed ($p>0.05$) for different temperatures and amount of substrates. Therefore, the optimum condition chosen for this study was 24 hours incubation time using 77 μg/ml of enzyme in the assay, while the optimum temperature and amount of substrate could not yet be determined. These results nevertheless indicate that *Citrobacter* sp. is capable to produce lipase under suitable conditions. Further investigation involving molecular identification and several other parameters is recommended to ensure highest yield of lipase production.

PENYARINGAN AKTIVITI ENZIM LIPASE DARI BAKTERIA MD018 DIPENCILKAN DARI MUKUS KARANG

ABSTRAK

Kajian tentang enzim lipase telah mendapat perhatian yang meluas kerana kepentingannya yang berkaitan dengan keberkesanan biopenukaran 'residue' lipase kepada produk dalam industri. Pada masa kini, terdapat hanya sedikit kajian yang memberi fokus kepada enzim dari bakteria marin. Dalam kajian ini, bakteria marin yang digunakan adalah MD018 bakteria yang telah dipencilkan dari mukus karang *Aeropora cervicornis* di Pulau Bidong, Terengganu. Untuk mengesahkan identifikasi bakteria, beberapa ujian biokimia berdasarkan ciri-ciri morfologi dan fenotip telah dijalankan. Keputusan yang diperolehi mencadangkan identiti bakteria ini sebagai *Citrobacter* sp (MD018). Tiga media berlainan telah diuji dalam mengenalpasti media terbaik untuk proses induksi enzim lipase. Medium yang terbaik adalah medium ZoBell yang telah dimodifikasi. Penghasilan lipase dijalankan dengan menggunakan minyak zaitun sebagai substrat. Parameter yang digunakan dalam mengkaji keadaan optimum penghasilan lipase adalah masa pengeraman, suhu dan jumlah substrat. Asid lemak bebas dibebaskan selepas 24 jam masa pengeraman menunjukkan signifikan yang lebih tinggi berbanding dengan masa pengeraman yang lain. Tiada signifikan yang berbeza didapati untuk suhu dan jumlah substrat yang berlainan. Oleh itu, keadaan optimum yang dipilih untuk kajian ini adalah 24 jam masa pengeraman menggunakan 77 μg/ml enzim dalam asai lipase, sementara suhu dan jumlah substrat yang optimum tidak dapat ditentukan. Namun begitu, keputusan yang diperolehi ini menunjukkan bakteria *Citrobacter* sp. berpotensi menghasilkan enzim lipase dalan keadaan yang sesuai. Kajian selanjutnya perlu dilakukan dengan mengkaji identifikasi molekular dan beberapa parameter yang lain untuk meningkatkan penghasilan enzim lipase.