

GRANULAR FERTILIZER OIL BACTERIAL
ON CRUDE OIL

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GROWTH OF A THERMOPHILIC OIL BACTERIUM ON CRUDE OIL

By

Ooi Boon Leong

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the requirements for the degree of
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**Department of Marine Science
Faculty of Maritime Studies and Marine Science
UNIVERSITY MALAYSIA TERENGGANU**

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**JABATAN SAINS MARIN
FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN
UNIVERSITI MALAYSIA TERENGGANU**

**PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

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Disahkan oleh:

Penyelia Utama

Nama: Prof. Dr. Law Ah Theem

Cop Rasmi: **PROF. DR. LAW AH THEEM**
Pensyarah
Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Kolej Universiti Sains dan Teknologi Malaysia
(KUSTEM)

Tarikh: 24/4/07

Ketua Jabatan Sains Marin

Nama: Dr. Razak Zakariya

Cop Rasmi:

DR. RAZAK ZAKARIYA
Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
(UMT)

Tarikh: 5/12/07

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LIST OF ABBREVIATIONS

km ²	-	kilometres square
km	-	kilometres
%	-	Percentages
°F	-	Degrees Fahrenheit
°C	-	Degrees Celsius
mm	-	Millimetres
cm	-	Centimetres
UV	-	Ultraviolet
m	-	Meters
mL	-	millilitre
μL	-	microlitre
DCM	-	dichloromethane
cm ²	-	centimetre square
mg	-	milligram
g	-	gram
v/v	-	volume per volume
mL.min ⁻¹	-	millilitre per minute
g.m ⁻¹	-	gram per meter
ng.mg ⁻¹	-	nanogram per milligram
[C]	-	concentration
ppm	-	part per million

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ABSTRACT

A thermophilic, oil degradation bacterium was isolated from tar-balls stranded on the beach of Kuala Terengganu. This isolate is known as TAC-O at present. TAC-O is a bacterium that has the ability to utilize the hydrocarbons as the sole carbon source and it is a thermophilic bacterium that has the ability to grow at temperature that is higher than normal ($>50^{\circ}\text{C}$). Thermophilic bacterium is one of the essential requirements in bioremediation of oil contaminated sand on beaches as its surface temperature may reach to 60°C in the afternoon that may kill all the others non heat resistant bacteria. In this study, the basic characteristics of the bacteria were studied. The specific growth rate of TAC-O at temperatures of 30°C , 40°C , 50°C and 60°C was studied to evaluate its optimum growth temperature. The result shows that the optimal temperature for growth was at 41°C . The specific growth rate of TAC-O at temperature of 30°C , 40°C , 50°C and 60°C were 0.026 hr^{-1} , 0.073 hr^{-1} , 0.064 hr^{-1} and 0.055hr^{-1} respectively. As for the degradation of crude oil, 30°C shows 42.7% of oil removal with a rate of $0.27\text{ mgL}^{-1}\text{hr}^{-1}$. At 40°C , it removed 50% of crude oil with a rate of $0.34\text{mgL}^{-1}\text{hr}^{-1}$. As temperature increased further, it could remove 25.0% of crude oil with a rate of $0.14\text{mgL}^{-1}\text{hr}^{-1}$ at 50°C and removal of 5% oil with a rate of $0.054\text{mgL}^{-1}\text{hr}^{-1}$ at 60°C . In addition, the optimum oil degradation rate was found at 37°C . Thus, TAC-O bacterium possesses a very high potential for degrading (clean-up) crude oil that contaminated the beach.