Growth of a thermophilic oil bacterium on crude oil / Ooi Boon Leong.

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Lihat sebelah

GROWTH OF A THERMOPHILIC OIL BACTERIUM ON CRUDE OIL

By

Ooi Boon Leong

Research report submitted in partial fulfillment of

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PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:
Growth of a thermophilic oil bacterium on crude oil oleh Ooi Boon Leong, No. Matrik: UK 9605 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda (Biologi Marin), Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

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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°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 $mgL^{-1}hr^{-1}$. At 40°C, it removed 50% of crude oil with a rate of 0.34$mgL^{-1}hr^{-1}$. As temperature increased further, it could remove 25.0% of crude oil with a rate of 0.14$mgL^{-1}hr^{-1}$ at 50°C and removal of 5% oil with a rate of 0.054$mgL^{-1}hr^{-1}$ 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.