

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME IV

Editors:

Ma'an Alkhatib
Abdullah Al Mamun
Faridah Yusof



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(VOLUME IV)

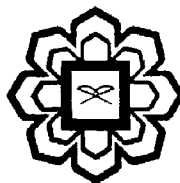
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Faridah Yusof

**Department of Biotechnology Engineering
Faculty of Engineering
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CHAPTER 29

ISOLATION OF BACTERIA FROM OIL-CONTAMINATED SOIL FOR CRUDE OIL DEGRADATION

Ma'an Alkhatib, Humaidah Bt Dr Hj Muhammad Nur Lubis, Alade Abass Olanrewaju

Department of Biotechnology Engineering, Faculty of Engineering, International Islamic University Malaysia, Gombak, 50728 Kuala Lumpur, Malaysia.

ABSTRACT

Crude oil (petroleum) contamination is inevitable and it may occur through oil-shipping disasters, pipeline ruptures, tank leakages or accidents. The adverse effects of crude oil contamination include polluted seas, marine life poisoning and suffocation, groundwater contamination, and land infertility. In the biological method for oil spill clean-up, or bioremediation, microorganisms are used to break down the contaminants without leaving any harmful residues. For this final year project, crude oil contaminated soil was used to isolate bacteria with the ability to degrade crude oil. A total of 10 strains were isolated and they were grown on MSM agar plates and filter paper soaked with crude oil was placed on each plate cover. A control plate without crude oil showed no bacterial growth and this proved that the strains had utilized crude oil hydrocarbons as the sole source of carbon and energy. Isolates were grown in shake flask to determine their optical density (OD) for 1 week. The temperature was kept constant at 37°C and the agitation speed was 200 rpm. All of the strains are cocci, gram negative, catalase positive and vegetative bacteria

Keywords: crude oil, bioremediation, microorganisms, cocci

INTRODUCTION

Oil spilled into the sea not only pollutes the water but it has an immediate and dangerous impact on marine fauna (Onwurah et al., 2007). Soil contamination on the other hand could result in oil leaching into the ground and contaminate groundwater or adjacent water bodies (Alquati et al., 2005; Coral and Karagoz, 2005; Rahman et al., 2002). This creates a health risk not only on humans but also on animals which rely on the natural source of water. Moreover, oil contamination on land has a negative effect on agriculture (Baek et al., 2004; Njoku et al., 2008; Onwurah et al. 2007). Therefore, it is vital to protect the soil and waters from such pollution and to clean the contaminated sites. In an article written by Popp et al. (2006), it is mentioned that the treated soil should at least be applicable for low purity requirements purposes, such as road construction or recultivation of industrial areas.

Unfortunately, mechanical clean-up is expensive, labor intensive and inefficient (El-Nemr, 2006). On the other hand, use of chemical dispersants to mitigate the oil contamination problem comes with its own problem. Early formulations of dispersants are toxic to animals and algae (Katsouros, 1992; El-Nemr, 2006). Modern dispersants are less toxic, but they are