Journal of Applied Biosciences 165: 17120 – 17154
ISSN 1997-5902

The biodegradative capability of two selected microorganisms for vegetable oil contaminated soil.

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Submitted on 14th July 2021. Published online at www.m.elewa.org/journals/ on 30th September 2021
https://doi.org/10.35759/JABs.165.8

ABSTRACT

*Objectives***:** The need to assess the bio-potentials of microorganisms for the treatment of vegetable oil-polluted sites is important. This study was carried out to monitor the pattern of degradation of vegetable oil in the laboratory.

Methodology and Results: Microbial load and concentration of the olive oil were monitored in two Mineral Salt Media. The first is a composition of (g/L) of KH_2PO_4, 7.584; K_2HPO_4, 0.80; $MgSO_4.7H_2O$, 0.80; $CaCl_2$, 0.16; $(NH_4)_2NO_3$, 0.80; $FeSO_4$, 0.16; and Olive oil 2%, while the second consist of (g/L) of KH_2PO_4, 7.584; K_2HPO_4, 0.80; $MnSO_4.4H_2O$, 0.80; NaCl, 0.16; $(NH_4)_2NO_3$, 0.80; $Fe_2(SO_4)_3$, 0.08 and Olive oil 2%. Degradation profiles of the fatty acid were determined using gas chromatography. The obtained data were analysed using ANOVA.

The total viable plate counts, 8.8 ± 0.03 and 10.3 ± 0.03, were ($P < 0.05$) significantly low on day 5 for both organisms compared to other days analysed. The residual oil degraded by *P. fluorescens* significantly ($P < 0.05$) reduced in concentration on day 15 (0.0031 mol/L) compared to day 0 (0.0064 mol/L). The percentage reduction of fatty acid by the two microorganisms' *P. fluorescens* and *C. parapsilosis* after 20 days was 8.2 % and 6.7 % respectively in the two media used.

Conclusions and Applications of findings: Vegetable oil spills can be challenging and cause havoc to the environment. Microorganisms are useful in protecting the environment and are usually used for the treatment of vegetable oil spills. The degradation ability of the isolates (from vegetable contaminated soil) on olive oil was monitored in the laboratory at five-day intervals for 25 days using two different mineral salt media. It was observed especially with the use of medium 1 in this study that the oil content reduced to the value 0.0031 mol/L (on the 15th day using *Pseudomonas fluorescens* for treatment) from the initial content of 0.0064 mol/L. The lipase enzymes from *Pseudomonas fluorescens* and *Candida parapsilosis* showed great potential for degradation of fatty waste. These isolates could be employed as candidates for in situ environmental clean-up of vegetable oil spill site especially in challenged edible oil producing countries like Malaysia.

Keywords: Vegetable oil spill, Microorganisms, Concentration, Degradation