

Bioremediation potential of *Aspergillus fumigatus* to restore some sites contaminated by used lubricating oil

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Soil contamination with used lubricating oil (ULO) due to anthropogenic activities has become an emerging global environmental issue. Since ULO contains hazardous organic compounds and heavy metals, remediation of ULO contaminated sites is vitally important to ensure environmental and human wellbeing. Bioremediation is a green technological approach that has high potential to be applied as a remediation method for ULO contaminated soils. However, its successfulness depends on the ULO degradation potential of the employed microorganism/s. Therefore, present study aimed to describe isolation, identification, and characterization of a ULO degrading fungi that naturally inhabit ULO contaminated soil as an initial step in the development of microorganism-mediated bioremediation technique. A soil sample exposed to ULO contamination for a long time was collected from the service station of Sri Lanka Transportation Board (SLTB) bus depot in Matara. Total petroleum hydrocarbon content in the collected soil sample estimated by using a gravimetric method was 70100 mg kg⁻¹ (7.01% w/w). Potential ULO degrading fungi were isolated by enrichment culture in mineral salt medium (MS). The ULO degradation potential of fungal isolate was further confirmed by assessing culture characteristics such as radial extension of mycelia, sporulation, pigmentation, and formation of clear zones on MS agar medium coated with 1% w/v ULO. Fungal isolate provisionally identified as *Aspergillus* spp. by using morphological characters and was confirmed as *Aspergillus fumigatus* by sequencing of 16S rDNA. The sequence was deposited in the GenBank database under the accession no MK949124. The results of the microcosm studies showed the biodegradation percentage of the isolate after 35 days of inoculation at 1-5% w/w ULO were 70.09%, 60%, 54.17%, 50.25%, and 49.12% respectively. Therefore, the overall results highlight the potential of *A. fumigatus* isolate to be used in the bioremediation of ULO contaminated soils.

Keywords: bioremediation, biodegradation, used lubricating oil and *Aspergillus fumigatus*

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