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ISOLATION AND IDENTIFICATION OF AZAMETHIPHOS DEGRADING BACTERIA FROM CONTROLLED SOLID WASTE DUMP SITE AT KARADIYANA, COLOMBO

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Abstract

Karadiyana; controlled solid waste dumpsite, is the biggest solid waste dump site in Sri Lanka. Operational practices have caused enormous social and environmental impacts both on environment and residence surrounding the dumpsite. In order to get rid of flies and the unbearable bad odor problem which has become a main public nuisance around the dumpsite and the adjacent villages, the Azamethiphos; an organophosphorus insecticide is used in daily manner. The surrounding of the dumpsite and the adjacent household and nearby stream which flows around the dumping site are more vulnerable to Azamethiphos contamination. The present study was aimed to isolate and identify potential Azamethiphos degrading bacteria from soil and water collected within and surrounding of the dumpsite. Enrichment and isolation of bacteria were carried out according to the standard pour plate and streak plate methods. Overnight bacterial cultures were equalized (0.35), and absorption was measured at 590 nm wavelength. The bacterial suspension was inoculated in 250 µg l-1 of Azamethiphos and incubated at 280C. The concentration of the Azamethiphos in each sample and control was measured by HPLC for 14 days at two days interval. Five potential bacteria which are capable of degrading Azamethiphos were isolated and identified as *Bacillus graminis*, *Corynebacterium* sp., *Enterobactor* sp., *Micrococcus* sp., and *Lactobacillus* sp. by 16S rRNA sequencing. Degradation kinetics revealed that *Corynebacterium* sp. was the fastest degrader having the highest degradation rate (0.681 d^{-1}) with the lowest half lifetime (2 days). Further, all the selected bacteria isolates had a greater degradation (100%) potential after 14 days of incubation. Thus, the results of the study clearly showed the potential of the use of the above bacteria as biodegraders of Azamethiphos in the environment and suggest further studies of bioaccumulation of the chemical.

Keywords: azamethiphos, organophosphorus insecticide, microbial degradation, *Corynebacterium* sp.