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POLYAROMATIC HYDROCARBON DEGRADING ABILITY OF *Bacillus* spp. PHYLLOSPHERE BACTERIA INHABITING URBAN AREAS IN SRI LANKA

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Abstract

Polyaromatic hydrocarbons (PAH) have become one of the common threats that contribute to air pollution. PAH were concerned as major pollutants since their higher carcinogenicity and genotoxicity. Even though there are numerous anthropogenic sources of PAHs, leading sources of PAHs are vehicular emission and oil refinery processes. The discharge of such air pollutants in dense concentrations are getting settled over the phyllosphere through dry and wet deposition and most of the phyllosphere bacteria are able to degrade PAHs. This study is to identify the best PAH degraders in *Bacillus* species and optimization of the method using spectrophotometer and High-Performance Liquid Chromatography (HPLC). Bacterial isolations were carried out by the leaf samples collected from Panchikawatta, Orugodawatta, Pettah, Maradana, Colombo Fort and Sapugaskanda oil refinery sites. Initially, the PAH degradation ability of isolated phyllosphere bacteria was screened using a plate assay. Subsequently, PAH degradation by each bacterial species was analysed using the UV-Vis spectrophotometer and HPLC. The selected bacterial isolates were identified up to species level through PCR amplification and sequencing the amplified 16s rRNA fragments using the primers 1492R and 27F. According to the HPLC confirmation results, the best Anthracene and Phenanthrene degrader was *Bacillus* sp. 1. The most efficient Naphthalene degrader was *B. velezensis*, *Bacillus* sp. P_2B-02 and *B. megaterium* showed 100% of Pyrene degradation capability. All these four Bacillus species had more than 25% of aromatic hydrocarbon degrading ability. The discoveries of the present investigation suggest the potential use of the phyllosphere microorganisms in remediating environment pollutants such as PAH. The *Bacillus* spp. could be useful as potential biological agents in effective bioremediation campaigns in polluted environments contaminated with polyaromatic hydrocarbons.

Keywords*: Phenanthrene, Anthracene, Naphthalene, Pyrene,* bioremediation