

Polyaromatic Hydrocarbons (PAHs) Degradation Ability of *Penicillium* spp. Isolated from Phyllosphere of Urban Areas in Sri Lanka

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Abstract

Polyaromatic hydrocarbons (PAHs), like highly toxic pollutants, are released into the air by various anthropogenic sources, and then they get settled on ground level surfaces as phyllosphere. Phyllosphere is an excellent niche to diverse fungi, and some of them are with PAH degradation capabilities. Out of them, *Penicillium* spp., which are highly abundant in different natural and contaminated atmospheres, have been leading for many research due to their high degree of physiological and genetic adaptation to degrade broad range of polyaromatic compounds. Therefore, this research attempted to determine the PAH (phenanthrene, anthracene, naphthalene and pyrene) degradation capability of phyllosphere inhabited *Penicillium* species. Fungal isolations were done from leaf samples collected from Panchikawatta, Orugodawatta, Pettah, Maradana, Colombo Fort and Sapugaskanda oil refinery sites in Sri Lanka. Isolated *Penicillium* spp. were identified up to genus level through colony morphology and microscopic observations. PAH degradation ability of isolated *Penicillium* spp. was screened using plate assay and confirmed through High Performance Liquid Chromatography (HPLC) analysis. Further, toxicity assays were performed. HPLC analysis results revealed that *Penicillium* sp. 1 showed the efficient degradation on phenanthrene (79%) and naphthalene (78%) while *Penicillium* sp. 2 showed the most efficient degradation on Anthracene (80%) and pyrene (66%) Toxicity assays results revealed that the metabolites of these PAHs degradation mechanism were not toxic for the growth of *Penicillium* spp, and also confirmed that those by-products were not harmful to the phyllosphere. All in all, *Penicillium* spp. showed efficient phenanthrene, anthracene, naphthalene, and pyrene like PAH degradation ability, with more than 54% of PAH degradation. Therefore this phyllosphere *Penicillium* spp. can be used in bioremediation of polluted air in the urbanized areas.

Keywords: Bioremediation, Phyllosphere, High performance liquid chromatography, Phytotoxicity, *Penicillium* spp.

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