Phenanthrene Degradation Ability of *Bacillus* sp. Phyllosphere Bacteria Inhabiting the Urban Areas in Sri Lanka

R.B.N. Dharmasiri[1], A.H.L Nilmini[1], L.J.S. Undugoda[1*], N.N.R.N. Nugara[1], D. Udayanga[1] and M.M. Pathmalal[2, 3]

[1*]*Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka*

[2]*Faculty of Graduate studies, University of Sri Jayewardenepura, Sri Lanka*

[3]*Department of Zoology, University of Sri Jayewardenepura, Sri Lanka*

Remediation of phenanthrene from the environment is essential since its toxic effect. Out of many remediation methods, bioremediation is the most eco-friendly and effective method which can be used to convert toxic substances to nontoxic. There are many phyllosphere microorganisms which have the capability in phenanthrene like polyaromatic air pollutant degradation. This attempt is to isolate, select, and identify the efficient phenanthrene degrading bacteria. Bacteria were isolated using specific leaf samples collected from Panchikawatta, Orugodawatta, Pettah, Maradana, Colombo Fort, and Sapugaskanda in Sri Lanka. Phenanthrene degradation ability of isolated bacteria was screened using plate assay. Phenanthrene degradation ability of each bacterial species was analysed using the UV-Vis spectrophotometer and HPLC. The selected bacterial isolates were identified up to species level by PCR amplification of a fragment of 16S rRNA gene and sequencing the amplified fragments using the primers 1492R and 27F. Four *Bacillus* species *Bacillus* sp. P_2B-02, *Bacillus velezensis*, *Bacillus* sp.1, and *Bacillus megaterium* were able to degrade more than 40% of phenanthrene. Out of these bacteria, *Bacillus sp.*1 (MN190173) was the most efficient bacterial species which was highly capable of degradation of phenanthrene. The *Bacillus* sp. could be useful as a potential biological agent in bioremediation for polluted environments with phenanthrene like polyaromatic hydrocarbons.

Keywords: Phyllosphere, Aromatic hydrocarbon, Bioremediation, Phenanthrene