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# Bioremediation potential of wood-associated fungi in Rajawaka forest reserve, Balangoda

D. M. H. S. K. Nadungamuwa[1], B. T. S. D. P. Kannangara[*1] and D.A. Daranagama[1]

[1]Department of Plant and Molecular Biology, University of Kelaniya, Sri Lanka
hasini6667@gmail.com*

Sri Lanka consists of a high diversity of fungal species, especially wood-associated fungi. These fungi play a vital ecological role in wood decomposition and have potential applications in environmental remediation due to their unique enzyme systems. Currently, the accumulation of polycyclic aromatic hydrocarbons (PAHs), mainly from vehicular emissions has become a significant environmental concern. Therefore, the present study aimed to identify the wood-associated macro and micro fungi in the Rajawaka forest reserve which is a lowland secondary forest located in the Balangoda area in the Rathnapura district, and to assess their ability to degrade specific PAHs, including phenanthrene, naphthalene, pyrene, and anthracene. Identification keys followed by morphological characteristics and image-based methods were used to identify the macrofungi. Microfungi were isolated following surface sterilization and culturing on potato dextrose agar (PDA) plates. Most frequently isolated fungal strains were subjected to plate assay to assess the fungal growth in PAHs by using 8 replicates. Control plates were prepared without inoculating fungi for each PAH-incorporated media. Spectrophotometric analysis was done to determine their PAH degradation abilities using 3 replicates. Controls were prepared without inoculating fungi. Obtained data were analyzed using ANOVA and Tukey's pairwise comparison by using Minitab 17 statistical software. The macrofungi collected from the Rajawaka forest reserve were mainly in the phylum Basidiomycota; *Ganoderma* sp., *Pycnoporus* sp., *Phellinus* sp., *Hexagonia* sp., *Trametes* sp., *Earliella* sp., *Schizophyllum* sp., *Lentinus* sp., *Calocera* sp., *Stereum* sp., *Microporus* sp., and *Pleurotus* sp. Frequently isolated microfungi included *Trichoderma* sp. 1, *Trichoderma* sp. 5, *Trichoderma* sp. 6, Grey sterile sp., *Mortierella* sp. 2, Brown sporulating sp., *Humicola* sp., and *Aspergillus* sp. 1. *Mortierella* sp. 2 and Grey sterile sp. were significantly effective in degrading phenanthrene (42.51%, and 34.16% respectively) and naphthalene (41.27%, and 33.48% respectively), while *Humicola* sp. and Grey sterile sp. showed a high degradation capacity for anthracene (33.73%, and 23.72% respectively) and pyrene (30.62%, and 19.32% respectively). All the PAHs studied were efficiently degraded by Grey sterile sp. This investigation serves as a preliminary exploration of the wood-associated macro and microfungal diversity in the Rajawaka forest reserve, and their potential in remediating PAH pollutants. It also opens the avenue for future research in finding environmental solutions for bioremediation of PAH deposition in Sri Lanka.

**Keywords:** Bioremediation, PAH degradation, Rajawaka forest reserve Balangoda, Wood-associated fungi