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Screening endophytic fungi of *Macromitrium* sp. for potential degradation of PAHs

A. R. P. D. U. K. R Ambadeniya, S. Kannangara* and K. Abeywickrama

Department of Botany, Faculty of Science, University of Kelaniya, Sri Lanka
sagarikadpk@kln.ac.lk

With rapid industrialization and urbanization, emission of air pollutants to the atmosphere has been increasing rapidly for several decades. Out of many pollutants, polyaromatic hydrocarbons (PAHs) take a prime advertence due to their toxicity, mutagenecity, carcinogenicity and long persistence in nature. Therefore, removal of these is one of the major cruxes that the modern world faces. In the present study, an effort was made to isolate and identify endophytic fungi in a moss (*Macromitrium* sp.) found in a polluted area (Sapugaskanda) and a less polluted area (Hettimulla), and to investigate their ability to degrade PAHs (naphthalene and phenanthrene). It was hypothesized that endophytes isolated from the moss can degrade PAHs and endophytes from polluted area have a higher ability to degrade PAHs compared to those isolated from the less polluted area. Moss plants from Sapugaskanda and Hettimulla area were used. Surface sterilized and trimmed moss plant pieces were placed on Malt Extract Agar and incubated for 10 days at room temperature. Percentage frequency of occurrence of each fungus grown was calculated. Utilization and degradation of PAHs by each of the fungus was assessed using a plate assay and a spectrophotometric analysis. Thirty six isolates were recovered from samples from Sapugaskanda area, 21 from Hettimulla and 6 were common to both areas. Highest frequency of occurrence was observed in *Eupenicillium* sp.2 (95.0%) in samples from Sapugaskanda and white sterile sp.7 (32.5%) for Hettimulla. Highest PAH utilization with the highest colony diameter, was recorded for *Nigrospora oryzae* for naphthalene (85.2 mm) and phenanthrene (59.5 mm). Almost all isolates from Hettimulla demonstrated low colony diameters. According to spectrophotometric analysis, highest degradation was observed with *Penicillium oxalicum* for naphthalene (98.60%) and *Nigrospora oryzae* against phenanthrene (98.02%). Almost all isolates in samples from Hettimulla area displayed poor degradation ability. The findings of the current study clearly reveal that *Macromitrium* sp. in Sapugaskanda harbours higher number of endophytic fungi than that in Hettimulla and most of them have a considerable ability to utilize and degrade PAHs in contrast to that in Hettimulla. It could be speculated that those endophytic fungi in *Macromitrium* sp. of Sapugaskanda, could be potential sources of fungal bioremediation. Further, they have potential practical application in removing PAHs from contaminated sites.

Keywords: PAHs, Endophytic fungi, *Macromitrium* sp., Bioremediation