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Bioremediation potential of leaf endophytic fungi in *Allium ampeloprasum* and *Brassica oleracea* var. *capitata*

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Polyaromatic Hydrocarbons (PAHs) are one of the major hazardous air pollutants which resulted mainly from vehicular emissions. Those PAHs can be subsequently deposited on many surfaces including vegetation which are referred to the human consumption, causing serious effects on human health. The present study attempts to investigate the PAHs (Naphthalene, Phenanthrene, Anthracene, and Pyrene) degradation capability of leaf endophytic fungi inhabiting *Allium ampeloprasum* and *Brassica oleracea* var. *capitata* which are the major economic green leafy vegetable crops in upcountry area, Sri Lanka. The leaf samples were randomly collected from vegetable beds located along the roadsides of highly urbanized areas (Nuwara Eliya town, Nanu Oya and Sent Clairs) to isolate fungal endophytes. Endophytic fungi were isolated following the surface sterilization method. Subsequently their potential in degrading PAHs (Naphthalene, Phenanthrene, Anthracene and Pyrene) was investigated using plate assay and spectrophotometric analysis. The sixteen fungal endophytes isolated from *A. ampeloprasum* leaves collected, belonged to 11 genera such as *Trichoderma*, *Alternaria*, *Aspergillus*, *Cochliobolus*, *Pestalotiopsis*, *Humicola*, *Acremonium*, *Fusarium*, White sterile sp., Gray sterile sp., and Brown sterile sp. Most of the fungal endophytes isolated from *B. oleracea* var. *capitata* leaves were more or less similar to the fungal consortium isolated from *A. ampeloprasum*. Almost all the endophytic fungi isolated from *A. ampeloprasum* and *B. oleracea* var. *capitata* were able to grow in Bacto Bushnell Haas (BBH) medium incorporated with Naphthalene, Phenanthrene, Anthracene and Pyrene, separately with colony diameters more than 20 mm. Among the tested fungi *Alternaria* sp.1 was able to grow in Naphthalene, Phenanthrene, Anthracene incorporated media displaying the highest colony diameters; 39.45 ± 1.23 mm, 38.25 ± 1.56 mm and 36.67 ± 0.34 mm respectively. As per the results from spectrophotometric analysis *Alternaria* sp.1 and *Trichoderma* sp.1 efficiently degraded Naphthalene, Phenanthrene, Anthracene and Pyrene more than 70%. *Alternaria* sp.1 exhibited the highest Naphthalene (75.63%), Phenanthrene (76.26%), and Pyrene (70.02%) degradation efficiencies respectively. Significantly the highest efficiency in degrading Anthracene (73.04%) was exhibited by *Trichoderma* sp.1. Among the tested fungi *Alternaria* sp.1, *Trichoderma* sp.1, *Aspergillus* sp.1 and *Aspergillus* sp.2 were the effective degraders of all the tested PAHs more than 50% degradation. The findings of the present investigation provide some insight into how these endophytic fungi could be used for bioremediation of PAHs in contaminated environmental sites.

Keywords: *Allium ampeloprasum*, *Alternaria* sp., Bioremediation, Endophytic fungi, Polyaromatic Hydrocarbons