



Screening and Evaluation of Endophytic Fungi from Selected Invasive Plants and Their Potential Applications in Biotransformation and Biodegradation

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Abstract

Endophytic fungi have symbiotic relationships with their host plants and play an important role by producing chemical constituents beneficial for both plants and fungi. On the other hand, plant invasion is currently one of Sri Lanka's most pressing environmental issues, with a significant impact on the country's native biodiversity. Yet the investigation of endophytic fungi in Sri Lankan flora, especially invasive plants, is minimal. *Prosopis juliflora*, *Acacia auriculiformis*, and *Annona glabra*, three invasive plants that are well-established in the Southern province of Sri Lanka were used to identify endophytic fungi and assess their potential for various biotechnological applications. Sixteen different fungal species were identified among cultured endophytic fungi using macro and micro-morphological characteristics. The biodegradability of polyaromatic hydrocarbon (PAH) and low-density polyethylene (LDPE) by endophytic fungi was assessed. Assay efficacy was analyzed using FTIR spectroscopy, pH, and mass reduction by manipulating *Fusarium* sp., *Aspergillus* sp., *Mucor* sp., and three *Penicillium* sp. from isolated endophytic fungi. *Fusarium* sp. showed a 46.6 % weight reduction of LDPE after 40 days of incubation. PAH biodegradation was assessed using a UV-visible spectrophotometer. Naphthalene and anthracene were used as PAH sources. The results showed that tested *Fusarium* and *Aspergillus* species can degrade PAHs by more than 80 %. The biotransformation ability of isolated endophytic fungal species was analyzed using eugenol as the model compound. The eugenol, which was extracted from the cinnamon leaves through steam distillation, was then subjected to biotransformation over a period of 5 days. After that, the FTIR spectra of initial and biotransformed products were compared. An additional band near 1700 cm⁻¹ confirms the biotransformation of eugenol into another chemical compound. Based on the results of the study, selected endophytic fungal strains have promise for numerous biotechnological applications and biotransformation processes. Therefore, further studies of isolated fungal species and their metabolites are strongly suggested.

Keywords: *Biodegradation, Biotransformation, Endophytic Fungi, Invasive Plants.*

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