
Analysis of secondary metabolites present in endophytic fungi from selected invasive plants as potent antioxidants and antibacterial agents

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Prosopis juliflora, *Acacia auriculiformis*, and *Annona glabra* are three of the well-established invasive plants in Sri Lanka. Symbiotic relationships of endophytic fungi with these plants may produce secondary metabolites with high medicinal values. Thus, this study was aimed at the identification of endophytic fungi and extracting secondary metabolites of fungi, with biological importance. Plant roots were collected from the Southern province and isolation of endophytic fungi was performed using standard procedures. Twelve endophytic fungi were isolated and identified. Five species (*Penicillium* sp1, *Penicillium* sp2, *Aspergillus* sp1, *Aspergillus* sp2, and *Aspergillus* sp3) were selected for further analysis. Qualitative phytochemical analysis of ethyl acetate crude extracts (scale up by batch culturing) of fungi showed the presence of alkaloids, phenols, tannins, terpenes, flavonoids, saponins, and sterols in all extracts. Quantitative analysis of total flavonoids and total phenolic content was also performed following standard protocols. The antioxidant capacity of extracts was investigated using DPPH and FRAP assay with ascorbic acid and FeSO₄.7H₂O as the standards respectively. According to the DPPH assay, the lowest IC₅₀ value was given by *Aspergillus* sp3 (59.85±1.05) ppm and the highest FRAP value was observed for *Aspergillus* sp3 (1382.94±1.74) μ mol Fe²⁺/g. *In-vitro* antibacterial studies (negative controls: Ethyl acetate and DMSO) were conducted using agar well diffusion assay and all the extracts showed inhibitory activity against *S. aureus*, *Enterococcus* sp, *Bacillus* sp, *Proteus* sp, and *E. coli*, where *Penicillium* sp2 showed the highest inhibitory activity against all the selected bacterial strains, with the highest value of (30.0 ±0.8) mm against *S. aureus*. In conclusion, it is confirmed, that the selected invasive plants are habitats for a number of endophytic fungi, and can be used as an important source of secondary metabolites with high antioxidant capacity and high antibacterial activity.

Keywords: Invasive plants, Endophytic fungi, Secondary metabolites

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