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# **Biological Activity of Endophytic Fungi Associated with Medicinal Plants from Sudan**

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The microorganisms which colonize healthy plant tissues without causing any obvious symptoms and noticeable damage to the host are called endophytes. They encompass a heterogenous group of organisms including bacteria, fungi and actinomycetes. Endophytes with unique ecological niches exhibit unique physiological and biochemical characteristics leading to the production of niche specific secondary metabolites which may have pharmacological potential. In this study endophytic fungi associated to medicinal plants growing in Sudan were identified and their bioactive potential was evaluated.

Thirty eight endophytic fungal strains were recovered from the leaves and stems of *Datura stramonium* L, *Moringa oleifera* Lam., *Prosopis chilensis* (Molina) Stuntz, *Calotropis procera* Ait., *Catharanthus roseus* L., *Euphorbia prostrata* Ait., *Trigonella foenum-graecum* L., and *Vernonia amygdalina* Del..

The ethyl acetate extracts obtained from the isolated fungal endophytes were screened for evaluation of their antimicrobial, antioxidant and anticancer activity. The antimicrobial activity of extracts was determined using the disc diffusion and microdilution methods. Endophytic fungi crude extracts isolated from of *P. chilensis* showed the highest antibacterial activity compared to other isolates. They all inhibited *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Salmonella Typhi* and *Staphylococcus aureus* with minimum inhibitory concentration value of 25 µg/mL. The antioxidant activity was determined using the 1, 1-diphenyl-2-picrylhydrazyl (DPPH) assay. A remarkable scavenging activity was obtained from endophytic fungi *Aspergillus* sp. and *Emericella bicolor* isolated from *D. stramonium* and *M. oleifera* respectively where they possessed activity higher than that obtained from the standard control ascorbic acid. Moreover, a positive correlation between the phenolic content of the extracts with their antioxidant activity was also observed.

Cytotoxicity studies were performed by the MTT assay using three cancer cells type; Human breast carcinoma (MCF7), and Colon adenocarcinoma (HT29, HCT116). Results of the

studied samples showed that, the endophytic fungi *Paecilomyces* sp. displayed very high cytotoxicity (IC<sub>50</sub> value of 1.51<sub>MCF7</sub> ± 0.2 µg/mL) followed by *Cladosporium* sp. (IC<sub>50</sub> value of 10.5<sub>MCF7</sub> ± 1.5 µg/mL). Astonishingly, these two cytotoxic fungi were isolated from *E. prostrata* leaves and stems which showed no cytotoxic activity (IC<sub>50</sub> value > 100 µg/mL). However, the endophytes isolated from the high cytotoxic *Catharanthus roseus* leaves (IC<sub>50</sub> 7.00<sub>HT29</sub> ± 0.43 and 7.83<sub>HCT116</sub> ± 1.28) showed very weak or no activity.

In conclusion, the endophytic flora associated within these widely used medicinal plants could be a potential source of novel products of great importance in medicine and industry.

Key words: Endophytes, medicinal plants, antibacterial activity, antioxidant activity, cytotoxicity.