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ISOLATION AND FREQUENCY DISTRIBUTION OF ENDOPHYTIC FUNGI INHABITING *JUSTICIA ADHATODA* L.

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ABSTRACT

A total 45 plant samples of *Justicia adhatoda* L. were collected from specific locations of Sangli district of Maharashtra state for isolation and identification of endophytic fungi. A total 10 different species of endophytic fungi were recorded. A maximum frequency of *Alternaria alternata* (17.03%) were recorded followed by *Aspergillus niger* (15.04%) , *Aspergillus flavus* (13.03) and *mucor species* (12%).

Key words: Endophytic fungi, *Justicia adhatoda*, frequency distribution

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1. INTRODUCTION

Justicia adhatoda L. is a medicinal plant widely used in Siddha medicine, Ayurvedic and Unani systems of medicine. It belongs to family Acanthaceae. It is widely used for the treatment of respiratory diseases and asthma. *Justicia adhatoda* harbor endophytic mycoflora. There is need to understand the biodiversity of endophytic fungi. In nature all plants show symbiotic relationship with fungal endophytes. The interest on endophytic fungi has recently focused, which has led to a considerable amount of research regarding the role of these fungi in host plants (Anand and Sridhar,2002). Sangli district is unexplored region for the study of endophytic

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fungi from *Justicia adhatoda*. Therefore the present investigation was carried out to determine fungal endophytes.

2.MATERIAL AND METHODS

Collection of plant samples

Healthy, fresh and mature leaves of 45 samples of *Justicia adhatoda* were collected from different locations of Sangli district. The collected plant material was kept in sterile polythene bags and brought to the laboratory and processed within few hours after sampling. For isolation work fresh plant materials were used to reduce the chance of contamination.

Isolation of endophytic fungi

For the isolation of endophytic fungi pieces of fresh leaves and nodes were used (Raviraja, 2005); Tiwari, 2012). The isolation of fungi was done followed by the method described by Petrini (1986). Leaves were cut in to 3-4 mm diameter and surface sterilized by dipping in 3% Hgcl₂ for 5 minutes followed by rising 2 times in sterilized distilled water. Each Petridis having 90mm diameter was poured with sterilized Potato Dextrose Agar medium amended with pinch of streptomycin. The plates were incubated at $28 \pm 2^{\circ}\text{C}$ and daily observations were recorded. The plates showing mycelia appearance were carefully isolated and subculture on sterilized PDA slants. The isolated endophytic fungi were identified on the basis of cultural and morphological characters like colony character, colour, conidial size, shape with the help of standard manuals (Ellis,1960), (Ellis,1963), (Ellis,1976), (Subramanian,1971).The microscopic observation of fungi was carried out by using cotton blue staining technique (Nagamani *et.al*,2005).

The rate of colonization percentage of endophytes was calculated by following formula.

$$\text{Rate of colonization (\%)} = \frac{\text{Number of segments colonized by single fungus} \times 100}{\text{Total number of segment observed}}$$

3. RESULTS AND DISCUSSION**Table 1- Colonization rate of endophytic fungi isolated from *Justicia adhatoda***

Sr. No	Endophytic fungi	% colonization frequency
1	<i>Aspergillus niger</i>	16.58
2	<i>Alternaria alternata</i>	14.31
3	<i>Trichoderma spp.</i>	10.33
4	<i>Fusarium spp.</i>	09.11
5	<i>Penicillium spp.</i>	07.66
6	<i>Curvularia spp.</i>	06.61
7	<i>Mucor spp.</i>	04.66
8	<i>Curvularia lunata</i>	03.67
9	<i>Fusarium solani</i>	02.80
10	<i>Helmanthosporium spp</i>	01.20

Table 1 depicts the percentage colonization of endophytic fungi isolated from *Justicia adhatoda* . It is observed that more endophytic fungi were isolated from leaves (69.33) as compared to nodes (33.13). A total 10 different endophytic fungi were found during this study. Among these *Aspergillus niger* showed the highest colonizing frequency (16.58%) followed by *Alternaria alternata* (14.31%) and *Trichoderma spp.* (10.33%) as compared to *Fusarium* (09.11), *Penicillium* (07.66) and *Curvularia* (06.61) were isolated with low frequency of colonization. *Mucor spp.*, *Curvularia lunata* ,*Fusarium solani* and *Helmanthosporium* were isolated in very low frequency.

4.CONCLUSION

There is symbiotic relationship between endophytic fungi and host plants. Plants provide nutrition and shelter to endophytes and in returns endophytic fungi excrete functional products and increase their resistance to different stresses.

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REFERENCES

1. Ananda K and Sridhar K R (2002), Diversity of endophytic fungi in the roots of mangrove species on the west coast of India, Canadian J. of Microbiology, Vol.48,p.871.
2. Ellis, M.B., 1960. *Dematiaceous hypomycetes*, I. Mycol. Pap., 76:1 – 36.

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3. Ellis, M.B., 1963, *Dematiaceous hyphomycetes*, V, Mycol. Pap, 93: 1-33.
4. Ellis, M.B., 1976. *Dematiaceous hyphomycetes*, CMI. pp-5.
5. Nagamani A, Kunwar I Kand Manoharachary C (2005), in Handbook of Soil Fungi, I K International (P) Publication Ltd., New Delhi.
6. Petrini O (1986), Taxonomy of endophytic fungi of aerial plant tissues, In : Microbiology of Phyllosphere, Fokkema N J, Van Den and Heuvel J(Eds), Cambridge University Press, Cambridge, pp.175-187.
7. Raviraja N S (2005), Fungal endophytes in five medicinal plant species from Kudremukh Ranga, Western Ghats of India, J. Basic. Microbiol, Vol.45, p.230.
8. Subramanian, C.V., 1971. *Hypomycetes* ICAR, New Delhi, India.