DIVERSITY OF MICROBIALFUNGI IN SELECTEDMEDICINAL PLANTS

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ABSTRACT:

Medicinal plants are relatively less attacked by the plant pathogens and pests, therefore endophytic micro-biota can be of great value in protecting plants from pests. Lookingit in to this opportunity, endophytic fungal diversity of Indian medicinal plants for their potential to application in plant protection. In these endeavor, bioactive endophytic fungi have been isolated from Indian medicinal plants. As microorganisms play a central role in the regulation of ecosystem processes, and they comprises the vast majority of species on Earth. Here we examine these revolutions in our understanding of microbial. Plant micro biome is less studied for its beneficial uses for human being. Since they exist in close association with the plants, they can offer great potential for the welfare of the plants provided that their presence does not have any adverse effect on the plant .They take nourishment from the plant and in turn provide protection from biotic and abiotic stresses. Almost all vascular plants examined till date shows some endophytic fungi in some parts of their life cycle. Present paper included with 15 selected medicinal plants belonging to 13 different families.

Key Words: *Endophytic fungi, bioactive, medicinal plants, pathogens*, 13, *etc.*

INTRODUCTION:

Fungal diversity patterns were uni-modal having greatest diversity with many forms of fungal growth.With recent developments in molecular biological method; it has become emergence to quantify the extent of microbial diversity in natural environments. Here we has been examine the revolution in our understanding of microbial diversity, and has to be explore the factors that contribute to seemingly astounding numbers of microbial taxa found within individuals of environmental samples (Karthikeyan *et al*. 2009; Chandra *et al.* 2010). We conducted analysis on the basis of fungal richness estimated from a variety of ecosystems. A primary comparison might be suggested, that microbial richness far exceeded the richness level of typically observed form plants. When these features are taken into consideration, the levels of microbial diversity may appear less astounding. Although the fields of the ecology and biogeography have traditionally ignored by microorganisms, there are no longer valid excuses for neglecting microorganisms in our surveys of biodiversity. Many of the concepts have been developed to explained the plant diversity patterns (Nautiyal *et al*., 2002). Endophytes are microorganisms that inhabit the interior of healthy plants, that they offered great-untapped potentials, which can be exploited to maintain the healthy crops. Many cultivated and wild type plants have been investigated for endophytic fungal metabolites which included guanidine and pyrrolizidine alkaloids, indole derivatives, iso-coumarin derivatives, etc. These metabolites show beneficial effects to crop plants and many of them also have been pesticidal and fungicidal properties (Shankar *et al,* 2007). Endophytic fungi or endophytes exist widely inside the healthy tissues of living plants, and are lots of important components of plant micro-ecosystems. Over the long period of evolution, some are co-existing endophytes and their host plants have established a special relationship with one to another, which can significantly influenced the formation of metabolic products in plants, that they affect quality and quantity of crude drugs derived from medicinal plants. (Ahmad *et al.*, 2010*).*

This paper will focus on the increasing knowledge of relationships between microbial fungi and medicinal plants through reviewing of published research data .The analytical results indicate that the distributions and population structure of endophytes can be considerably affected by factors, such as the genetic background, age, and environmental conditions of the particular host plants. On the other hand, the endophytic fungi can also be confer profound impacts on their host plants by enhancing their growth system, increasing their fitness, strengthening their tolerances to abiotic and biotic stresses, and promoting their accumulation of secondary metabolites (Arnold *et al*, 2007). All these changes are very important for the production of bioactive components in their hosts. Hence, it was so essential to understand such relationships between endophytic fungi and their host medicinal plants. Such knowledge has been well exploited and applied for the production of better and more drugs from medicinal plants.

Endophytic Fungi for Pest and Disease Management:

All the changes are very important for the production of bioactive components in their hosts. Hence, it is essential to understand such relationships between endophytic fungi and their host medicinal plants. Such knowledge can be well exploited and applied for the production of better and more drugs from medicinal plants. The secondary metabolites became obstacles for the colonization of endophytic fungi (Gunatilaka *et al.*, 2006). To overcome this, endophytic fungi must secrete the matching detoxification enzymes, such as cellulase, lactase, xylanase, and protease, to decompose these secondary metabolites before they penetrate through the defense systems of the resided host-plants (Phongpaichit *et al.,* 2006). Once inside the tissues of a host-plant, the endophytic fungi assumed a quiescent (latent) state, either for the whole lifetime of the host plant (neutralism) or for an extended period of time (mutualism or antagonism) until environmental conditions are favorable for endophytic fungi or the onto gestate of the host changes to the advantage of the fungi (Chandra *et al.*,2010).The mutual interrelation between endophytic fungi and their host plants can impose certain effects on the formulation of some types of bioactive compounds that can be used by humans.

MATERIALS AND METHODS

Different medicinal plants are collected from nearby village areas of forest of Buldhana district. The affected and non affected leaves should be separated and wash with water and kept dry under shade for further laboratory processes.

Fungal growth:

By taking the affected portion of the leaf cut the small portion on put it on sterile standard pH PDA media and kept it for 3 to 4 days at 27°c to 30 °cfor better fungal growth. Loop-ful fungal spores were streaked on potato dextrose agar (Hi- media) plates and incubated at 37°c for 2-3 days. All fungus plates were maintained at 4°c in refrigerator for further use.The fungal identification supported by 'Plant Pathology' of George N. Agrios (2006) and web sources.

Table 1: Plant list with causal organisms

Sr. No.	Name of the Plant	Family	Causal organisms
1	***Terminalia chebula* Retz.**	**Combretaceae**	***Rhizopus stolonifer* *Curvularia clavata***
2	***Gossypium arboreum* L.**	**Malvaceae**	***Rhizopus stolonifer* *Curvularia clavata* *Fusarium moniliforme***
3	***Cleome viscosa* L.**	**Cleomaceae**	***Aspergillus niger* *Curvularia clavata***
4	***Amaranthus spinosus* L.**	**Amaranthaceae**	***Fusarium moniliforme* *Aspergillus niger* *Curvularia clavata***
5	***Tribulus terrestris* L.**	**Zygophyllaceae**	***Fusarium moniliforme***
6	***Alysicarpus scariosus* (Rotll. ex Spreng)**	**Fabaceae**	***Curvularia clavata* *Fusarium moniliforme***

7	***Buchanaina lanzan* Spreng.**	**Anacardiaceae**	***Trichoderma viridae*** ***Rhizopus stolonifer***
8	***Commelina forskalaei* Vahl.**	**Commelinaceae**	***Alternaria alternata*** ***Aspergillus niger***
9	***Terminalia catappa* L.**	**Combretaceae**	***Rhizopus stolonifer*** ***Curvularia clavata***
10	***Ficus religiosa* L.**	**Moraceae**	***Alternaria alternata*** ***Rhizopus stolonifer***
11	***Ficus benghalensis* L.**	**Moraceae**	***Alternaria alternata*** ***Rhizopus stolonifer***
12	***Ficus racemosa* L.**	**Moraceae**	***Curvularia clavata*** ***Trichoderma viridae***
13	***Ceiba pentandra* (L.) Gaertn.**	**Bombacaceae**	***Alternaria alternata*** ***Fusarium moniliforme***
14	***Digera muricata* (L.) Mart.**	**Amaranthaceae**	***Curvularia clavata*** ***Trichoderma viridae*** ***Fusarium oxysporum***
15	***Ipomoea sinensis* Desr.**	**Convolvulaceae**	***Rhizopus stolonifer*** ***Curvularia clavata***

OBSERVATIONS:

Mixed fungal growth of some fungal organisms

Fig. 1: Mixed fungal growth of some fungal organisms in *Terminalia chebula* Retz. leaf

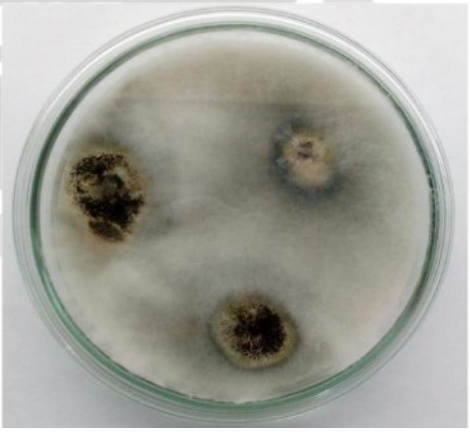

Fig. 2: Mixed fungal growth of some fungal organisms in *Ficus religiosa* L. leaf

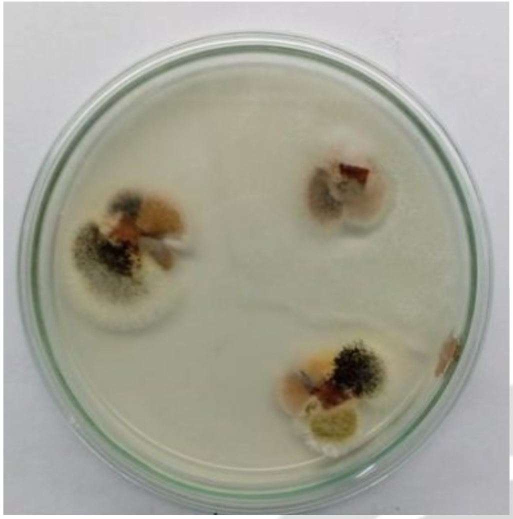

Fig. 3: **Mixed fungal growth of some fungal organisms in *Gossypium arboreum* L. leaf**

Fig. 4: **Mixed fungal growth of some fungal organisms in *Cleome viscosa* L. leaf**

Fig. 5: Mixed fungal growth of some fungal organisms in *Tribulus terrestris* L. leaf.

Pure culture of some fungal organisms

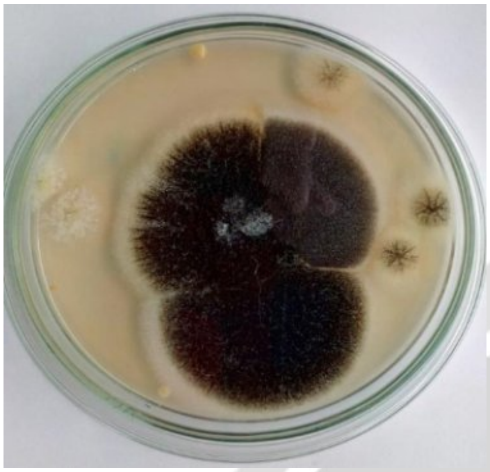

Fig. 6: Pure fungal growth of *Rhizophus stolonifer*

Fig. 7: Pure fungal growth of *Fusarium moniliforme*

Fig. 8: Pure fungal growth of *Alternaria alternata*

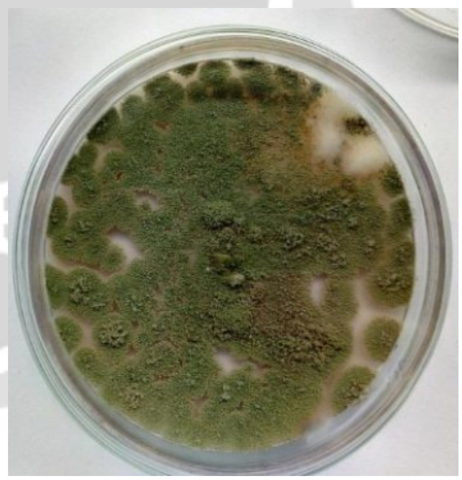

Fig. 9: Pure fungal growth of *Aspergillus niger*

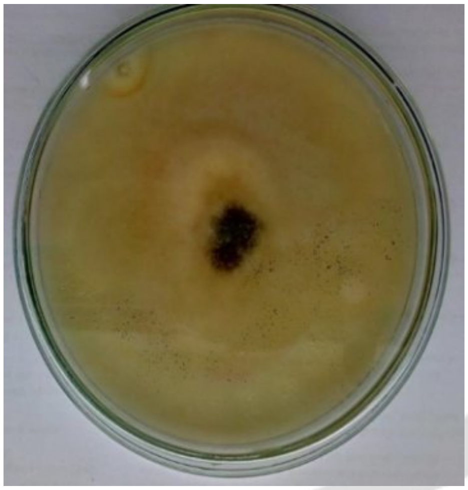

Fig. 10: Pure fungal growth of *Curvularia clavata*

Fig. 11: Pure fungal growth of *Trichoderma viridae*

RESULT AND DISCUSSIONS:

Results of the analyses indicates that the population structure or distribution pattern of endophytic fungi was significantly associated with the variation in environments, as well as the classification and genetic background of host plants .Data from the reference analysis suggested that some environmental conditions, such as temperature, humidity, illumination, geographic location, and vegetation significantly affected the distribution pattern of endophytic fungi (Satyanarayan *et al*., 2000). For example, particular conditions determined the distribution ranges of host plants that in return determine the species of endophytic fungi and their spore germination, growth, reproduction, and metabolism during the entire life cycle. Similarly, results from the analyses suggested that the distribution of certain endophytic fungal populations was only restricted to particular host plant species (or families) and particular genetic background (genotypes) of a species (Duong *et.al*, 2006).

This finding is particularly important because the non-random distribution of endophytic fungi will determine the production of diverse secondary metabolites promoted by endophytic fungi that can be used by human as drugs. In addition, the secondary metabolites may confer different benefits to the host plants and such as enhancing to the growth and resistance to biotic and abiotic stresses, which provide opportunities for us to understand the relationships between endophytic fungi and medicinal plants.

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