Original Research Paper

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ISOLATION AND IDENTIFICATION OF SOIL FUNGI FROM KADEGAON, SANGLI DISTRICT OF MAHARASHTRA, INDIA

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ABSTRACT The study was carried out to find out fungal presence and diversity in soil of agricultural land in and around Kadegaon tahsil. Ten different sites were selected for the study. Fifteen different species of fungi were isolated in the soil. The results of this study showed that the soil of these selected locations has a large diversity of fungal members. Fungi are active in decomposing plant residues and animal tissues.Continuous use of chemical fertilizers over a long period may cause imbalance in soil microflora.

KEYWORDS : Soil fungi,Isolation,Identification, Kadegaon tahsil

INTRODUCTION

Soil fungi play a crucial role in nutrient cycling in terrestrial systems, due to the primary role they play as decomposers. They are particularly involved in cycling C, N, and P, but have roles in most of the other soil elemental cycles. Soil fungi often make up more biomass in soil than any other microbial group. These filamentous organisms are heterotrophic, which means they consume organics as a carbon source. Fungi can produce abundant hyphae that are able to extract nutrients and water from many locations within the soil matrix. Also, fungi are active in decomposing plant residues and animal tissues. Soil fungi are microscopic plant-like cells that grow in long thread like structures or hyphae that make a mass called mycelium. The mycelium absorbs nutrients from the roots it has colonised, surface organic matter or the soil. Many soil fungi cause disease occurrence to the plants but many among them some members also have beneficial roles in combating phytopathogens and protect crop plants from insect attack. Fungi perform important functions within the soil in relation to nutrient cycling, disease suppression and water dynamics, all of which help plants become healthier and more vigorous. Along with bacteria, fungi are important decomposers of hard to digest organic matter.

In the present study, isolation and purification of fungi near some plants of in and around Kadegoan tahsil regions. The aim of the present investigation is to isolate fungi from different agricultural fields, and to observe the percentage contribution of different fungal species. Continuous use of chemical fertilizers over a long period may cause imbalance in soil microflora and there by indirectly affect biological properties of soil leading to soil degradation

MATERIALAND METHODS

Study area: The Kadegaon is a Tahsil place of Sangli district in Maharashtra. The soil is black cotton soil along with the Krishna canal. Also canal and well water facilities are available.The ten selected sites were coded as S-1(Karad -Vita road), S-2 (Kadegaon -Tadsar road), S-3 (Kadegaon canal side), S-4 (Kadegaon- Shivajinagar road), S-5 (M.B.S.K.College road), S-6 (Kadegaon- Nerli road), S-7 (Kadegaon- Sagareshwar spinning mill road), S-8 (KadegaonNimsod road), S-9 (Dongarai road), and S-10 (KadegaonKadepur area).

Collection of soil sample:

The soil samples were collected from ten different selected sites of Kadegaon tahsil. The collection was made during dry monsoon. At each sites, soil samples was taken from different fields. The study sites was fixed, the digged at about 30 cm deep 'V' shaped pit and remove all soil after the samples were collected from margin of 'V' shaped pit with the help of large scalpel. Each of sample were labeled and numbered with date of collection.

Composition of Potato Dextrose Agar (PDA) media :-

Peeled potato – 200 g, Dextrose – 20 g, Agar- 15 g and distilled water 1000 ml, pH 5.6. Peeled potatoes were boiled until soft and passed through muslin cloth. Then dextrose was added in it and final volume of solution was made up to 1000 ml. In this solution agar was added, pH was adjusted.

Soil dilution plate agar:-

One gram of soil was added into the tube containing 9 ml of sterile distilled water to obtain 1/10 (stock solution) and a series of 1/100, 1/1000, 1/10,000, and 1/100,000 dilutions was prepared by adding 1ml of solution to 9 ml of sterile distilled water respectively (Waksman & Fred., 1922). One ml suspension from each dilution was transferred onto Potato Dextrose Agar (PDA) (Johnston & Booth, 1983) media.The fungal culture was raised by using spread plate technique, 0.1ml of diluted sample was plated in a sterile petri plates, containing selective media i.e. PDA. 1% streptomycin solution was added to the medium before pouring into petri plates for preventing bacterial growth. The plates were incubated at 37°C for 48 hrs. After incubation colonies were examined under the microscope for the identity of fungi with the help of lactophenol staining.

Isolation and Identification of fungi :-

The fungi occurring on each and every diseased tissue portion in the plates were identified preliminary on the basis of sporulation characters like asexual or sexual spores and fruiting structures with the help of stereoscopic binocular microscope. The identification and further confirmation of the fungi was made by preparing slides of the fungal growth and observing them under compound microscope (Mukadam D.S.et al 2006). Pure cultures of these fungi prepared and maintained on potato dextrose agar slants.

Identification of fungi:-

Fungal morphology were studied macroscopically by observing colony features (Colour and Texture) and microscopically by staining with lacto phenol cotton blue which was observed under compound microscope for the conidia, conidiophores and arrangement of spores .

On the basis of their morphological characteristics, the fungi were identified. Lacto phenol cotton blue stain was used as mounting fluid. The slides were observed under microscope and fungi were identified. The morphological characteristics evaluated included colony growth (length and width), presence or absence of aerial mycelium, colony colour, presence of wrinkles and furrows, pigment production etc. The characteristics were compared with the standard description of, 'A manual of Soil Fungi', by Gilman, (2001), 'Illustration of fungi 'by Patil and Mukadam (2000).

RESULTS AND DISCUSSION

The study aimed that the isolation of soil fungi from Kadegaon tahsil. Isolated fungi was identified by some key with help of standard books. During investigation 15 isolates obtained from the soil samples. 15 isolates were identified with standard key and microbial expert.From the fungal isolates the most of the species belonging the genera Aspergillus were dominant. Present study carried out for an effort to understand the soil fungal diversity in Kadegaon tahsil. The environmental, moisture, organic carbon an nitrogen play an important role in distribution of mycoflora.Soil fungi that have survived under highly stressed conditions of high temperature and little available moisture (Faud Ameen et al; 2022).Various factors are responsible for the fungal diversity. The common fungi found Aspergillus, Rhizopus and Fusarium. A fungal species of belonging to the phyla ascomycota, and genera Aspergillus were successfully identified after staining with lactophenol cotton blue based on their morphological characters and microscopic analysis. During the investigation the maximum fungal species belongs to Ascomycotina and the genera A.niger. Aspergillus was the only genus that was distributed in all the types, indicating that it adapts easily to different environments well; followed by Fusarium and Rhizopus. Diversity was found to be higher in the agricultural fields and garden soils as compared to the barren land. Among the

various genera of Hyphomycetes as Aspergillus was the only genus that was dominant followed by Rhizopussp and Fusariumsp. The reason behind genera with rare distribution of Fusarium and Rhizopus is lack of nutrition which means less organic matter in the soil.

CONCLUSION

The present study undertaken to fungal diversity .Diversity was found to be higher in the agricultural fields and garden soils as compared to the barren land. This indicates utilization of superior quality of soils for plantations. The studies also suggest that agricultural soil samples and especially the garden soil need amendment.

Fungal diversity in soil among the selected sites :

Sr. No.	Fungal species	Selected sites									
		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
1	Mucor	-	+	-	-	+	+	-	-	-	+
2	Rhizopus	-	+	+	-	+	-	+	+	-	+
3	Fusarium solani	+	+	-	+	-	-	+	-	+	-
4	Trichoderma	+	-	+	-	-	+	-	+	-	+
5	Aspergillus	-	+	+	-	+	-	+	-	+	-
6	Fusarium moniliforme	+	+	-	-	-	+	-	+	-	+
7	Aspergillus niger	+	-	+	-	+	+	+	-	+	+
8	Fusarium oxysporum	+	+	-	+	-	-	+	-	-	-
9	Penicillum chrysogenum	-	-	-	+	-	-	+	-	+	+
10	Chaetomium	-	+	-	+	-	-	-	-	-	+
11	Pythium	-	-	+	-	-	+	-	-	+	-
12	Rhizoctonia	+	+	-	-	+	-	-	-	+	-
13	Verticillium	-	+	+	+	-	+	-	+	+	-
14	Phoma	-	-	-	-	+	-	-	+	-	-
15	Nigrospora	-	-	+	-	-	-	+	-	-	-

+ = Fungus present, - = Fungus absent

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