

# Fungal diversity and their role in Soil Health from soil sample of different localities in Osmanabad District

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**ABSTRACT-** Fungi play essential roles in the soil where they help in enhance the uptake of mineral nutrients, water dynamics, and disease suppression, all of which maintain the health of the soil and increases crop yield. The investigation was conducted to find out the fungal diversity in soil samples collected from village Gunjoti, Dist Osmanabad. In the investigation 10 isolates isolated from the soil samples using the soil dilution technique on potato dextrose agar medium supplemented by suitable antibiotics such as streptomycin. Among these isolates were identified with the help of authentic manuals of fungi. From the fungal isolates the most of the species belonging to the genera *Aspergillus*, *Penicillium* and *Rhizopus*. The identified soil fungi namely *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus terreus*, *Mucor sp.* *Penicillium chrysogenum*, *Penicillium sp.*, *Rhizopus stolonifer*, *Rhizopus oryzae* and *Trichoderma viride*. Among the identified species *Aspergillus niger* found maximum numbers in the all soil samples and followed by *Rhizopus stolonifer* and *Penicillium chrysogenum*.

**Key word:** Soil samples, soil dilution technique, isolation of fungi.

## INTRODUCTION

The fungi play important role in soil ecosystem which comprises of organic residues, minerals and large numbers of macro and microorganisms (Chandrashekar *et al.*, 2014). Fungi having ability to produce a wide variety of extracellular enzymes, they are able to break down all kinds of organic matter decomposition and elements release by mineralization as nutrients for biological control (Stefanis *et al.*, 2013). Microorganisms are beneficial in increasing the soil fertility and plant growth as they are involved in several biochemical transformation and mineralization activities in soils. Ramkumar *et al.*, (2017). Species of *Aspergillus*, *Penicillium*, *Talaromyces*, *Verticillium*, *Trichoderma*, *Fusarium* and *Rhizoctonia* are the most abundant in the agricultural, horticultural and grassland soil ecosystem [Acosta *et al.*, 2018, Franç *et al.*, 2018, Lehmann *et al.*, 2020]. The aim of the present investigation is to isolate mycoflora from different locations of Gunjoti, and to observe the percentage contribution of different fungal species.

## MATERIAL AND METHODS

### Collection of soil samples:

The soil samples were collected from various locations of Gunjoti, Dist- Osmanabad. The soil samples were collected (up to 15cm depth) into a small sterilized polythene bags and brought to laboratory for further studies.

### Isolation of fungi from the soil samples:



The soil micro fungi were enumerated by Soil Dilution plate method and on media such as Potato Dextrose Agar.

#### Soil dilution plate method (Waksman, 1922):

1gm of soil sample was suspended in 10 ml of double distilled water to make microbial suspensions ( $10^{-1}$  to  $10^{-5}$ ). 1 ml of microbial suspension of each concentration were added to sterile Petri dishes (triplicate of each dilution) containing 15 ml of sterile Potato Dextrose Agar. One percent streptomycin solution was added to the medium before pouring into petriplates for preventing bacterial growth. The Petri dishes were then incubated at  $28 \pm 2^{\circ}$  C in dark. The plates were observed everyday up to five days.

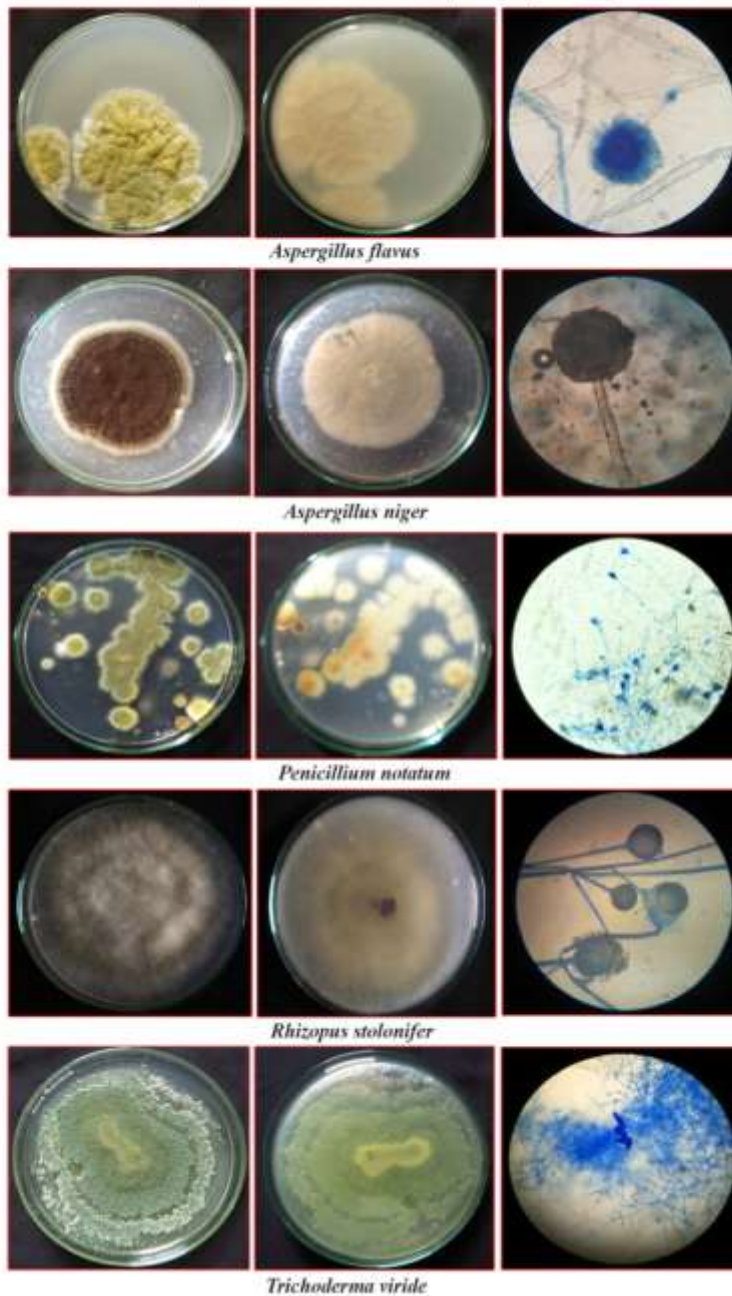
#### Identification of the soil fungi :

Fungal morphology were studied macroscopically by observing colony features (Colour and Texture) and microscopically by staining with lacto phenol cotton blue and observe under compound microscope Aneja K. R. (2001) The fungi were identified with the help standard literature [Gilman (2001), Nagamani *et al.*,(2006)]

**RESULTS AND DISCUSSION:****Table: Isolation of fungi from soil samples**

Soil samples	Black	Sandi	Red	White
Fungi				
<i>Aspergillus flavus</i>	+++	++	+	+
<i>Aspergillus fumigatus</i>	++	++	+	+
<i>Aspergillus niger</i>	++++	+++	++	++
<i>Aspergillus terreus</i>	+++	++	++	+
<i>Mucor sp</i>	++	++	+	-
<i>Penicillium chrysogenum</i>	+++	+++	++	-
<i>Penicillium sp</i>	++	+++	++	+
<i>Rhizopus oryzae</i>	+++	+++	++	++
<i>Rhizopus stolonifer</i>	++++	++++	+++	++
<i>Trichoderma viride</i>	++++	++	++	-

Photoplate: Pure culture and microphotograph of fungi



From the table, results observed that 10 fungal species were isolated from all soil samples fungi viz., *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus niger*, *Aspergillus terreus*, *Mucor sp.*, *Penicillium chrysogenum*, *Penicillium sp.*, *Rhizopus oryzae*, *Rhizopus stolonifer* and *Trichoderma viride*, similar work studied by Gaddeyya *et al.*,(2012). Out of the fungi *Aspergillus niger*, *Penicillium chrysogenum*, *Rhizopus stolonifer* showed

maximum occurrence in all soil samples. Whereas *Trichoderma viride* showed maximum occurrence in black soil, similar results were found by Paulina Fatima Mary and Sagaya Giri (2016). Moderate occurrence were recorded by *Aspergillus flavus*, *Aspergillus terrus*, *Penicillium chrysogenum*, *Penicillium sp*, *Rhizopus oryzae*, while minimum occurrence found by *Aspergillus flavus* and *Mucor sp*. similar work investigated by Raja *et al.*, (2017). On the other hand Maximum fungi were found in black soil followed by sandy soil and red soil and minimum detected in white soil, (Ramkumar *et al.*, 2017).

It can concluded from results that *Aspergillus niger*, *Penicillium chrysogenum* and *Rhizopus stolonifer* showed maximum occurrence in soil. Black soil is most favorable for growth of mycoflora. Soil health conditions have a enormous impact on environmental sustainability like agriculture and horticulture. More research is required to find the best way to maintain fungal biodiversity in soil.

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