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Research Paper

# Isolation, Screening and Identification of Fungi From Soil

Science

**KEYWORDS :** Fungi, Aspergillus niger, culture media, percentage contribution.

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## ABSTRACT

*Mycoflora from the soil of Bhopal was investigated at some different locations from February to June, 2003. The fungi were isolated by using soil dilution and soil plate method. On the basis of cultural and microscopic characteristics, the isolated strains were identified as Trichoderma viride, Aspergillus niger, Aspergillus fumigatus, Curvularia sp., Fusarium sp. etc. Total 14 species were obtained from 20 soil samples. Aspergillus niger showed highest percentage contribution.*

## INTRODUCTION

The role of fungi in the soil is an extremely complex one and is fundamental to the soil ecosystem. Fungi are an important component of the soil microbiota typically constituting more of the soil biomass than bacteria, depending on soil depth and nutrient conditions (Ainsworth, 1995). Fungi play an important role in nutrient cycling and plant health and development and play crucial roles in ecosystem function (Christensen, 1989). The saprobic fungi represent the largest proportion of fungal species in soil and they perform a crucial role in the decomposition of plant structural polymers, such as, cellulose, hemicellulose, and lignin, thus contributing to the maintenance of the global carbon cycle.

## Materials and methods

**Samples collection:** Fungi were isolated from soil, which were collected from different parts of Bhopal city, such as Barkatullah university campus, dairy farm, poultry farm, sewage soil, near lack site, garden/parks/nursery, agricultural field, near road side, residential colonies and market site etc.

**Isolation of fungi.:** In case of soil, the collection site of sample were cleaned of all the superficial deposit such as; stone, grass, litter *etc*. and a pit of 15x15 cm was drug. The soil was loosened inside the pit and collected in sterile bags, which were brought to the laboratory. Isolation of fungi (both of thermophillic and mesophillic) from the sample was collected.

**Direct Plate Method (Warcup 1950):** In this procedure a small amount of soil sample (0.005 to 0.015 grams was taken from the main sample by means of a sterile nichrome needle with a flattened tip and it was dropped into the bottom of a sterile plate, agar medium was poured and particles were distributed throughout the medium by shaking and rotating the plate. After solidification, plates were incubated at $37^0$C for mesophile and similarly $45^0$C for thermophiles, and observation were made as above.

After this, isolation were made from the plates, different fungal species were picked up with the help of sterile needle and then streaked into the slant, containing Potato Dextrose Agar (PDA) medium.

**Medium used for the isolation:** Here we used Potato Dextrose Agar Medium (PDA) for the isolation of each type of fungi. PDA contains:-

| | | |
|---|---|---|
| Potato extract | - | 200 ml |
| Dextrose | - | 15 gram |
| Distilled water | - | 1000 ml |

**Identification of fungi:** The isolated fungi were identified to the genus level and to the species when possible on the basis of macromorphological and micromorphological characteristics using suitable media, slide cultures (obtained by inoculating microfungi directly on a small square of agar medium) and the most updated keys for identifications.

## RESULTS AND DISCUSSION

During the investigation period 14 fungal floras were isolated from soil samples. Aspergillus ,Cladosporium oxysporum, Fusarium Mycelia sterilia, Penicillium,Curvularia,Cladosporium, Rhizopus ,Trichoderma species were observed. It is found that maximum percentage contribution is observed for Aspergillus niger (18.46), Cladosporium cladosporioides & rhizopus sp. (13.84) followed by A flavus (10.76), A. versicolor (7.69), A fumigatus & Curvularia lunata (6.15). On the contrary, minimum percentage contribution (1.53) is observed for Aspergillus oryzae, Fusarium pallidoroseum and Trichoderma viridi (Table 1).

During the investigation period (Between February-May) monthly seasonal variation were also observed. Minimum (6) fungal species were found in the April month of summer season due to high temperature, dry winds and percentage of humidity is very low in the environment which is not favourable for fungal growth.

The results of present investigation revel with various work done by researchers. All of these species have been reported as commonly isolated from Antarctic soil by Deming (2002) and Onofri *et al* (2007). Our results were supported by Akpoveta *et al,* (2011); in their studies they isolated *Penicillium* and *Aspergillus* sp. from soil. Study supported by Obire and Anyanwu (2009), they isolated fourteen fungal genera from soil. These include *Alternaria*, *Aspergillus*, *Candida*, *Cephalosporium*, *Cladosporium*, *Fusarium*, *Geotrichum Mucor*Sharma (2010) Sharma *et al* (2011) *al,* (2006), *Penicillium*, *Rhizopus*, *Rhodotolura*, *Saccharomyces*, *Torulopsis* and *Trichoderma*. Oboh *et al,* (2006) reported that the fungal isolates obtained in their study were mainly *Aspergillus* species, while others were *Trichoderma*, *Penicillum*, *Rhizopus* and *Rhodotorula* species which were all able to utilise hydrocarbon as carbon source. Our finding coincides with the work of Elisane *et al,* (2008), who also isolated four strains from the contaminated soil. They were identified as *Aspergillus* sp. Kostadinovaa *et al* (2014) isolated Aspergillus and Penicillium from Antarctica. Sharma (2010) isolated same fungi at Darjeeling tea garden soil and Sharma *et al* (2011) reported some same fungi from Lachung soil.

**Table: 1. Isolated fungi from soil samples**

| S. No. | Name of Fungi | Feb. | Mar. | Apr. | May | Total | % contribution |
|---|---|---|---|---|---|---|---|
| 1. | Acremonium scatrotium | 0 | 0 | 0 | 2 | 2 | 3.07 |
| 2. | Aspergillus flavus | 2 | 1 | 3 | 1 | 7 | 10.76 |
| 3. | A. fumigatus | 2 | 2 | 0 | 0 | 4 | 6.15 |
| 4. | A. niger | 3 | 6 | 0 | 3 | 12 | 18.46 |
| 5. | A. oryzae | 1 | 0 | 0 | 0 | 1 | 1.53 |
| 6. | A. versicolor | 4 | 0 | 1 | 0 | 5 | 7.69 |
| 7. | Cladosporium cladosporioides | 5 | 2 | 0 | 2 | 9 | 13.84 |

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|---|---|---|---|---|---|---|---|
| 8. | Curvularia lunata | 2 | 2 | 0 | 0 | 4 | 6.15 |
| 9. | Fusarium pallidoroseum | 1 | 0 | 0 | 0 | 1 | 1.53 |
| 10. | Penicillium Chrysogenum | 2 | 0 | 0 | 2 | 4 | 6.15 |
| 11. | Rhizopus sp. | 3 | 5 | 0 | 1 | 9 | 13.84 |
| 12. | Trichoderma viride | 1 | 0 | 0 | 0 | 1 | 1.53 |
| 13. | Mycelia sterilia (White) | 1 | 0 | 1 | 0 | 2 | 3.07 |
| 14. | Mycelia sterilia (Pink) | 3 | 0 | 1 | 0 | 4 | 6.15 |
| | TOTAL | 30 | 18 | 6 | 11 | 65 | |

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