

Isolation and Identification of Soil Fungi from Mahamera Aniket, Shivnath River Durg (C.G)

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Abstract: Soils are highly complex systems, with many components playing diverse functions mainly due to the activity of soil organisms. Soil Sediment from the surface layer (top 5 cm) were collected aseptically, transferred into sterile polythene bags. The mycoflora were isolated by using soil dilution technique on Potato Dextrose Agar Soil fungi have been most frequently isolated by dilution techniques. From 10^{-1} dilution to 10^{-3} dilution slide with lacto phenol and cotton blue were prepared from pure culture slants of isolated filamentous fungi. The 15 fungal isolates were obtained in this study and have various physiological and morphological characters. *Penicillium spp* and *Cladosporium Spp* occurred in most abundant amount besides *Absidia cylindrospora*, *Fusarium oxysporum*, *Alternaria alternate*, shows maximum CFU.

Keywords: Soil Sediment, Mycoflora, Soil Dilution Technique, CFU.

I. INTRODUCTION

In such a situation may be many, but gross pollution of water has its origin mainly in urbanization, industrialization, agriculture and increase in human population.

Wurzbacher *et al* (2010) highlighted the presence and ecological roles of fungi in lakes, and aims to stimulate research in aquatic mycology. They play potentially crucial roles in nutrient and carbon cycling and interact with other organisms, thereby influencing food web dynamics.

Fungi are ubiquitous, achlorophyllous and heterotrophic organisms, which are directly influenced by environmental factors. They cosmopolitan in occurrence and are found in rivers, oceans and occur commonly on decomposing organic matter.

The population of some communities near the Shivnath river in term of provision of domestic water and small scale farming around the river inspired the research into the microbial quality and the physicochemical parameters determination of the water and soil sediment of the river (David A. Wardle, Richard D. Bardgett, John N. Klironomos, 2004).

To understand fungal community present in Shivnath river; soil samples, were collected month wise from different locations of river bank, to understand the overall diversity among different taxonomic groups of fungi present, as well as their occurrence, and contribution of the fungal species in the river.

The members and kinds of micro organisms present in soil depend on many environmental factors such as the amount and type of nutrients, moisture, degree of aeration, pH and temperature etc. (A. M. Cundell 1977). The aim of the present investigation is to isolate mycoflora from mahmara aniket, Shivnath river.

II. MATERIALS AND METHODS

The soil samples were randomly collected from the mehmara aniket, Shivnath river:

1.1 Collection of Samples – Soil and Sediment from the surface layer (top 5 cm) were collected aseptically, transferred into sterile polythene bags and were brought to the laboratory, stored in refrigerated conditions for further mycological analysis.

1.2 Culture Media Preparation:

The following media was prepared and used in these studies.

Potato Dextrose Agar medium (PDA) (Aneja, 1996):

Peeled potato:	200gm
Dextrose:	20gm
Agar Agar :	20gm
Distilled water:	1000ml

Five hundred ml of water was taken in one liter capacity beaker and 200gm washed peeled and sliced potatoes were added to the beaker. Potatoes were boiled gently for 30 minutes or by the time till they are easily penetrated by a glass rod. Boiled potatoes were filtered through muslin cloth and squeezed out all the liquid.

In another beaker, 500ml of water was taken and heated, to which 20gm agar was added bit by bit to get it dissolved followed by addition of 20gm of dextrose. Potato extract was mixed with agar and dextrose and water was added to make volume up to 1000 ml. The whole mixture was stirred gently to allow the proper dissolution of agar and dextrose. A pinch of streptomycin sulphate was added to the flasks containing medium to avoid bacterial contamination.

The PDA medium was poured into five conical flasks each of 200ml capacity. The flasks were plugged with cotton and wrapped with aluminum foil. Conical flasks with culture media were sterilized at 121°C at 15 psi pressure in an autoclave for about 20 minutes.

1.3 Isolation Of Soil Fungi – Soil fungi have been most frequently isolated by dilution techniques (Warcup, 1950). soil was stored for 1-5 weeks in plastic packets, until additional assays are completed. 10-gm samples of the soil were diluted to 10^{-1} and 10^{-10} . A one-ml. suspension was plated onto each of five plates. All plates were incubated on a lab bench at $25 \pm 2^\circ\text{C}$ for 6 days prior to counting of fungal colonies.

1.4 Identification of Soil Fungi – From 10^{-1} dilution to 10^{-3} dilution slide with lacto phenol and cotton blue were prepared from pure culture slants of isolated filamentous fungi. These slides were observed for identification under ‘Olympus biological research microscope’, Model: CX-41-R The confirmation of these species was done by sending one replication of each culture tube to NCFT, New Delhi. The description of the isolated fungi were then pooled and presented in results (Chowdhry P.N. and Agarwal, G.P. 1976, 1980a, 1980b, 1981).

III. RESULT & DISCUSSION

Filamentous fungi are naturally found in soil and water and the type of water is directly obtained from their natural resources. In the present study shows major diversity.

Table: Isolated and Identified Fungal Population of Mahamara Aniket, Shivrath River

Number of Petri plates used/ numerical value is Colony forming unit (CFU) of each fungi												
S.N.	Name of the Fungus isolated	1	2	3	4	5	6	7	8	9	10	Total
01	<i>Absidia cylindrospora</i>	3	1	3	4	2	2	3	2	4	0	24
02	<i>Mucor mucedo</i>	0	3	0	1	0	2	1	2	0	1	10
03	<i>Gongronella butleri</i>	2	0	1	2	0	1	1	0	0	0	07
04	<i>Rhizopus stolonifer</i>	2	1	1	0	2	2	2	1	0	0	11
05	<i>Cunninghamella stolonifer</i>	2	3	0	0	2	1	1	0	2	2	13
06	<i>Syncephalastrum racemosum</i>	3	1	2	3	1	0	2	1	1	0	14
07	<i>Fusarium oxysporum</i>	0	3	2	1	3	3	2	2	4	2	22
08	<i>Cladosporium shaerospermum.</i>	3	2	3	1	2	3	3	4	2	2	25
09	<i>Cladosporium cladosporioides</i>	2	1	1	3	1	3	3	2	1	0	17
10	<i>Penicillium chrysogenum</i>	3	3	2	1	2	3	3	4	0	2	23
11	<i>Penicillium citrinum</i>	1	3	2	2	2	3	2	2	1	3	21
12	<i>Penicillium oxalicum</i>	2	2	1	1	2	3	2	1	0	2	16
13	<i>Phoma sorghina</i>	3	1	2	3	1	0	0	1	0	1	12
14	<i>Alternaria alternata</i>	4	2	1	2	2	2	3	2	1	1	20
15	<i>Drechslera tetramera</i>	1	2	0	2	1	0	0	1	2	1	10
	Total	31	28	21	26	23	28	28	25	18	17	245

Filamentous fungi are naturally found in soil and water and the type of water is directly obtained from their natural resources. In the present study shows major diversity. The results obtained are based on Survey, isolation and identification, of soil fungi of the Shivrath River of Durg (C.G.) are presented as following. A total of 15 different fungi *Absidia cylindrospora*, *Mucor mucedo*, *Gongronella butleri*, *Rhizopus stolonifer*, *Fusarium oxysporum*, *Alternaria alternate*, *Cunninghamella stolonifer*, *Syncephalastrum racemosum*, *Cladosporium*

cladosporioides; *Cladosporium shaerospermum.*, *Drechslera tetramera.*, *Penicillium chrysogenum*), *Penicillium citrinum*, *Penicillium oxalicum*, *Phoma sorghina* were isolated and identified.

Penicillium spp are major contaminants of the environments and occur as ubiquitous saprophytes, with their spores able to survive and reproduce in the water. Others like *Cladosporium* species a nonhalophilic, terrestrial species known for their cosmopolitan distribution was also isolated. (G. Gaddeyya*, P. Shiny Niharika, P. Bharathi and P. K. Ratna Kumar, 2012). In the present study *Cladosporium Spp* occurred in most abundant amount, and *Penicillium Spp*. Also occurred in almost equal in amount as compared to the above mentioned studied. The Soil pH, organic content and water are the main factors affecting the fungal population and diversity (Yu C, Lv DG, Qin SJ. Du GD, Liu GC, 2007). *Absidia cylindrospora*, *Fusarium oxysporum*, *Alternaria alternate*, shows maximum CFU 24, 22, 20 respectively.

REFERENCES

- [1]. A. M. Cundell The Role of Microorganisms in the Revegetation of Strip-Mined Land in the Western United States *Journal of Range Management* Vol. 30, No. 4 (Jul., 1977), pp. 299-305.
- [2]. Chowdhry P.N. (1976) Studies on some aquatic fungi with special reference to ecology and taxonomy. Ph.D Thesis Rani Durgavati University Jabalpur (M.P.)
- [3]. Chowdhry P.N. and Agarwal, G.P. (1980 b) Studies in seasonal variation on aquatic fungi from Delhi. *Indian Phytopathology*. **33**(4): 614-615.
- [4]. Chowdhry P.N. and Agarwal, G.P. (1980a) Studies on distribution of some aquatic fungi in India. *Indian Phytopathology*. **33**(1): 107-109.
- [5]. Chowdhry, P.N. and Agarwal, G.P. (1981) Taxonomic studies on aquatic from India. *Indian Phytopath.* **35**(2): 235-236.
- [6]. David A. Wardle, Richard D. Bardgett, John N. Klironomos, **Ecological Linkages Between Aboveground and Belowground Biota** *Science 11 June 2004: Vol. 304 no. 5677 pp. 1629-1633.*
- [7]. G. Gaddeyya*, P. Shiny Niharika, P. Bharathi and P. K. Ratna Kumar, Isolation and identification of soil mycoflora in different crop fields at Salur Mandal *Advances in Applied Science Research*, 2012, 3 (4):2020-2026.
- [8]. H. Charles J. Godfray, John R. Beddington Ian R. Crute, Food Security: The Challenge of Feeding 9 Billion People *Science 12 February 2010: Vol. 327 no. 5967 pp. 812-818.*
- [9]. K.R. Aneja, Experiments in Microbiology, Plant Pathology, and Biotechnology, New Age International Publishers, fourth edition 2003.
- [10]. Wurzbacher, M; Barlocher, F; Grossort, HP (2010) Fungi in lake ecosystem. *Aquatic Microbial Ecology* **59**:125-149.
- [11]. Yu C, Lv DG, Qin SJ. Du GD, Liu GC, *J. Appl. Ecol.*, 2007, 18(10):2277-2281