

# Study of Soil Mycoflora of Patna Town through Baits of Different Nature

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**Abstract:** *The mycoflora of soil is momentous for plant, animal and human being. Soil is depository of all life which are carried out most of the changes that enable life to continue. In the soil dead remains of plants and animals, which are changed after decay and decomposition to the material. In this present study author focus on survey of fungal biodiversity in the soil of Patna town, Bihar state, India. Patna is located at latitude of 25° 6' and the longitude of 85° 1', through different baits in different nature. Cellulolytic, keratinophilic, seasonal fruits and vegetables using different agar media. These fungal biodiversity degrade the environmental waste ie fruit and vegetables, leather, nail, hair, cotton cloth, paper and jute which respond to clean the environment. Some fungal sps after decaying assist in soil fertility. Keratinophilic fungi is called dermatophytic fungi. They cause skin disease ring worm. Hence the present study focus on soil conservation and eco environmental management. Indian author Randhwa & Sandhu (1963, 1964, 1965), Mercantini et-al (1978), Pieta D Kesik T2006 reported pathogenic soil borne fungi of onion cultivated field, Vidyasagar GM (2005) keratinophilic fungi from hospital dust.*

**Keywords:** fungal biodiversity, cellulolytic, Keratinophilic, environment, soil fertility

## 1. Introduction

Soil is the major component of earth ecosystem which comprises of organic matter, minerals, gases, and large no of micro and macro organisms. Soil ecosystem is promoted by several interactions among its physical, chemical and Biological components (Buscot 2005). The fungi of soil is always an interesting and important study, soils are very composite systems, with many components playing diverse functions due to the activity of soil organisms. Soil mycoflora plays a pivotal role in evaluation of soil conditions and in stimulating plant growth (Kiran Singh et-al 1999) by biochemical transformations and mineralisations. Micro fungi play a focal role in nutrient cycling by regulating soil biological activity. Indirect accumulations in higher trophic level in organisms such as mammals may cause health problem. The quality and quantity of organic materials present in the soil assist soil fungal population. Microorganisms are beneficial in increasing soil fertility, degradation of waste such as cellulolytic, keratinophilic and fruit and vegetables effect economic potential.

## 2. Materials and Methods

General account of material and methods frequently used in course of experiments pertaining to the isolation of mycoflora from the soil by using different baits hair nail jute cotton cloth paper leather local fruit and vegetables.

### 2.1 Physicochemical properties of soil

#### Collection of Soil samples

Maximum types of soil samples of Patna were collected in sterile plastic bags and sealed in the pot. Samples were brought to the laboratory and used immediately or stored over night at 4 °C. Samples of soil collected for this study were taken from different habitats of Patna. The soil samples

from corporation garbage, Bank of river Ganges, where washer man washes their cloth, cremation ghat, Zoological garden, poultry farm, saw mill dust, Road side soil, vegetable field, and dairy farm were collected

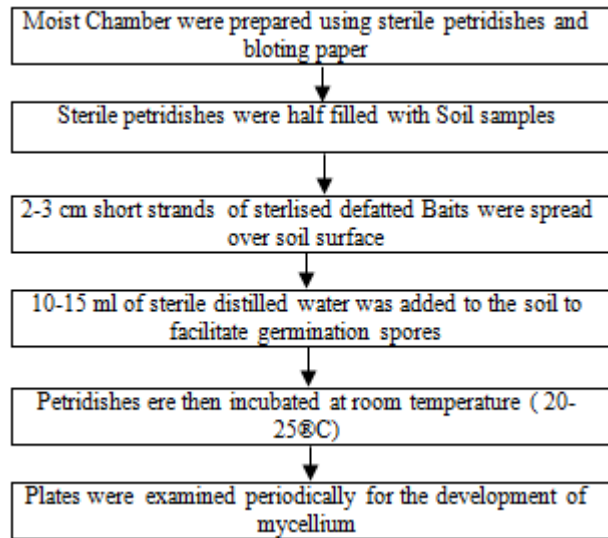
#### Baits preparations

Baits such as hair, nail, and leather contain oily and greasy substance therefore they were diluted first by treatment with diethylene for 12 hrs at 30+1°C temperature, twice dried at room temperature and boiled with 80% ethanol for 2hrs and finally washed with distilled water. Such treated baits were autoclaved at 15psi for 15 min, after cutting into suitable sizes. Cotton cloth, Jute and paper were sterilized in autoclave. Another bait such as fruit and vegetables after cutting into suitable sizes were sterilized by dipping them into 0.1% HgCl<sub>2</sub> solution for one minute, blot dry, repeated the process 5-8 times.

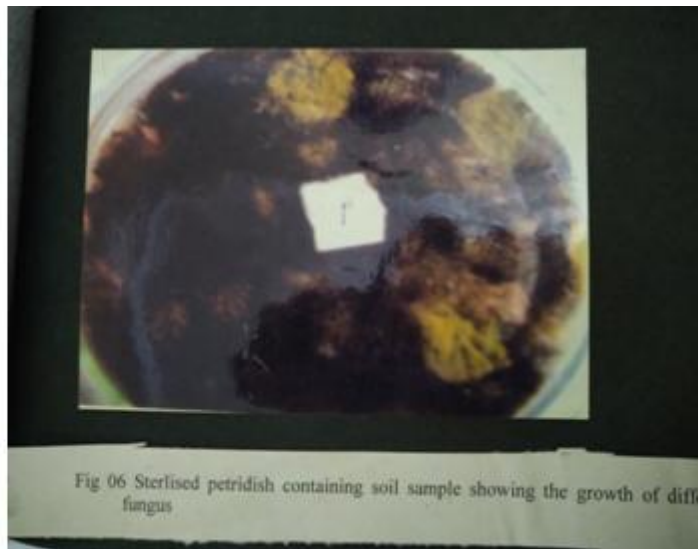
#### Isolation and identification of fungi

Keratinophilic fungi, cellulolytic, were isolated by the Baiting technique of vanbreuseghem (19) using autoclaved human nail, hair, leather, cellulolytic jute paper cloth, fruit and vegetables bait. For this sterile petridishes half filled with the soil samples and moistened with sterile distilled water were baited, incubated at room temperature and examined daily from the third day for fungal growth over a period of four weeks. After observing the mycelia growth on the different baits, isolates were cultured on SDA, PDA and RBM medium supplemented with streptomycin. Isolated fungi were stained with Lactophenol cotton Blue and observed under the phase contrast microscope and identified on the basis of the monographs of Sigler and Carmichael (20) von Arx (23) by using macro and micro morphological characters.

### 2.2 Baiting Technique



Fungal population on different baits



### 3. Result and Discussion

Present study shows an overall prevalence of fungal population of different nature in different sites of patna town is presented in tables

**Table 1:** Fungal sps of keratinophilic fungi

Fungal sps Site of soil samples	Bait	Aspergillus flavus	A.candidus	Candida albicans	Chaetomium bostrichodes	Epidermophyton flucosum	Ggleomatrix murorum	Histoplasma capsulatum	Monosporium apiosporum	M.canis	Trichophyton verrucosum
Cattle graing	H		+								
	N	+									+
	L										
Cremation ghat	H										
	N							+			+
	L										
Dairy farm	H										
	N										+
	L						+				
Garbage soil	H		+							+	
	N				+						+
	L					+	+				
Poultry farm	H									+	
	N									+	
	L									+	
Rampur nahar	H										
	N										+
	L										
River Bank	H										
	N				+						
	L										
Road side	H								+		
	N										+
	L										
Saw mill dust	H		+								
	N				+						
	L										
Vegetable field	H			+							
	N										
	L		+								
zoo	H			+							
	N										+
	L					+					

**Table 1:** Fungal sps isolated using bait, leather, human hair and nail

Hint:H=human hair

N=nail

L=leather

**Table 2:** Frequency occurrence of keratinophilic fungi

SN	Name of fungi	number	% value
1	Aspergillus flavus	2	18.1%
2	A.candidus	4	36.36%
3	Candida albicans	2	18%
4	Chaetomium bostrichodes	3	27.2%
5	Epermophyton flucossumid	2	18%
6	Gleomatrix murorum	2	18%
7	Histoplasma capsulatum	1	9%
8	Microsporium canis	4	36.3%
9	M.apisporum	1	9%
10	M.gypseum	4	6.6%
11	Trychophyton verrucosum	7	63.3%

**Table 3:** Fungal sps fruit and vegetable baits

Fungi	Bait	Aspergillus flavus	A.fumigatus	A.niger	A.vesicular	Curvulara lunata	Fusariummoniliformae	Geotrichum spss candidum	Monilia sps	Penicillium palitans	Rhizopus sps	Trichoderma lignorum	Torrula
Cattle graing	LC	+										+	
	LV	+											
	PM						+						
Cremation ghat	LC						+						
	LV						+						
	PM		+		+	+	+			+			
Dairy farm	LC	+			+								
	LV												
	PM									+			
Garbage soil	LC				+		+				+		+
	LV				+		+				+		+
	PM	+	+				+			+		+	
Poultry farm	LC						+						
	LV						+						
	PM						+				+		
Rampur nahar	LC				+								
	LV				+								
	PM	+	+										
River Bank	LC	+								+			
	LV	+								+			
	PM	+	+		+					+			
Road side	LC	+			LC								
	LV												
	PM		P										
Saw mill dust	LC	+											z
	LV												
	PM						+			+			
Vegetable field	LC			+				+	+				
	LV	+		+				+	+				
	PM				+	+							
ZOO	LC			+			+						
	LV			+			+						
	PM		+										

**Table 4:** Frequency occurrence of fruit and vegetable fungi

SN	Aspergillus flavus	9	81%
1	A.fumigatusf	5	45%
2	A. niger	7	63%
3	A.vesicular	1	9%
4	Curvularia lunata	2	18%
5	Fusarium monilifrmæ	6	63%
6	Geotrichum candidum	1	9%
7	Monilia species	1	1%
8	Penicillium palitans	5	45%
9	Rhizpus arhius	2	8%
10	Trichoderma lignorum	1	9%
11	Torula graminis	1	9%

**Table 5:** Fungal sps of cellulolyticbaits

Fungal sps/soil samples	Bait	Aspergillus flavus	A.niger	a.nidulans	A.fumigatus	Chaetomium ostrictroooooode	C globossum	C.indicum	Cladosporium herbarum	Fusarium moniliformae	Geotrichum candidum	Trichoderma lignorum
Cattle graing	C	+	+									
	P											
	J											
Cremation ghat	C	+	+		+					+		
	P											
	J	+				+				+		
Dairy farm	C					+	+			+		
	P											
	J											+
Garbage soil	C	+	+			+						+
	P					+			+	+		
	J					+			+	+		
Poultry farm	C	+	+	+								+
	P											
	J	+	+			+			+			
Rampur nahar	C		+								+	+
	P	+										
	J										+	+
River Bank	C											
	P									+	+	
	J											
Road side	C	+	+									+
	P						+		+			
	J											
Saw mill dust	C						+					
	P											
	J											
Vegetable field	C	+	+								+	+
	P											+
	J											
zoo	C		+									
	P						+		+			
	J									+		

Hint-  
C=cotton cloth  
P=paper  
J=jute

**Table 6:** Frequency occurrence of cellulolytic fungi

SN	Name of Fungi	no	% value
1	Aspergillus flavus	6	54%
2	A.fumigatus	1	9
3	A.niger	6	54%
4	A.nidulans	1	9%
5	Chaetomium bostrichodes	4	6%
6	C.globossum	3	27%
7	C indicum	4	36%
8	Cladosporium herbarum	1	9%
9	Fusarium moniliformae	5	45%
10	Geotrichum candidum	3	27%
11	Trichoderma lignorum	5	45%

#### 4. Result Analysis

From keratinophilic bait such as human hair ,nail leather-fungal genera - Aspergillus flavus , A.candidus, Chaetomium bostrichodes ,Candida albicans, Curvularia lunata, Fusarium sps, Gleomatrix murorum, Histoplasma capsulatum, Microsporum gypseum, M.canis, Monosporium apiosporum, Trychophyton verrucosumetc.were observed

with different proportions. In keratinophilic nature human hair , nail and leather baits were taken , in which maximum fungal genera were found on leather bait and least genera were observed in nail as bait. In cellulolytic bait the fungal genera were investigated which are as –Aspergillus fumigates, A.niger, A.nidulans, Chaetomium homopilatum, C. globosum, C. indicum, Cladosporium herbarum, Fusarium moniliformae, Geotrichum candidum, trichoderma lignorum, and T. viridae with different proportions . Here cotton cloth paper and jute as bait were taken ..out of three baits cotton cloth and jute showed maximum fungal populations while paper showed least fungal populations. In the case of fruit and vegetables the fungal genera were Aspergillus flavus, A. fumigatus, A. niger A. vesicular, Curvularia lunata, fusarium moniliformae, Geotrichum candidum, monilia sps, Mucor sps, penicillium paliatans,Rhizopus arhizus, Trichoderma lignorum, and Torula graminis,. here maximum fungal populations were found on bait vegetables ie luffa cylindrica and L. vulgaris

## 5. Result and Discussion

Extensive literature clearly indicate that soil is the depository of the largest reservoir of saprophytic, cellulolytic, keratinophilic, fruit and vegetables fungi. Karling (1947, 1948, 1954), Aldoori (1967), Rodger (1977), Anderson (1979), Meisner and Quadripur (1983), Af mstafa and MS sarkar reported fungi are able to decompose cellulose in the tidal mud flats of Kuwait. 12 fungal forms were isolated from cellulose substrates ie cotton clothes and paper (Domer & Jodith, RG bagool & DD wani (1982), young Weijnune, Kishwan Nazir (2006), some fungal sps were also investigated in the presence of Cryptococcus neoformans in various natural resources such as bird drooping, fruits and vegetables (Lopez Martinez LR, castanon oliver (1994) DAesigbe and SA bankole(1997). Bern stein BE, Zehr I, Dean RA, Shabi E(1995), Desai AJ. Some dermatophytic fungi cause skin disease George LK 1959, fungal colony on hair Griffith DM 1960, .isolation of trychophyton tonsurans and T. verrucosum from a keratinosis Krempt lampreecht et al 1982, Ov.GP1969, Pandey AA, Misra Sp, 1966. Abdel hafez, Mokaram AM, Abdel Gawad KM 1990 .a study of Tinea capitis was carried out during the period Jan-June 1996 in 7525 primary school children. The mycoflora of the hair in 285 sheep from the west bank of Jordan was analysed and the frequency of occurrence and the relative importance value for different fungal sps were isolated (MD saleem Ali, Satyeh, HM Arda SF Sahhen), recovery of dermatophytes from shoes and shoewer, (Ajello & Getz MZ 2004). Histoplasma capsulatum was isolated from the feather of 324 chicken ,CC Campbel, RP Tiwary,. Survey of keratinophilic fungi associated with birds from feathers Pugh GJF, et al 1965, 1970) .

## 6. Conclusion

In reviewing the above result from tables 1-6 it is conclusively found that

- 1) In keratinophilic baits trychophyton verrucosum (63%) showed maximum dominancy in keratinophilic baits leather and nail. Here bait leather and nail showed better performance for the growth of fungal population.
- 2) In cellulolytic bait Aspergillus flavus (54%) showed better growth on bait cotton cloth and jute. Here bait cotton cloth and jute showed maximum fungal growth.
- 3) In fruit and vegetables, maximum fungal populations were observed in vegetables.

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