

ISOLATION AND IDENTIFICATION OF KERATINOPHILIC FUNGI FROM REGIONAL PARK OF INDORE (MADHYA PRADESH)

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Abstract-

Thirty soil samples were collected randomly from Regional Park from Indore (Madhya Pradesh). Screened for presence of keratinophilic fungi using hair baiting technique for isolation. The isolated keratinophilic fungi were classified in to 11 species belonging to 9 genera. These soil samples are rich in pathogenic keratinophilic fungi including dermatophytes. The keratinophilic fungi isolates were *Aspergillus niger*, *Fusarium solani*, *Aspergillus sp.*, *Penicillium sp.*, *Microsporum canis*, *Microsporum audouinii*, *Trichophyton rubrum*, *Chrysosporium sp.*, *Arthroderma sp.*, *Bipolaris sp.* and *Scedosporium apiospermum*.

Key words: Keratinophilic fungi, Soil samples, Hair baiting technique, Regional Park.

1- Introduction-

Soils rich in keratinous materials are most conducive for the growth and occurrence of keratinophilic fungi. Soil is the main reservoir of different types of fungi and some of them are pathogenic to both humans and animals. Keratinolytic mycoflora love to grow and even reproduce on keratin materials such and utilize keratin as carbon source. Keratinophilic fungi are ecologically important because the fungi are help in degradation of keratin. The distribution of these fungi depends on different factors one of which is of vital importance in human and in animal presence. Some of these fungi are well known dermatophytes and are known to cause superficial cutaneous infection (Dermatophytosis) of keratinized tissues (skin, hairs and nails) of humans and animals. Mycotic infection is reported throughout the world and is extremely contagious. Keratinolytic mycoflora love to grow and even reproduce on keratin materials such and utilize keratin as carbon source. The biggest group of organisms that can utilize keratin as the sole source of carbon and nitrogen are the keratinophilic fungi. Keratinophilic fungi belongs to Kingdom Eumycota (true fungi), two groups - the Deuteromycetes and the Ascomycetes. The present investigation was therefore undertaken to record the natural occurrence of keratinophilic fungi in the Regional Park soils of Indore city (Madhya Pradesh) of India.

2- Material and methods-

2.1 Collection of soil samples and baits: 30 soil samples were collected randomly (4 sites) from regional park from Indore (Madhya Pradesh). Before collection of soil samples, superficial debris and other vegetative materials were removed from the soil surface. Loosened soil (approximately 500g) were taken from the surface layer of each site to a depth of 2-5cm. Soils were collected in sterile plastic bags and sealed on the spot.

Defatting of baits was done by soaking them for 24 hrs in diethyl ether and later rinsing them 3- 4 times distilled water followed by air drying.

2.2 Isolation identification of keratinophilic fungi: Keratinophilic fungi were isolated by the hair baiting technique of Vanbreuseghem (1952) human hair as keratin bait. The soil samples and moistened with sterile distilled water were baited by burying sterile keratinous bait in the soil. These dishes were incubated at room temperature for 3- 4 weeks. After observing the mycelial growth on the baits, isolates were cultured on Sabouraud's Dextrose Agar (SDA) medium supplemented with streptomycin or chloramphenicol (30 mg/l).

2.3 Identification of keratinophilic fungi: Isolated fungi were stained with lectophenol and cotton blue and observed it under the microscope, literature, camera lucida and other sources.

3- Results and Discussion -

Present study shows an overall prevalence of keratinophilic fungi in regional park soils at Indore, Madhya Pradesh. The soil samples collected from different area of Regional Park of Indore. The result of isolation of keratinophilic fungi are presented in table no. 1

S.no.	Name of the fungus	Sampling site						Total colonies	% Occurance
		1	2	3	4	5	6		
1	<i>Fusarium solani</i>	+	+	+	-	-	+	4	9.52
2	<i>Arthroderma sp.</i>	+	+	-	-	-	-	2	4.76
3	<i>Chrysosporium sp.</i>	+	-	+	-	+	+	4	9.52
4	<i>Microsporum canis</i>	+	+	+	+	-	+	5	11.90
5	<i>Microsporum audouinii</i>	+	+	+	+	+	+	6	14.28
6	<i>Trychophyton rubrum</i>	-	-	-	+	+	-	2	4.76
7	<i>Aspergillus niger</i>	+	+	+	+	+	+	6	14.28
8	<i>Bipolaris sp.</i>	+	+	+	-	-	-	3	7.14
9	<i>Penicillium sp.</i>	+	+	+	+	-	-	4	9.52
10	<i>Aspergillus sp.</i>	+	+	+	+	+	+	6	14.28
11	<i>Scedosporium apiospermum</i>	+	-	+	+	-	-	3	7.14

A total of 18 colonies of different keratinophilic fungi were isolated from 30 soil samples of Regional Park of Indore (Madhya Pradesh). The isolated keratinophilic fungi were classified in to 11 species belongs to 9 genera.

The isolated keratinophilic fungi were in the following: *Aspergillus niger*, *Fusarium solani*, *Aspergillus sp.*, *Penicillium sp.*, *Microsporum canis*, *Microsporum audouinii*, *Trychophyton rubrum*, *Chrysosporium sp.*, *Arthroderma sp.*, *Bipolaris sp.* and *Scedosporium apiospermum*. Moallaie *et al* (2006) also reported that *Fusarium* was the most prevalent saprophyte in south and Razavi Khorasan provinces.

Arthroderma tuberculatum also reported of Public Park and agriculture field of Uttar Pradesh, India. (Singh and Kushwah 2010)

Some species of *Aspergillus niger*, *Fusarium solani* and *Bipolaris spicifera* are the causative agents of mycotic keratitis (Eghtedari *et al* 2006).

Jangid and Begum (2018) also reported *Aspergillus niger*, *Chrysosporium sp.*

In these studies the fungal strain *Microsporum* and *Trychophyton sp.* were frequently isolated keratinophilic fungi and dermatophytes were also previously reported from soil of India (Deshmukh 2010 and Shadzi 2002). Keratinophilic fungi are important ecologically and play a big role in bioremediation in natural environment.

Occurrence of *Microsporum sp.* In different types of soil is important for pathogenic potential of fungus and was confirmed in several studies in different countries. *Microsporum audouinii* was showed to cause systemic infection in a person with a chronic skin disease (Hedayati and Shokohi, 2005).

In previous studies *Trychophyton rubrum* reported best producer of keratinase (Roilides *et al* 2014). *T. rubrum* had been recognized as a strong producer of extracellular keratinase in medium including porcine nail as the source of nitrogen and carbon. *T. rubrum* and *T. tonsurans* reported the most frequent isolate from Public Park in Isfahan (Fillipello 2000).

Second most common species isolated in our study were *Chrysosporium* and *Penicillium sp.* was reported from comb lesion in two different breeds of chicken in India. (Sharma and Rajak 2003).

Scedosporium apiospermum is also reported by Cooley *et al.* (2007) in Australia. 59 case of scedosporiosis caused by *Scedosporium apiospermum* and *Scedosporium prolificans* in patients with underlying diseases.

Conclusion

It is concluded from the present study that Keratinophilic and other fungi isolated from soil of Regional park of Indore (M.P.). This could be attributed to the high organic debris and keratinous substrates present in these soils. Finally, this study reveals that the soil is rich in dermatophytes and related fungi responsible for dermatophytosis or ringworm disease.

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