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DISTRIBUTION OF KERATINOPHILIC FUNGI ISOLATED FROM CATTLE SHEDS AND HOSTEL GROUND SOILS OF JAIPUR, INDIA

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The present study was done to isolate and to analyse the distribution of keratinophilic fungi from cattle shed and hostel ground soils. Of a total of 42 soil samples examined, 34 were found positive for fungi. A total of 93 fungal isolates belonging to 13 different genera with 19 species were isolated as follows: *Chrysosporium tropicum* (26%), *C. indicum* (10%), *Trichophyton mentagrophytes* (19%), *T. verrucosum* (19%), *T. tonsurans* (12%), *T. simii* (7%), *T. terrestre* (5%), *Nocardia* sp. (17%), *Fusarium oxysporum* (14%), *F. moniliformae* (10%), *Histoplasma capsulatum* (12%), *Torula* sp. (12%), *Cladosporium* sp. (12%), *Gymnoascus reessii* (12%), *Microsporum gypseum* (12%), *Rhizopus* sp. (10%), *Curvularia lunata* (7%), *Alternaria* sp. (5%) and *Drechslera tetramera* (2%). The distribution of above isolated keratinophilic fungi was found to be higher in cattle shed soils.

Key words: Keratinophilic fungi, cattle shed, hostel ground.

The ubiquity of keratinophilic fungi in soil and various other environments is well recognized. Keratinophilic saprophytes are found on soil enriched with keratin. French dermatologist Sabouraud (1893) postulated that dermatophytes are primarily soil saprophytes. Ajello (1953) postulated that dermatophytes survive in soil as saprophytes. Most of the keratinophilic fungi, viz. species of *Chrysosporium, Fusarium, Aspergillus, Scopulariopsis, Curvularia* and *Alternaria* etc. are common saprophytes in soil and plant debris; some of them are often recovered as laboratory contaminants. Keratinophilic fungi are presented in the environment with variable distribution patterns that depend on different factors, such as human and or animal presence, which are of fundamental importance. These fungi are also reported from some other habitats viz. rice field soil (Sundaram, 1987), lake-side soils (Ghosh and Bhatt, 2000), muddy soil (Zaki *et al.*, 2005) and forest and farm yards (Moallaei *et al.*, 2006). Shukla and Rajak (1984) have done a comprehensive survey of keratinophilic fungi in Jabalpur. Deshmukh and Agrawal (2003) isolated the dermatophytes and other keratinophilic fungi from soils of Jammu, India. Srivastava and Nigam (2006) studied the seasonal diversity and distribution of keratinophilic fungi from cattle sheds and poultry farm soils of Kanpur, India.

In the present study, cattle sheds and hostel ground soils of Jaipur were examined for prevalence and distribution of keratinophilic fungi. The study on the distribution of keratinophilic fungi in different soil localities will be promising in understanding the possible occurrence of the fungi.

MATERIALS AND METHODS

Forty two soil samples were collected from some cattle sheds and hostel grounds of various region of Jaipur in sterilised polythene bags during 2004 and 2005. The all soil samples were collected from the superficial layers of 2 to 3 cm, with the help of a sterilized spatula. Each polythene bag was labelled indicating the date and site of collection and tightly closed with rubber bands, to maintain the initial moisture of the soil. The samples were maintained in room temperature until processing. The To. Ka. Va. hair baiting technique (Vanbreuseghem, 1952) was followed for isolation of fungi. For mixed growth of fungi, the Dilution Plate Technique/Single Spore Method was followed to separate the mixture. Percent distribution of isolated fungi in different habitats was calculated.

Table-1 Distribution of Keratinophilic fungi in cattle sheds and hostel ground soils of Jaipur

Keratinophilic fungi	No. of keratinophilic fungal isolates		Total isolates	Distribution (%)
	Cattle sheds	Hostel ground		
Chrysosporium tropicum Carmichael.	8	3	11	26
C. indicum (Randhawa and Sandhu)	2	2	4	10
Trichophyton mentagrophytes (Robin) Blanchard.	5	3	8	19
T. simii (Pinoy) Stockdale, Mackenzie and Austwick.	2	1	3	7
T. terrestre (Durie and Frey)	2	-	2	5
T. verrucosum Bodin.	5	3	8	19
T. tonsurans Malmsten.	3	2	5	12
Histoplasma capsulatum Darling.	3	2	5	12
Fusarium monilliformae Sheldon.	2	2	4	10
F. oxysporum Schlecht.	6	-	6	14
Curvularia lunata (Wakker) Boedijn.	3	-	3	7
Drechslera tetramera (McKinney) Subram and Jain.	-	1	1	2
Torula sp.	4	1	5	12
Nocardia sp.	5	2	7	17
Alternaria sp.	2	-	2	5
Cladosporium sp.	3	2	5	12
Gymnoascus reessii Baranetzky.	3	2	5	12
Microsporum gypseum (Bodin) Guiart and Grigorakis.	3	2	5	12
Rhizopus sp.	2	2	4	10
Sample examined	26	16	42	
Sample positive	21	13	34	
Percent occurrence	80.76	81.25	80.95	

RESULTS AND DISCUSSION

In a total of 42 samples, 34 were positive and yielded a total of 93 isolates of keratinophilic fungi belonging to different 19 species of 13 genera. Studies revealed overall 81 percent sample to be positive. In the present study, some of the soil samples yielded a single species and some samples yielded a mixed growth of two or more than two species of keratinophilic fungi.

Among the isolates, *Trichophyton* spp. were dominant, followed by *Chrysosporium* spp. *Trichophyton,* which is a well known dermatophytes, being the anamorphous species of Gymnoascaceae, was represented by *T. mentagrophytes, T. tonsurans, T. verrucosum, T. simii* and *T. terrestre* (Table 1). Within this group *T. mentagrophytes* and *T. verrucosum* both showed the maximum occurrence whereas *T. terrestre* showed less distribution and it was isolated only from cattle shed (two isolates). Ogbonna and Pugh (1987) reported a higher incidence of *T. mentagrophytes* from Nigerian soil. Ramesh and Hilda (1999) examined a high percentage of *T. mentagrophytes* from primary schools and public parks in Madras.

Chrysosporium spp. was next in distribution followed by *Fusarium* spp. In *Chrysosporium* spp., *C. tropicum* was maximum in distribution from cattle shed (eight isolates). *C. indium* was reported same in number same from both habitats. Jain *et. al.* (1999) also reported the dominance of *C. tropicum* in different localities of Jaipur soil. Deshmukh and Verekar (2006) also reported the maximum occurrence of *C. tropicum* in Himachal Pradesh soil. Deshmukh (2002) reported the incidence of *Chrysosporium indicum, C. keratinophilum, C. lobatum, C. pannicola, C. tropicum*, Chrysosporium state of *Arthroderma cuniculi* and Chrysosporium state of *Ctenomyces serratus* from selected soils of Kerala state (India).

Srivastava and Nigam (2006) reported the dominance of *Chrysosporium* spp. in cattle shed and poultry farm soils of Kanpur.

F. oxysporum was isolated only from cattle shed (six isolates) whereas *F. moniliformae* was isolated from both, cattle shed and hostel ground. Simpanya and Baxter (1996) isolated *Fusarium* sp. from roadside samples. *Nocardia* sp. was isolated from both but maximum number of isolates from cattle shed (five isolates) and minimum from hostel grounds (two isolates). Goel and Kanta (1993) reported 8 percent prevalence of *Nocardia* sp. in Patiala area. *Cladosporium* sp., *G. reessii*, *Rhizopus* sp., *M. gypseum* and *H. capsulatum* were isolated from both soil habitats. Caretta *et al* (1992) isolated *G. reessii* from soil of Italian parks in the province of Pavia. Sanyal and Thammaya (1975) isolated *H. capsulatum* from the Gangetic plains. The number of *C. lunata* isolates was less followed by *Alternaria* sp. and *D. tetramera*. *C. lunata* and *Alternaria* sp. were isolated only from cattle shed and *D. tetramera* was isolated only from hostel ground.

Use of the hostel grounds by people and presence of animals in cattle shed may introduce keratinous dander (waste). These keratinous wastes may serve as substrata for keratinophilic fungi in soils of hostel grounds and cattle shed. Therefore, it can be concluded that the selection of certain keratinolytic isolates could become useful in managing heavily polluted habitats. Finally, to our knowledge, this is the first report concerning the isolation of *T. verrucosum*, *T. tonsurans*, *Alternaria* sp. and *Cladosporium* sp. as geophilic keratinophiles from the studied areas of Jaipur.

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