

## Isolation of dermatophytes and related keratinophilic fungi from the two public parks in Ahvaz

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### Abstract

Fungi found in soil and the variation and prevalence in each area depends on environmental and nutritional conditions. Considering the importance of soil in transmission of diseases, this study aims at assessing the frequency of dermatophytes and related keratinophilic fungi, potentially pathogenic fungi in various samples collected from two public parks in Ahvaz, SW Iran. Five hundred samples were collected from different parts of the Zoo and Laleh parks in Ahvaz. The fungal flora was analyzed in different samples for the presence of dermatophytes and keratinophilic fungi by hair baiting technique. Specimens were contained soil, carpet pad technique from the walls of the cages, and animals' residues. The samples were cultured on Sabouraud's dextrose agar, containing chloramphenicol and cyclohexamide, and incubated at 25-27°C for 4-5 weeks aerobically. Isolates were identified by colony morphology, slide cultures, and differentiation tests. Most of the isolated dermatophytes were collected from the soil of the Zoo park. The most common keratinophilic fungus was *Chrysosporium* (5). Other species were *Trichophyton mentagrophytes* (3), *T. verrucosum* (2), *T. schoenleinii* (1) and *M. gypseum* (1). The results demonstrated that dermatophytes and related keratinophilic fungi of Ahvaz is somewhat different from that in other parts of Iran. This may be due to the different climatic conditions prevailing. Considering, the fact that most of the potential pathogenic fungi were isolated from the Zoo park, where there are wilds and domestic animals.

**Keywords:** Dermatophyte, Keratinophilic fungi, Park, Ahvaz, Iran

### Introduction

Keratinophilic fungi along with dermatophytes are responsible for various cutaneous mycoses. Dermatophytes require keratin for growth. These fungi can cause different types of tinea in humans. The majority of the fungi producing diseases in human beings and animals exist freely in nature as soil saprophytes [1]. Dermatophytes are spread by direct contact

from infected people (anthropophilic organisms), animals (zoophilic organisms), and soil (geophilic organisms), and indirectly from fomites [2]. Several studies have been shown that soils are important sources of dermatophytes and keratinophilic fungi [3]. The presence of dermatophytes in soil (especially parks) can be a reservoir for infection in human beings. In the recent years, many workers have reported the

distribution of keratinophilic fungi and related dermatophytes in soils [4-6]. Ahvaz, a city in the South West of Iran is a good candidate for this study because of having a subtropical climate and geographic diversity, leading to the area suitable for wisely distribution these fungi. To date, little epidemiological data on fungal flora of soil in this area has become available. The present paper reports the prevalence of dermatophytes and related keratinophilic fungi in the various locations of two public parks in Ahvaz.

### Materials and methods

Five hundred samples were collected from different parts of the two parks in Ahvaz. Soil samples were placed in plastic bags by disposable spoons from 150 different parts of the parks, including 100 soil samples, from inside the parks and 50 from around the cages. Carpet sterile fragments was used for sampling the walls of the cages (n=50), resting areas (n=100), and the children's playgrounds (n=100). In brief, carpet were cut into pieces 2×2cm and sterilized by autoclave. For sampling, a piece of sterile carpet was put on a surface, and after a few minutes removed and placed on the surface of the culture medium. Animal's residues (hairs, wool and feather) (n=100) were also put in plastic bags.

The samples were analyzed by three different methods. Keratinophilic fungi were isolated by hair baiting technique of Vanbreuseghem using human hair as keratin bait from soil [7]. Approximately 50g of each soil sample was placed into a sterile Petri dish and baited with sterilized small

pieces of hair. Each Petri dish was moistened with 5–10ml sterile distilled water and incubated at room temperature for up to five weeks before being discarded. The presence of keratinophilic fungi was confirmed by low-power microscope. Fragments of colonized hair were subcultured on Sabouraud's dextrose agar medium containing chloramphenicol and cyclohexamide (SCC) (Merck, KGaA, Germany). A collected Animals' residues such as hair, wool and feathers were cut into small pieces and inoculated into SCC plates. A piece of sterile carpet was put over the surface of SCC and incubated at 25-27°C aerobically. The cultures were examined weekly for a period of five weeks. The different types of colonies were subcultured on SCC slants. Isolates were identified on the basis of microscopic morphology, cultural characteristics and differentiation tests.

### Results and discussion

Out of 500 analyzed samples for the presence of dermatophytes and related keratinophilic fungi, twelve strains of fungi were isolated. Among the 12 isolated strains, five strains were *Chrysosporium* Spp. followed by *T. mentagrophytes* (3), *T. verrucosum* (2), *T. schoenleinii* (1) and *M. gypseum* (1). The results are given in table 1. In general, the frequency of dermatophytes and keratinophilic fungi in the Zoo park was higher than in the Laleh park. The maximal frequency of these fungi may be a result of the presence of wild and domestic animals, serving as a reservoir of organisms.

**Table 1:** Dermatophytes and related keratinophilic fungi isolated from parks in Ahvaz

Species	Zoo park					Laleh	Total
	Soil	Animal's residues	Rest area	Playgrounds	Cages	Rest area	
<i>T. schoenleinii</i>	1						1
<i>M. gypseum</i>	1						1
<i>T. verrucosum</i>				2			2
<i>T. mentagrophytes</i>			1		1	1	3
<i>Chrysosporium</i> Spp.	1	2	1		1		5
Total	3	2	2	2	2	1	12

The geophilic *M. gypseum* was only isolated from soil in one case. Other researchers previously reported few cases of tinea due to *M. gypseum* in Ahvaz [8-10]. Among recovered dermatophytes, *M. gypseum* was the most frequent species in Isfahan [11]. The optimum temperature for dermatophyte is 25-27°C. Depending on the seasonality, Ahvaz as a subtropical region, its ambient temperatures reach the peak of 40-50 °C during June to August. Shukia *et al.* [12] believe that increasing temperature and decreasing humidity lead to providing a less favorable condition for the growth of *M. gypseum* in the soil.

In the present study three isolates of *T. mentagrophytes* and two isolates of *T. verrucosum* were made from samples. Both species are zoophilic and are usually associated with animals. *T. mentagrophytes* typically invades wild animals whereas *T. verrucosum* is more prevalent in household animals. The spread of these fungi in the Zoo park is probably due to wild and domestic animals that live in the park. *T. mentagrophytes* and *T. verrucosum* were shown to be major causative agents of human dermatophytoses in Ahvaz [8-10]. *T. schoenleinii* is an anthropophilic dermatophytes and is unusually found in the soil. This usually causes tinea in human beings. Shadzi *et al.* [11] report *Chrysosporium keratinophilum* as the most frequent isolate from public parks in Isfahan. *Chrysosporium* species are the most common keratinophilic fungi isolated from soil in many parts of the world [5, 6, 11].

It is appeared from this study that the dermatophytes and related keratinophilic fungi of Ahvaz are somewhat different from that in other parts of Iran. This may be due to the different climatic conditions prevailing. It must also be taken into the account that the majority of the potential pathogenic fungi were isolated from the Zoo park, where there were wild and domestic animals. Finally, the study reveals that the soil of Ahvaz is not rich in dermatophytes and related fungi.

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### References

- (1) Kumari GR, Mahrora S, Rao PS. Prevalence of Non-Keratinophilic Fungi in the Soil. *Indian Journal of Medical Microbiology* 2005; 23: 144-145.
- (2) Hainer BL. Dermatophyte Infections. *American Family Physician* 2003; 1: 101-108.
- (3) Hedayati MT, Mohseni-Bandpi A, Moradi S. A survey on the pathogenic fungi in soil samples of potted plants from Sari hospitals, Iran. *Journal of Hospital Infection* 2004; 58: 59-62.
- (4) Ramesh VM, Hilda A. Incidence of keratinophilic fungi in the soil of primary schools and public parks of Madras City, India. *Mycopathologia* 1998; 143: 139-145.
- (5) Deshmukh SK. Incidence of keratinophilic fungi from selected soils of Kerala state (India). *Mycopathologia* 2002; 156: 177-181.
- (6) Papini R, Mancianti F, Grassotti G, Cardini G. Survey of keratinophilic fungi isolated from city park soils of Pisa, Italy. *Mycopathologia* 1998; 143: 17-123.
- (7) Vanbreuseghem R. Technique biologique pour isolement des dermatophytes du sol. *Annual of Society of Belgique Medicine* 1952; 10: 165-171.
- (8) Zarei Mahmoudabadi A. A survey of 382 suspected patients with tinea capitis (Ahvaz). *Ahvaz Scientific Medical Journal* 1997; 22: 45-52.
- (9) Hedayati MA. Common dermatophytes in Khuzestan province. *Ahvaz Scientific Medical Journal* 1989; 10: 59-65.
- (10) Rafiei A, Emmami M, Moghadami M, Mahmedi M, Shidfar M. Cutaneous mycosis in Khuzestan province. *Ahvaz Scientific Medical Journal* 1992; 14: 22-34.
- (11) Shadzi S, Chadeganipour M, Alimoradi M. Isolation of keratinophilic fungi from elementary schools and public parks in Isfahan, Iran. *Mycoses* 2002; 45: 496-499.

- (12) Shukia P, Shukla CB, Kango N, Shukla A. Isolation and characterization of a dermatophyte, *Microsporum gypseum* from poultry farm soils of Rewa (Madhya Pradesh), India. *Pakistan Journal of Biological Sciences* 2003; 6: 622-625.

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