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ORIGINAL ARTICLE

# Dermatophyte and non dermatophyte fungi in Riyadh City, Saudi Arabia



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## KEYWORDS

Dermatophytes;  
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Trichophyton;  
Tinea

**Abstract** *Background:* Dermatophytes are a scientific label for a group of three genera (*Microsporum*, *Epidermophyton* and *Trichophyton*) of fungus that causes skin disease in animals and humans. Conventional methods for identification of these fungi are rapid and simple but are not accurate comparing to molecular methods.

*Objective:* This study aimed to isolate human pathogenic dermatophytes which cause dermatophytosis in Riyadh City, Saudi Arabia and to identify these fungi by using conventional and molecular methods.

*Methods:* The study was conducted in Medical Complex, Riyadh and King Saud University. Samples of infected skin, hairs and nails were collected from 112 patients. Diagnosis of skin infections, direct microscopic test, isolation and identification of dermatophytes by conventional and molecular methods were carried out.

*Results:* The results indicated that the tinea capitis infection had the highest prevalence among the patients (22.3%) while *Tinea barbae* had the lowest. In this study the identified dermatophyte isolates belong to nine species as *Trichophyton violaceum*, *Trichophyton verrucosum*, *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Trichophyton schoenleinii*, *Trichophyton concentricum*,

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*Microsporium canis*, *Microsporium audouinii* and *Epidermophyton floccosum* which cause skin infections were isolated during this study. Non dermatophyte isolates included 5 isolates from *Aspergillus* spp. 4 isolates from *Acremonium potronii* and 15 isolates from *Candida* spp. *M. canis* were the most common species (25% of isolated dermatophytes). Out of the 52 dermatophyte isolates identified by conventional methods, there were 45 isolates identified by the molecular method.

**Conclusions:** The results concluded that approximately *M. canis* caused a quarter of dermatophyte cases, tinea capitis infection was prevalent and the molecular method was more accurate than conventional methods.

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## 1. Introduction

The dermatophytes are a group of fungi that are able to damage and utilize keratin found in the skin, hair and nails. They are classified into three genera (*Microsporium*, *Trichophyton* and *Epidermophyton*) based on the shape of macroconidia. Dermatophytosis is an infection produced by dermatophytic fungi in the keratinized tissues (Grumbt et al., 2013). Since 1978, it was decided that the dermatophytes contracted half way across the world may become manifest in a country in which the pathogen is not normally found because of the rapid transit, and the increasing mobility of people (Aho, 1988). The dermatophytosis transfers to man from animal (zoophilic dermatophytes) and from soil (geophilic dermatophytes) or through direct infection by personal contact (Aho, 1988; Philpot, 1978).

The infectious phase includes fungal hyphae and arthrospores that have a latency phase that reaches to 24 months inside loose vacuoles keratinocytes of host (Richardson, 1990). The phenotypic characteristics of dermatophyte fungi are changed by many environmental, nutritional and chemical factors, for this reason researchers prefer the molecular methods, genotypic characteristics, to identify the dermatophytes, also the molecular methods are fast and more specific (Faggi et al., 2001; Liu et al., 1997, 2000b). Direct microscopic examination, isolation, cultural features and physiological characteristics are useful to identify the genus and species of dermatophytes but these conventional methods require time and effort (Singh and Beena, 2003). Molecular methods such as random amplified polymorphic DNA (RAPD) or arbitrarily primed PCR (AR-PCR) and Specific nucleotide sequence are used to identify species and sub-species of dermatophytes (Faggi et al., 2001). Recently, multiplex PCR method has been developed to detect dermatophytes in onychomycosis based on chitin synthase and internal transcribed spacer genes (Dhib et al., 2014).

Many studies were carried out in Saudi Arabia to isolate and identify some dermatophytes by conventional methods. Some of those studies found that the onychomycosis (40.3%) was more prevalent than tinea capitis (21.9%) followed by tinea pedis (16%), tinea cruris (15.1%) and tinea corporis (6.7%). In the Riyadh region, *Trichophyton mentagrophytes* and *Microsporium canis* were the most common dermatophytes whereas *M. canis*, *Trichophyton rubrum* and *T. mentagrophytes* were the most prevalent in the Eastern Province (Abanmi et al., 2008; Al-Sogair et al., 1991; Al Sogair and Hay, 2000). The aim of this research was to isolate and identify dermatophytes from

patients in Riyadh City by a conventional and molecular method.

## 2. Materials and methods

### 2.1. Reference isolates

Reference dermatophyte isolates were purchased from Assiut University Mycological Center (AUMC), Egypt. (Table 1).

### 2.2. Specimen collection

The experimental design of current study was approved by the Department of Botany and Microbiology, College of Science, King Saud University (No. 29499001265). This study was performed according to international ethical guidelines for epidemiological studies prepared by the Council for International Organizations of Medical Sciences (CIOMS) in collaboration with the World Health Organization (CIOMS, 2008). The Samples were collected from patients treated in a dermatology clinic-medical complex, Riyadh. The medical diagnosis was done by physicians and consultants as skin diseases. Samples of skin, hair and nails were collected by sterilized scalper, nail clipper, tweezers, toothbrush, vinyl tape strips or moistened cotton swabs depending on nature of infection. The samples were preserved in a sterile Petri dish and were transferred within 6 h to the Medical mycology laboratory in the Department of Botany and Microbiology, College of Science, King Saud University to perform isolation and identification.

**Table 1** Reference dermatophyte isolates from Assiut University Mycological Center, Egypt.

No.	AUMC No.*	Fungal species
1	2350	<i>Microsporium fulvum</i>
2	2349	<i>Microsporium gallinae</i>
3	5096	<i>Microsporium gypseum</i>
4	5503	<i>Trichophyton mentagrophytes</i>
5	5488	<i>Trichophyton rubrum</i>
6	2353	<i>Trichophyton simii</i>
7	5097	<i>Trichophyton violaceum</i>
8	2357	<i>Microsporium praecox</i>
9	5448	<i>Microsporium canis</i>
10	5473	<i>Trichophyton verrucosum</i>
11	5495	<i>Epidermophyton floccosum</i>

\* AUMC: Assiut University Mycological Center.

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