# Differentiating agents of dermatophytosis (Trichophyton rubrum and Trichophyton interdigitale) in human by dual polymerase chain reaction(Article)

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Abstract

Background: Dermatophytes create the most common fungal disease in humans, called dermatophytosis. The two species of Trichophyton rubrum and Trichophyton interdigital are responsible for over 80% of types of dermatophytosis. So far, several morphological and physiological methods have been used to differentiate these very similar species, but these methods are generally time-consuming and have low specificity. The purpose of this study was to introduce a simple and rapid duplex polymerase chain reaction (PCR) reaction to differentiate these two species from each other. Methods: This research was an analytical and experimental study that was carried out from 2017 to 2018 in the Medical Mycology Laboratory, School of Public Health, Tehran University of Medical Sciences, Iran. For this purpose, the nucleotide sequences of the 4 regions of internal transcribed spacer (ITS), beta-tubulin, elongation factor 1 alpha and calmodulin in the two considered species of fungi were conducted bioinformatics analysis. The differences and similarities of nucleotides between two species in each of these genes were studied for selecting the primer. The specificity of selected primers was tested for duplex PCR reaction against sequenced isolates of dermatophyte species. Results: According to the total data, the specific primers were selected from elongation factor 1 alpha gene. These primers produced a product of 173 and 384 bp, in Trichophyton rubrum and Trichophyton interdigital, respectively. They had high specificity in the face of various dermatophytes. The length of nucleotide sequences found in the genebank of this gene in the two species is between 700 and 770 bp. The similarity of the two species in this region is 94.6% and differs by 78 bp. Of the 107 extracted DNAs from clinical dermatophyte isolates, in duplex PCR 24 isolates were positive with Trichophyton interdigital primer and 71 isolates against Trichophyton rubrum. The remaining isolates, which included 6, were negative in this reaction, which included other dermatophyte species. Conclusion: This method is a specific and fast differential method compared to conventional methods for identifying Trichophyton rubrum and Trichophyton interdigital from each other.

## Author keywords

Dermatophytosis, Elongation factor 1, Polymerase chain reaction