Study of Characteristic Features of Pleomorphic *Epidermophyton floccosum*

Ali Abdul Hussein S. AL-Janabi

Deprtment of Clinical Laboratory, Collage of Pharmacy, University of Karbula, Iraq

**Abstract:** *Epidermophyton floccosum* is one of two species belonging to the genus *Epidermophyton* that related to the dermatophytes group. Isolated Strain of *E. floccosum* induced to be pleomorphic through sub-culturing at high temperature. Comparison in colony morphology and microscopic examination between pleomorphic strain and wild strain was performed Morphological features of pleomorphic *E. floccosum* were found to be differing from isolated parent strain. Pigmentation and increasing in fold density were considered the main changes in pleomorphic strain. While, conidation and hyphal morphology did not change from wild strain.

**Key words:** Pleomorphism • *E. floccosum* • Dermatophytes

**INTRODUCTION**

Pleomorphism is an old phenomenon associated with dermatophytes since beginning study of these fungi. As defined by Emmons [1] pleomorphism refers to the occurrence of different growth forms in the life history of a fungus. The main characters of pleomorphism in dermatophytes are absence of reverse pigmentation of grown colony, fluffy white mycelia and reduced ability to sporulate [2].

*Epidermophyton floccosum* is one of two species belonging to the genus *Epidermophyton*. It is an anthropophilic species which means it tends to infect human more than animals. Microscopically examination of *E. floccosum* colony revealed the presence abounded of macroconidia with absence of microconidia [3]. Macroconidia are broadly clavate with typically smooth thin to moderately thick walls and one to nine septa.

Although the characters of pleomorphism is much more described in other species of dermatophytes, morphological features of pleomorphism in *E. floccosum* is not obviously illustrated by any of previous study.

During laboratory work with dermatophytes, pleomorphism was tried to induce in *E. floccosum*. Characters of pleomorphic strain were investigated in this study. Morphology and microscopically examination was also determined for pleomorphic strain.

**MATERIALS AND METHODS**

**Fungal Strain:** *Epidermophyton floccosum* was isolated from male patient (35 years) at AL-Hussein general hospital of Karbala province in February 2009. Skin scales of fungal lesion from patient were cultured on Sabouraud's glucose agar has the following components; glucose 20 g, peptone 10 g, agar 15 g, chloramphenicol 0.05 g and 1000 ml of distilled water. Culture was incubated at 28°C for two weeks. Grown fungus was diagnosed according to the criteria recorded by Rippon [3] and Emmons [1].

**Preparation of Pleomorphic Strain:** Isolated *E. floccosum* was sub-cultured eight times on Sabouraud's glucose agar for eight weeks at 35°C. Colony morphology of wild strain acquired other features that described letter in results section. Microscopically examination of pleomorphic strain was performed for detecting any changes in hyphal morphology and the presence of macroconidia.

**RESULTS**

Grown colony of isolated *E. floccosum* revealed the ordinary morphology characters of wild type. Colony is frequently graining, lumpy and sparse on initial isolation. After developed, the colony is gently folded, fuzzy or
suede-like in texture (Fig. A). Such a mature colony is greenish-yellow and the reverse side of colony is yellow-brown in color (Fig. B).

Pleomorphic strain has the same features of folded colony with irregular radial folds in the center. It differs from wild type by changing the color of colony to become tiny yellow and tend to be white over the surface of colony (Fig. C). Reverse pigmentation of pleomorphic colony was also changed to become whiter in color (Fig. D). Furthermore, density of folded surfaces in pleomorphic colony increased to become more elevated than in wild type.

Macroconidia were still present in pleomorphic strain with the same broad bases and rounded distal ends. Microconidia were absence.

**DISCUSSION**

In past, many studies tried to explain the pleomorphism process in dermatophytes. These studies could be considered much more useful to us due to the absence of recent scientific researches on this phenomenon. Thus, most of our references are depending on old studies.

Pleomorphism is extensively studied in *Trichophyton mentagrophytes*. In this dermatophytic fungus, pleomorphism converts the morphology of fungal colony from granular texture to white fluffy tufts of aerial mycelium on the surface of colonies which results in the loss of characteristic pigmentation and conidation [2]. These changes found to be reduced at high pH value [4].

In present study, *E. floccosum* was also noted to sever from pleomorphism, but without loss of conidation. The only obvious changes were in the pigmentation of grown colony which was affected on the whole morphology of *E. floccosum* colony. Thus, diagnosis of *E. floccosum* based on colony morphology becomes impossible in presence of such pigmentation changes.

An explanation of pleomorphism phenomenon is not cleared until day. Mutation is an acceptable reason for dermatophytes pleomorphism and it is not autoinduced or related to the age of the parent cell or colony [5]. Recently, Weitzman [6] found that pleomorphism resulted from single chromosomal gene mutations showing diminished conidation.

Generally, dermatophytes like other fungi prefer to grow under moderated temperature such as room temperature. This temperature considers perfect for growing of *E. floccosum*. Isolated strain of *E. floccosum* was induced to become pleomorphic through several times of sub-culturing at high temperature. In this condition, mutation process may be induced to appear in growing colony leading to change some characters of *E. floccosum*. Bistis [5] demonstrated that mutation event does not occur in the plates incubated at 25°C, whereas it appears in such plates incubated at 35°C. Furthermore, aeration is found to be effected on pleomorphism of dermatophytes through induced production of macroconidia in pleomorphic fungus in shorter time [7].
In this study, pleomorphic *E. floccosum* did not lose its macroconidia or hyphal morphology in contrast with other species of dermatophytes. Moreover, Jones and Noble [8] found that there is no difference in enzymes content between pleomorphic and wild strain of *E. floccosum*.

In conclusion, morphological features of pleomorphic *E. floccosum* are differed from isolated parent strain. Pigmentation and increasing in fold density were considered the main changes in pleomorphic strain. Whereas, conidation and hyphal morphology did not change from wild strain.

REFERENCES