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ISOLATION OF SOME KERATINOPHILIC FUNGI FROM SOIL

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ABSTRACT

Soil has diverse types of fungi which are pathogenic. Geophilic fungi are mixture of several types of fungi where keratinolytic are very common and normal farmyard ,garden soil ,domestic soil have keratinophilic mycoflora. Sample collected showed *Microsporium gypsum* (9.53%), *Trichphyton terrestrial* (1.59%), *Chrysosporium* sp. (1.28%), *Chrysosporium keratinophilum* (15%), *Chrysosporium qeenslandicum* appeared to be most abundant keratinophilic fungi i.e. (24.73%). Saprophytic fungi which colonize on skin ,nails, hair and cause skin infections called dermatophytes. These types of fungi can easily form colonies in keratin rich substances. *Aspergillus*, *Cladosporium*, *Coccidioides*, *Fusarium*, *Microsporium*, *Piedraia*, *Scopulariopsis* and *Trichophyton* fungi were also observed. They can easily degrade polypeptides chains biologically which are very difficult in normal condition. In the present study the occurrence of keratinin degrading fungi in soil were analysed. The microbiological and pathological analysis was done.

Keywords: Keratinophilic, mycoflora, soil

Introduction

Filamentous keratinophilic fungi are hymphomycetes fungi. It includes both Dermatophytes and non-Dermatophytes (Mukesh and Sharma, 2010). Feathers, hooves, skin, and wools etc are the natural occurring keratinous substances (Min Jung Lee *et. al.*, 2011). Mycoses and other disease are caused by Dermatophytes. These are sparophytic potential pathogens. Playground and Garden soil are a suitable environment for keratinophilic fungi because of having kerationous material from debris and occurrence of varieties of fungi depends upon the quality of debris. These dermatophytes and kerationphilic fungi also cause several diseases due to availability of human pathogen dermatophytes. Occurrence of human pathogen dermatophytes also indicates environmental pollution.

Organic keratinous matter are the major factors for these saprophytic keratinophilic fungi. Different areas have different varieties of fungi like hospital dust has *T. mentagrophytes*. We can identify these fungi by their telomorphic phase, and anamorphic phase. All phases are dependent on the amount of keratinous material. These are called machinery of cycling in this ecosystem. Special care required while handling these fungi, the human pathogen. A stable protein keratin degraded by keratinophilic fungi which are very ecologically important and is a part of keratin degrading cycle in soil. Scleroprotein keratin is very stable and tough to degrade by chemicals .The group of Deutromycetes and Ascomycetes have quality to decompose these keratinous substances. Ecologically saprophytic behavior of keratinophilic fungi are very important in degrading keratinous substances present in the soil. Study of these fungi are very important for mycologist and

dermatologist because of mycoses and diseases of human being and animals. We can analyse such mycoflora in any common ground soil of college, domestic areas, municipal areas and hospital etc. Athlete's foot, ringworm and other skin diseases are caused by these fungi and they may be geophilic (soil loving), zoophilic (animal loving) and anthropilic (human loving) according to their hosts.

Materials and Methods

Samples were taken from college ground from surface layer and weighed. Soil samples were collected in polythene bags which were sterilized. Equal amount of samples were kept in the petridishes and HBT technique was used for culture. Sometimes the fungal growth was examined for identification. Hair baiting technique for isolation of keratinophilic fungi was used (Vanbreuseghem, 1952). In this method the soil samples were kept in sterile petridishes and 10-12 ml sterilized water was added to sample and then short strand of sterilized hair was put into petridishes and placed into incubator at 25 degree for 3 to 4 for growth. After 3 to 4 weeks fungal growth was observed and transferred into Sabouraud's Dextrose Agar media. In culture chloramphenicol and cycloheximide were added for avoiding bacterial growth. Sometimes growth of isolated fungi observed directly by lactophenol staining method .Collected Soil samples had many keratinophilic fungi appeared in the form of keratin debris .Method to calculate the percentage of amount of fungal growth:

Percentage amount of species =

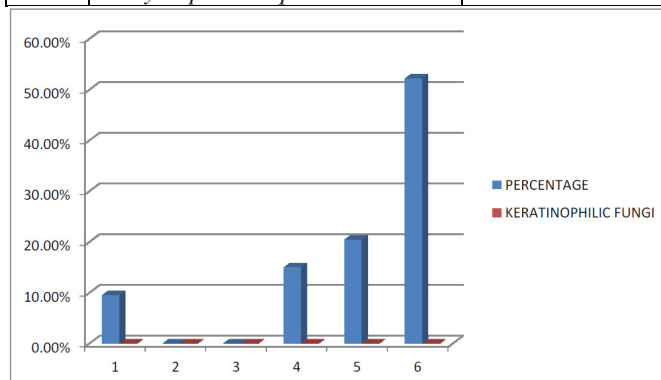
$$\frac{\text{Number of isolates of a species}}{\text{Total number of microorganisms}} \times 100$$

Results and Discussion

Aceremonium occurs both in garden soil and pot soil (Nigam *et al.*, 1989). It is observed that keratinophilic fungi in lonar area where meteorite crater soil was found (Deshmukh *et al.*, 2006). On the basis of present analysis it was observed that *Chrysosporium pannicola* found in house dust while *Chrysosporium tropical* was reported to be in garden soil. *Keratinophyton terreum*. normally was found in domestic dust. Keratinophilic fungi is important because it degrade keratin and its residue in soil naturally (Pakshir *et al.*, 2013). Presence of this fungi in soil indicates that soil has keratin from animal and human resources (Zarrin and Highwood, 2011). These fungi help in degrading keratinous compounds into simple lower molecular weight compounds and are small group of fungi (Kumar *et al.*, 2013). Degrading cycle of keratin is of ecological important because keratin products which are found generally in hair, nails and horns etc. (Desshmukh 2006 & Aug *et al.*, 2013). Keratin is decomposed into carbon and nitrogen residues and is a permanent source of keratinophylic fungi (Yazdanparast *et al.*, 2013). Low Soil moisture content is an important favourable factor for fungal growth (Anon, 2016). Favorable pH is 6 to 9. All these fungi are commonly isolated from normal soil (Bisen and Tiwari, 2015). Asepergillus found in domestic soil. The present findings are in conformity with other worker (Soni and Sharma, 2014). Aspergillus with aflatoxin causes several human lethal disease syndromes called aflatoxicosis (Kimanya, 2013). Microsporium and Trichophyton are easily available in soil (Gupta, 2012), *Chrysosporium indicum* was found in higher percentage in warmer season and areas (Desshmukh *et al.*, 2011). Some of keratinophilic fungi are very much related to dermatophytes found in garden soil and indoor dust depending on the pH of the soil (Jain *et al.*, 2011). College play ground and school playground have large amount of *Chrysosporium zonatum* and it causes granulomatous disease. Keratinophilic fungi grow on keratinous substrates like hair, wool, feathers, nail, horns, are pathogenic and saprophytic both (Gugnani *et al.*, 2012). *C. queenslandicum*, *Microsporium gypseum* were reported by (Dhagat and Rahman, 2009 & Tambekar *et al.*, 2007).

Table : Percentage of keratinophilic fungi in soil sample

S.No	Keratinophilic Fungi	Percentage
1	<i>Microsporium gypsum</i>	9.53%
2	<i>Trichphyton terrestrial</i>	1.59%,
3	<i>Chrysoaporium sp</i>	1.28%,
4.	<i>Chrysoaporium keratinophillum</i>	15%
5.	<i>Chrysosporium qeenslandicum</i>	24.73%



Graph: Percentage of keratinophilic fungi in soil sample

Conclusion

Diversity of keratinophilic fungi in particular soil was observed which was not very broad. Keratinophilic fungi also are very important for degradation of kreatin. These are also very important because they act as scavengers and maintain balance of soil ecosystem. Higher percentage of keratinophilic fungi show higher degree of pollution in the environment. In the present study the different types of keratinophilic fungi were taken from the college play ground and observations were made. Some keratiniphilic fungi such as *Chrysosporium indicum*, *C. tropicum*, *A. flavus*, *M. gypseum* are very common and found in common places like play ground and is rich sources of all types fungi. Fusarium and Alternaria species was also showed their occurrence. The percentage varies from fungus to fungus for eg. *Microsporium gypseum* 9.53%, *Trichphyton terrestrial* 1.59%, *Chrysoaporium indicum*. 1.28%, *Chrysoaporium keratinophillum* 15%, *Chrysosporium qeenslandicum* was 24.73%.

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