Original Article

Bulletin of Environment, Pharmacology & Life Sciences
Volume 1, Issue 2, January 2012: 30 -32
Journal's URL: www.bepls.com
Online ISSN 2277-1808
[Accepted 16 January 2012]

Presence of *Aspergillus flavus* in scalp associated with dandruff and its potentiality as an opportunistic pathogen

Abhinaba Ghosh*, Anand Raj and Mohanasrinivasan V.
School of Biosciences and Technology, VIT University
Vellore-632014, Tamil Nadu, India
Email: abhinaba@vit.ac.in

ABSTRACT

Aspergillus has been associated as an opportunistic pathogen by causing aspergillosis in lungs. Aspergillus flavus is a widely feared fungal pathogen capable of producing the potent mycotoxins, aflatoxin. This toxin is carcinogenic in nature and has the ability to induce cancer such as liver cancer. The pathogenicity of this fungus has been well studied. This study was designed to demonstrate the presence of this fungus in hair scalp and find out its ability to cause diseases in immunocompromised patients such as AIDS patients and patients treated with immunosuppressant. During this experimentation, dandruff flakes were aseptically isolated from five healthy individuals and plated on Potato Dextrose Agar and Rose Bengal Agar media. Out of 50 plates, 38 plates were found to have Aspergillus flavus along with other fungi such as Fusarium, Aspergillus niger and others. This number is significant in causing severe ailments as opportunistic pathogen. Once it establishes itself as opportunistic pathogen, it can produce the aflatoxins and cause detrimental effects like cancer.

Keywords: *Aspergillus flavus, dandruff, aflatoxin, scalp, fungi*

INTRODUCTION

Fungal organisms are widely associated with human hosts and are often ignored as they do not harm healthy humans. However their potentiality is widely studied in causing diseases in immunocompromised patients which can even be fatal. *Aspergillus sp*. is long known to cause aspergillosis in lungs of AIDS patients. Their toxin effect is also well studied along with their detrimental effects. *Aspergillus flavus* is more potent in the genus due to its ability to produce mycotoxin, aflatoxin B(B1 and B2) and aflatoxin G (G1 and G2).Of the four aflatoxins (B1, B2, G1, and G2), B1 is the most common and most toxic with lethal dose (LD50) of less than 0.5 mg/kg body weight Aflatoxin is carcinogenic in nature and has been involved in inducing hepatic carcinoma. Thus their presence in healthy individuals may be ignored but not in case of AIDS patients as well as individuals treated with immunosuppressant drugs. Fungal organisms have been widely associated with dandruff, majorly the lipase producing fungi *Malassezia furfur*. This study aimed to study the dwelling of this fungal population in the scalp of healthy humans so that they can be correlated to the potentiality in causing severe ailments in immunocompromised individuals. Five healthy individuals were screened for the presence of this fungus in their scalp[1-3].

MATERIALS AND METHODS

Collection of sample:

Sterile dry forceps were used for scrubbing the scalp and obtaining dandruff flakes in biosafety hood cabinet. The flakes were obtained from different areas of the head of five different individuals separately using separate sterile forceps and collected in a clean dry petridish.

Plating on media:

Two different media were used for plating the sample, five plates for each media for each individual. Thus total fifty plates were plated with the sample. Sterilized Himedia Potato Dextrose Agar (PDA) and Rose Bengal Agar (RBA) were poured into sterile petriplates and allowed to solidify under sterile conditions. There after using sterile inoculation loop the flakes were touched and placed onto the center of the solidified media. This process was followed for all the samples plated on the solidified media with proper incineration of the loop followed my cooling before touching the sample of dandruff flakes. Then the plates were sealed with parafilm and placed in a clean cupboard wiped with 70% ethanol at room temperature for 4-5 days for incubation [4].

RESULTS

Out of the 50 plates plated with dandruff flakes, 38 plates were found to have colonies with characteristic colonies with white margin and yellowish green colonies which show *Aspergillus flavus*. This number is significant as this equals to 76%. This possesses significant threat for being a highly potent opportunistic pathogen. In immunocompromised patients this fungi can cause the release of aflatoxin with significant effects which can even be fatal.

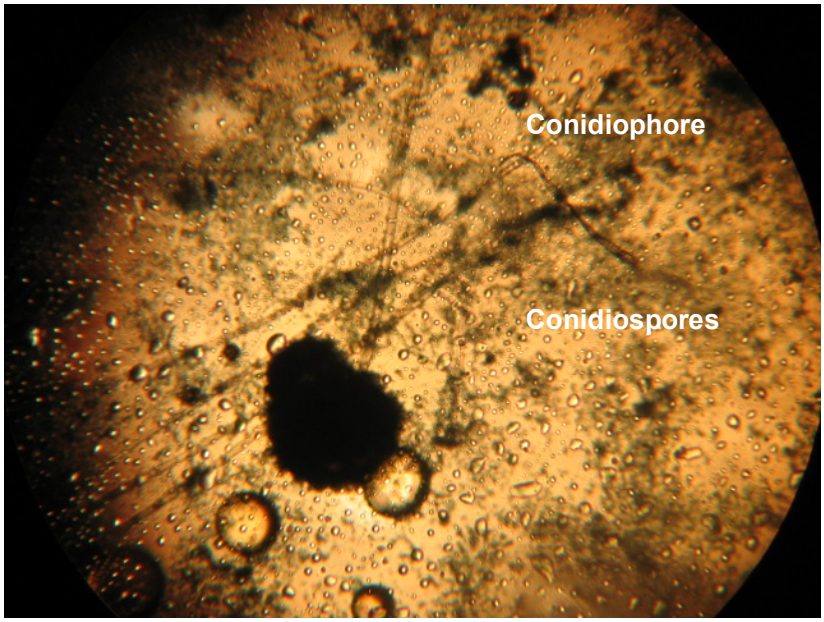

Figure 1: *Aspergillus flavus* conidiospore under 40X magnification

DISCUSSIONS

Significant number of *Aspergillus flavus* was obtained in the plates for all five individuals. This exhibits the higher chances of pathogenicity and toxicosis in immunocompromised individuals. Thus the chance of ill effects by this fungus in such individuals is fuelled up. Invasive sinus aspergillosis due to A. flavus and massive intracranial infections also have been reported. Chances of secondary ill effects such as carcinoma is also at higher probability for such individuals. Hence significant consideration should be given for treating the mycotic infection by this fungus and presence of these fungi should be pre-screened for such individuals to prevent such infections to develop and proceed at later stage. Drugs like amphotericin B, itraconazole, voriconazole and posaconazole show significant activity against *Aspergillus flavus*. Thus these drugs can be employed for treating the infections. Thus hepatocarcinoma(acute aflatoxicosis) can be prevented to higher extent. An approach to develop an ideal vaccine for fungal infections is still on prowl and significant work needs to be done on this aspect. Aflatoxin should be primarily concentrated upon due to its serious nature. Development of agents to block the action of this toxin in host and render it harmless can also be given a thought [5].

Table 1: Presence of *Aspergillus flavus* in the inoculated plates

INDIVIDUALS → / MEDIA ↓	A	B	C	D	E
PDA	4	4	4	3	3
RBA	4	5	3	4	4

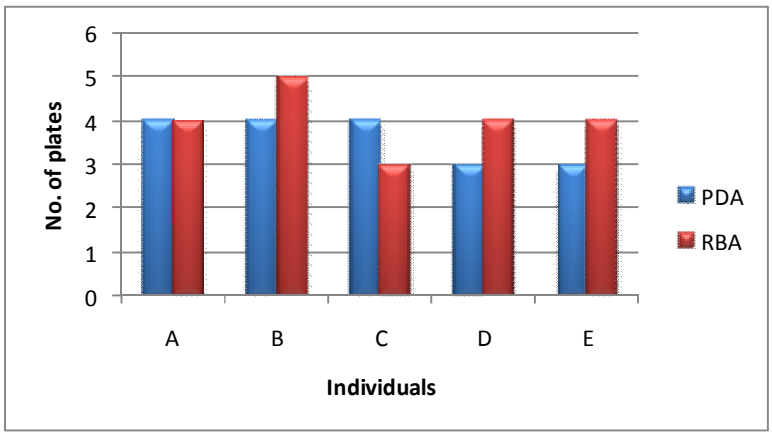

Figure 1: Graph showing the number of petriplates with *Aspergillus flavus*

ACKNOWLEDGEMENT

The authors wishes to thank Mr. Sekar Viswanathan, Vice President-University Affairs, VIT University for his enormous encouragement and Dr. Anilkumar Gopinathan, Director, School of Biosciences and Technology for his constant support and motivation for taking up this research project.

REFERENCES

1. Amadi, J.E; Adeniyi, D.O.(2009). Mycotoxin production by fungi isolated from stored grains. *Afr. J. Biotechnol*.**8** (7); pp: 1219-1221
2. Denning, D.W; Hope, W.W.(2010).Therapy for fungal diseases: opportunities and priorities. *Trends in Microbiol*.**18** (5); pp: 195-204
3. Woloshuk,C.P; Seip,E.R, Payne,G.A, Adkins, C.R. Genetic transformation system for the aflatoxin-producing fungus *Aspergillus flavus*. *Appl. Environ. Microbiol*. **55**(1); pp: 86-90
4. Ren,P.;Ahearn, D.G.;Crow,S.A.(1999). Comparative study of *Aspergillus* mycotoxin production on enriched media and construction material. *J. industrial Microbiol. Biotechnol*.**23**; pp: 209-213
5. Ellis, M.(2001).Invasive fungal infections: evolving challenges for diagnosis and therapeutics. *Mol. Immunol*.38; pp: 947-957