STUDY OF AEROMYCOSPOREA IN TWO DIFFERENT LOCATIONS OF JODHPUR, RAJASTHAN

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ABSTRACT
Fungi are ubiquitous in air and their presence is often associated with asthma and other allergic manifestations. In the present study, outdoor airborne fungal concentration at two different locations, J.N.Vyas University campus (JNVUC) and Rajiv Gandhi colony (RGC) representing slum area in Jodhpur, Rajasthan were investigated during winter season. A total of seven fungal genera were isolated from these two locations among which Cladosporium sp. and Alternaria sp. were dominated. Presence of various fungus and their spores in air can be a potential health hazard to all people residing around.

Key Words: Airborne, Colony forming units, Asthma, Cladosporium, Alternaria

INTRODUCTION
Fungi are ubiquitous in air but their proportion varies according to environmental condition and locations. Airborne fungi are present in both outdoor and indoor environments, sometimes occupying 70% of total microflora of air (D’Amanto et al., 2000). Fungal conidia and spores are liberated in air from plants, animal, soil, decaying organic material and can remain airborne for long time. Airborne fungus and their spores are potential to create health hazards and associated with dermatitis and respiratory diseases along with allergic manifestation in human beings (Burge, 1985). Now day’s allergic respiratory diseases have become so common that it affects over 25% of total population in the world (Kurup et al., 2002). Many genera of fungi can cause allergic responses, but particularly important are some species of Cladosporium, Alternaria, Penicillium and Aspergillus. Cladosporium and Alternaria are frequent and predominant genera present mainly in the outdoor air (Akerman et al., 2003). Some moulds also produce mycotoxins and some species become particularly toxigenic by producing dangerous volatile compounds (D’Amanto et al., 2000). Nowadays thousands of people spend several hours studying and working in enclosed spaces every day and where microbiological quality of indoor air can influence their health and physical condition. Various studies have suggested that outdoor air is the primary source of indoor air mycoflora thus, monitoring of outdoor air is necessary for the estimation of indoor air quality. Therefore, present study aim to investigate quantitative and qualitative analysis of airborne fungi at two different locations of Jodhpur, Rajasthan.

MATERIAL AND METHODS
In the present study, two sampling locations were selected, J.N. Vyas University campus (JNVUC), which represents the institutional area encompassed with educational institutions and good plantation and Rajiv Gandhi Colony (RGC) comprises slum area. Air samples were collected once a month for four months in the winter season (November to February) using the settle plate methods. Duplicate plates containing Potato dextrose agar (PDA) were used for the isolation of fungi. Each plate was exposed at a height of 1.5m from the floor (human breathing zone) for a period of 30 minutes. The plates were incubated at 25°C for 5-7 days. After incubation, the total number of colony forming unit (CFU) for the fungi was enumerated and converted to colony forming unit per cubic meter (CFU/m3) of air. Identification of fungi was initially based on colonial appearance and then a wet mount preparation of each fungal colony was prepared by using Lactophenol-cotton-blue solution. Spore and hyphal characteristics of these stained preparations examined microscopically (Frey et al., 1979 and Watnabe, 2002).
RESULTS AND DISCUSSION

Figure 1 shows the average levels of total count of airborne fungi for two different locations during the study period (November to February) which varied in the range of 30 to 62.5 CFU/m³. Numerous studies have shown that concentration of airborne fungi in urban air influenced by population density and other anthropogenic activities (Zheng, 2009 and Kumar et al., 2011). In the present study higher concentration of fungi at RGC shows that this may be due to more human activity or crowding at this location. The higher counts of most of the fungus may also be due to garbage heaps which provide safe breeding ground for them (Sunita et al., 2011). In addition to this, lower airborne fungal concentration in outdoor air of university campus has also been observed which represents better cleanliness and good environmental conditions at this location. This observation is in agreement with the study of Filipiak et al., (2004). A total of seven fungal genera which comprises, Cladosporium sp., Aspergillus sp., Alternaria sp., Helminthosporium sp., Fusarium sp., Rhizopus sp., and Yeast were isolated from both locations. The present study reports that so called “outdoor mould” Cladosporium sp. and Alternaria sp. were dominated at both sampling locations (Table.1), which is in agreement with results of previous studies (Fang et al., 2004 and Bugajny et al., 2005). The dominance of these two fungus may be due to their nature of conidia, as they both produce dry conidia in chains easily carried through air (Katia et al., 1997).

Exposures to airborne fungi are often associated with asthma and other allergic respiratory symptoms. In the present study, fungal genera such as Cladosporium, Alternaria and Aspergillus were observed in the air which exert adverse effects on the respiratory tract of exposed people. However, this fungus may cause allergic reactions if present in high concentration (Horner et al., 1995). Fungus like Cladosporium, Alternaria and Aspergillus cause diseases like asthma or cystic fibrosis which develop a chronic allergic reaction with cough. Not only the occurrence of asthma but also its persistence and severity have also
been strongly associated with sensitization and exposure to Cladosporium sp. and Alternaria sp. (Salo et al., 2006 and Li, 2010). Aspergillus sp. also poses a risk to people exposed to it repetitively, as it is associated with a life threatening disease Allergic Bronchopulmonary Aspergillosis (ABPA).

**Conclusion**

Present study shows the airborne fungal concentration at two different locations of Jodhpur. Higher airborne fungal concentration was observed at RGC than JNVUC. Among isolated fungi there were also strongly allergenic and toxic species of genera such as Cladosporium, Alternaria and Aspergillus which poses health risk to people residing around. Regular monitoring of fungus and their spores may provide better knowledge of specific group of fungi causing various health hazards to human being. Therefore, it is necessary to carryout regular air monitoring at various outdoor locations.

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