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Research Article

A Preliminary Study on the Airborne Mycoflora of Central Railway Station – Chennai

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Abstract

Allergic diseases especially of the respiratory tract are common in India. People suffer from nasobronchial allergy due aeroallergens including fungal spores present in the atmospheric air. As there were no comprehensive survey on fungal spores of different species distributed in the atmospheric air of Chennai central railway station, studies are initiated in this line of research. Air was sampled by installing and exposing a Petri plate with potato dextrose agar media at every sampling site in the Chennai central railway station. The periodic air sampling was analyzed to get volumetric information on the culturable fungal species present in the atmospheric air of Chennai central railway station. The results of this six month survey on the air mycoflora of Chennai central railway station are described and discussed.

Keywords: Mycology-air mycoflora, Chennai central railway station.

INTRODUCTION

Bio aerosol particles are almost always present in the atmospheric air although their composition and concentration changes with the time, site, season and geographical location of investigation (Larsen and Gravesen, 1991).Most of the bio aerosol particles are fungal spores but some may be bacterium, algae and viruses. Fungal spores make a large contribution to the mycoflora of atmospheric air. The fungal spores originate from living dead and stored products. Inhaled spores can cause a number of respiratory disorders in human beings (Hataez *et al.,* 1986). Respiratory allergies are identified in the vendors and supporting staff of Chennai central railway station. Thousands of people arrive in and depart from the Chennai central railway station. The atmospheric air in and around the Chennai central railway station has significant level of fungal spores. Thus precise knowledge of fungal spores of different species distributed in atmospheric air is essential for accurate diagnosis and proper treatment of patients. Initially air mycoflora of Chennai central railway station was investigated by collecting samples in Chennai central railway station at three different sites. Samples were collected at each sampling site by exposing a Petri plate with potato dextrose agar media (Hurtado and Riegler, 1986). Fungal species diversity is known to vary with the different sites. Thus it was felt worth, while to undertake a survey of distribution fungal species in the atmospheric air of Chennai central railway station used by thousands of people every day.

MATERIALS AND METHODS

Preparation of sterilized Petri plates

The Petri plates were washed and air dried, wiped with cotton soaked in 100% alcohol. Then the plates with their lids were made in to packages of ten plates each package. These packages were sterilized with help of autoclave.

Growth medium

Among the different growth media the potato dextrose agar medium is a widely used for growing fungal spores (Anbazhakan and Sankaran, 2004). In the present study this medium proved more suitable for growing the airborne fungal spores.

Composition of potato dextrose agar medium

Potato (Peeled) - 200 g; dextrose - 20 g; agar -15 g; distilled water – 1L.

Preparation of potato dextrose agar medium

The potato is peeled, grated and weighed. Then it was boiled in 500 mL of distilled water in a conical flask plugged with cotton plugs. The agar stripes were boiled in 500 mL of distilled water in a separate conical flask. The boiled potato was filtered and the potato extract was mixed with the boiled agar. Dextrose was added the potato extract agar mixer solution. The medium was thoroughly mixed and spread to three 500 mL flasks and were tightly plugged with cotton plugs. The medium was in an autoclave. The sterilized medium was poured into the sterilized Petri plates in an aseptic condition using laminar air flow chamber.

Collection of samples

The Petri plates with media were taken to the sampling sites in air tight containers without allowing any contamination. In the sampling sites, the air samples were collected by installing and exposing the Petri plates with potato dextrose agar medium. After the collection of air samples for about 10 min the Petri plate with media was properly closed with its lid and brought to the laboratory and left at room temperature in an aseptic condition for a period of 5 days. The fungal spores present in the air sample were growing.

Preparation of micro slides

Clean micro slides of the standard size were used. The fungal colonies grown in the Petri plates were transferred to the micro slides and mounted sing the mounting solution the lacto phenol in an aseptic condition. Then the specimen in the micro slide was sealed by DPX solution. Then the micro slide with sealed specimen was examined under light microscope for identification (Cunningham, 1873).

Identification of fungal taxa

The nature of mycelia, the structure of fruit body and the nature of spores were used as tools for identification using standard keys.

RESULTS AND DISCUSSION

The present study was aimed at collecting comprehensive information on the air mycoflora of Chennai central railway station; hence air sampling was made the Chennai central railway station prone to human activities of the visiting population which provides to the source of airborne fungal source. The air spores are varies with the varied site of sampling depending on the human activities. The spores of borne mycoflora are very small size and suited for penetration in to the respiratory tract. The present study was made by sampling over a period of six months. The fungal taxa have been grouped into ‘ most common’, ‘common’ and ‘rare’ depending on periodicity of occurrence the total number of fungi recorded from Chennai central railway station car parking area was less than those Chennai central suburban station platform area and Chennai central railway station platform area.

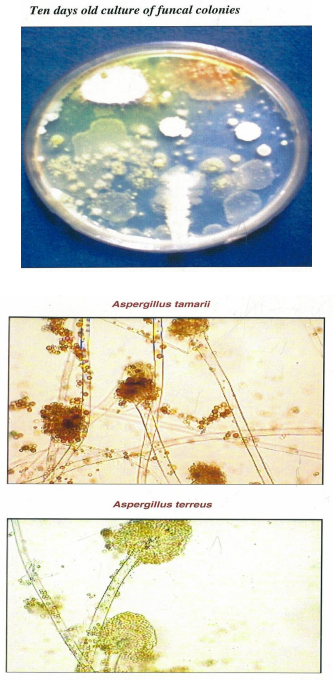

Figure 1: Culture plate of air samples collected from Chennai central railway station platform area

The number of species belonging to zygomycota recorded in central railway station platform area (2) was more than in Chennai central railway station car parking area (Figure 1). The number of species recorded per sampling was high in Chennai central railway station platform area when compared with Chennai central railway station car parking area and Chennai central suburban station platform area (Figure 2). The number of mitosporic fungi recorded in Chennai central suburban station platform area and Chennai central railway station platform area were greater than that in Chennai central railway station car parking area. There were no specific species to Chennai central railway station car parking area.

Although many fungi were found to be common to all the three sampling sites their frequency was not the same. The percentage frequency of some selected taxa in three sampling sites is compared in Figure 3. The average percentage frequency of species in different sampling sites is given in Table 1 for comparison. The number of fungal species compared with Chennai central railway station platform area when compared with Chennai railway station car parking area and Chennai central suburban station platform area. This may be due the higher rate of human activities in that range of sampling sites which forms the source of fungal components in the air samples.

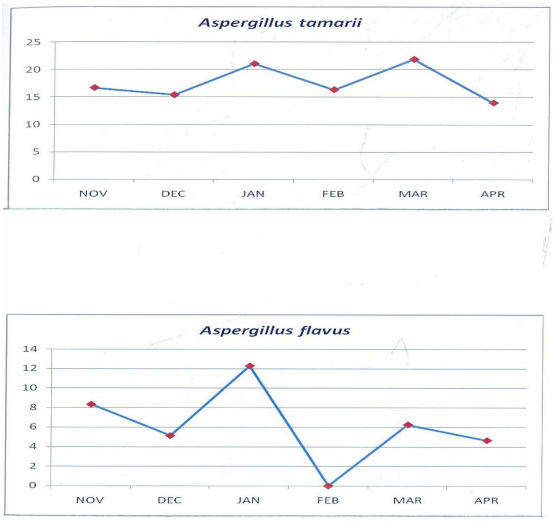

Figure 2: Percentage frequency of some of the species recorded in Chennai central railway station car parking area

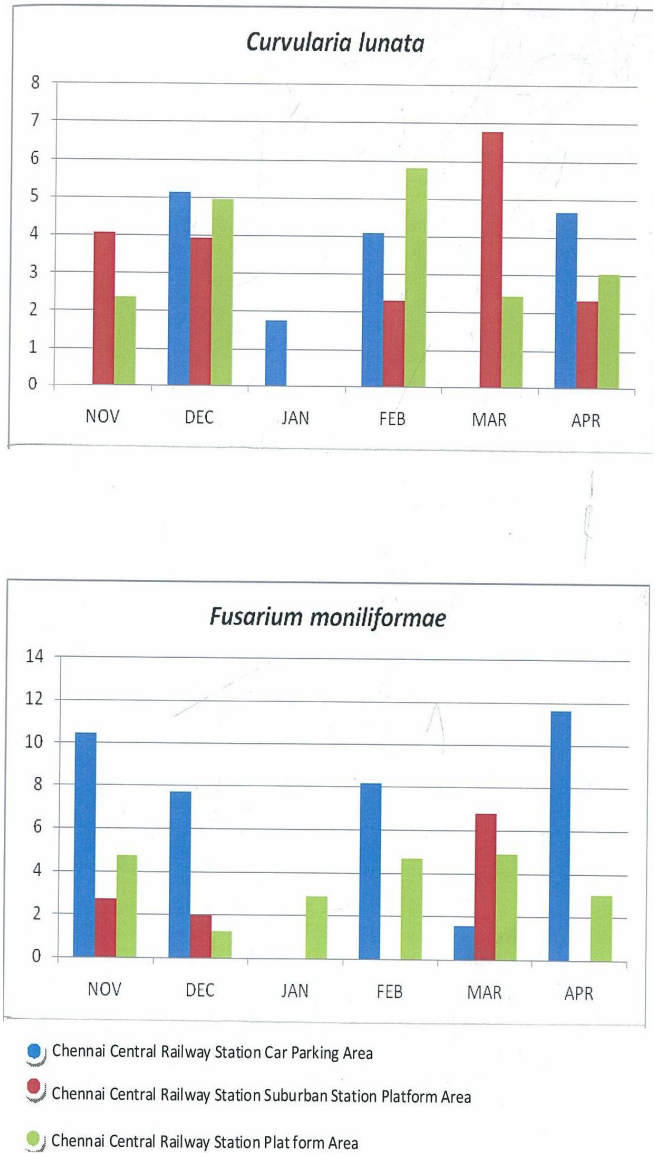

Figure 3: Comparison of percentage frequency of selected species in three sampling sites

Table 1: List of fungi isolated from air samples collected at Chennai central railway station and their percentage frequency in different months of sampling

S.No.	Species	Average Frequency(%) S.S-I	S.S-II	S.S-III
	ZYGOMYCOTA			
01.	*Absidia corymbifera*	-	-	0.24
02	*Mucor recemosu*	-	3.03	-
03.	*Rhizopus stolonifer*	1.67	2.05	1.04
	ASCOMYCOTA			
04.	*Ascotricha chartarum*	-	-	0.24
05.	*Chaetomium funicolum*	-	0.28	-
	MITOSPORICFUNGI HYPHOMYCETS			
06.	*Acremonium strictum*	-	-	0.19
07.	*Alternaria alternate*	2.37	3.89	1.57
08.	*Aspergillus flavus*	6.11	3.94	5.14
09.	*A.fumigatus*	5.14	6.14	9.76
10.	*A.japonicus*	1.89	0.67	3.74
11.	*A.niger*	7.54	16.28	13.8
12.	*A.tamarii*	-	1.04	-
13.	*A.terreus*	4.35	3.95	3.35
14.	*A.versicolor*	-	0.57	0.76
15.	*Chrysosporium pannorum*	-	0.83	0.68
16.	*Cladosporium cladosporioides*	14.67	14.41	15.52
17.	*Curvularia lunata*	2.6	3.23	3.09
18	*Drechsieria australiensis*	0.52	1.74	2.26
19.	*D.hawaiiensis*	-	0.28	1.47
20.	*Fusarium moniliformae*	6.57	2.29	3.56
21.	*F.oxysporum*	-	1.18	1.47
22.	*Monilia sitophila*	0.43	0.99	-
23	*Nigrospora sphaerica*	0.6	0.29	-
24.	*Paecilomuces varioti*	1.23	1.44	0.41
25.	*Pencillium chrysogenum*	-	-	1.63
26	*P.citrinum*	5.9	2.87	-
27.	*P.frequentans*	2.68	2.28	7.45
28.	*P.oxalicum*	-	0.39	-
29.	*P.purpurescens*	-	-	4.25
30.	*P.purcpurogenum*	7.98	3.47	0.65
31.	*Trichoderma harzianum*	0.9	0.67	0.64
32.	*T.viride*	-	0.61	-
	COELOMYCETES			
33.	*Lasiodiplodia theobromae*	0.34	0.33	0.4
34.	*Pestalotiopsis sp.*	-	-	0.2
35.	*Phoms.sp.*	-	0.28	0.24
	Yeast-like colonies	9.43	10.37	8.32
	Non Sporulating colonies	12.99	9.53	7.86

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