

# Study of Aeromycoflora of Aarey Lake in Mumbai

KEYWORDS	Aeromycoflora, Aarey Lake, Aspergillus species			
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ABSTRACT An experiment was conducted during September 2013 to see the aeromycoflora of Aarey Lake (popularly known as Chota Kashmir), which is major Ganpati idol immersion point in Goregaon, Mumbai. Aarey lake is the only place for Mumbai citizens as boating location to enjoy. The present aerobiological investigation was carried out by using gravity petriplate method. The some important fungus like Aspergillus, Penicillium, Fusarium, Cladosporium were found near this lake. It was also reported that fungal species like Aspergillus niger, Aspergillus flavus, Aspergillus terreus was more prominently occurs near this lake. Study of this fungal spores play an important role in respiratory allergies and cause a wide range of symptoms, including allergic rhinitis, asthma, chronic bronchitis, etc. in human beings.

#### INTRODUCTION

Aerobiology is mainly deals with the airborne particles of biological origin and their effect on living organisms. These particles mainly include viruses, bacteria, pollen grains and fungal spores. The mycoflora concentration in the atmosphere is influenced by the processes involved in their production, release and deposition (Lyon et al., 1984). Aerobiology studies not only participate in the liberation of airborne particles and spores from the sources, their transport and deposition, but also affects on humans, animals, plants and even over food, building, works of art, etc (Rafael). Fungi are also known as a bio-indicator of air quality (Gaikwad et al). Among the different microorganisms in bioaerosol, fungal spores are larger ranging from 3 to 30  $\mu$ m in diameter with various sources. (Debasmita et al).

Recent scientific reports indicated that the environment is full of variety of dangerous fungal propagules comprising allergens, phytopathogens and saprophytes (Chaubal and Kotmire, 1985; Bajaj, 1978 and Mishra and Bhandari, 2006). Many investigations on the aeromycoflora have been carried out in order to correlate with different type of allergic diseases in humans and vegetable diseases in India (Sreeramula and Seshavataran, 1962; Sreeramula and Ramalingam, 1963, 1964, 1965; Tilak and Kulkarni, 1970:72: 80; Padmanaban et al., 1993; Tiwari and Sahu, 1995). Occurrence of aeromycoflora in vegetable, fruit market and metro-railway station were also studied (Sharma and Bhattacharjee, 2001; Medhi and Sharma, 2010, Debasmita et al) However very little attention has been paid to the aeromycoflora of the lake. Present investigation deals with the study of aeromycoflora near the atmosphere of Aarey Lake, Goregaon. Present literature shows that the More than 80 genera of fungi have been associated with respiratory tract allergy (Horner et al., 1995). Most of the allergenic fungi are classified under Ascomycetes and Dueteromycetes and a few in Basidiomycetes (Kurup et al., 2000). Some genera of airborne fungal spores such as Alternaria, Aspergillus and Cladosporium are found throughout the world. Number and type of fungi vary with time of day, weather and seasonal fluctuations, condition of the surrounding areas, climatic conditions and the presence of a local source of spores (Pepeljnjak and Segvic Klaric, 2003).

Filamentous fungi or moulds are vital for the maintenance of ecosystems. By breaking down dead organic material, they continue the cycle of nutrients through ecosystems. Some of them act as plant pathogens causing severe crop losses and post-harvest food spoilage. In the reagent industry and medicine areas, filamentous fungi are the source of commercial enzymes, organic acids, and numerous drugs, such antibiotic (e.g. penicillin, cefalosporin). Penicillium species have been frequently recovered from water in the various studies performed. Several of the species in genus Penicillium and Aspergillus are known to produce mycotoxins in other substrates, such as food and beverages (Moreau 1979; Pitt and Hocking, 1999).Interestingly, detection of aflatoxins produced by A. flavusin water from a cold water storage tank was demonstrated by Paterson et al., (1997). Aspergillus species is one of the more commonly isolated genus in water. A. niger and A. flavus are common allergens and may cause opportunistic invasive infections (De Hoog et.al., 2000; Denning, 1998).







Aarey Lake (Chota Kashmir), Goregaon

## MATERIAL AND METHOD

## Selection of study site:

The site selected for the present study was the Aarey Lake, Mumbai, India. Aarey Lake (popularly known as Chota Kashmir), which is major Ganpati idol immersion point in Goregaon, Mumbai and also the only place for Mumbai citizens as boating location to enjoy. The microflora studies of this particular place have never been reported. So, information about the airborne sample of the Aarey Lake, Mumbai is largely lacking.

#### Media preparation:

Fungi require a suitable substrate or culture medium that can support their nutritional needs. By understanding the growth requirements of a fungal species, it is possible to establish the necessary conditions in vitro to support the maximum growth of that organism. For this purpose, Potato Dextrose Agar (PDA) medium, containing peeled potato, agar and dextrose in distilled water, was prepared aseptically. Then the liquid media was poured into sterile Petri dishes using aseptic techniques. The media was allowed to solidify and then the junctures of the Petri dishes were sealed by sellotape.

#### Collection of sample:

The Petri dishes were taken to the selected site to trap the fungal composition and were exposed in different sites of the Aarey Lake. The samples were collected at the month of September, 2013. Samples were taken in the afternoon (12:30 to 1:30 p.m.) The Petri plate gravitational method was employed for the isolation of fungi (Savino and Caretta, 1992; Rosas et al., 1993; Asan et al., 2002; Uddin, 2004). The Petri dishes were exposed to the air for 10 mins. The Petri plates containing the samples were incubated for 8 to 15 days at room temperature (25 to 28°C).

#### Identification of fungal strains:

The colonial features of the fungal colonies were studied as well as the morphological features of the fungi were studied using compound microscope. The determination of the morphological structures of fungi was carried out after being mounted in lacto phenol and cotton blue covered with cover slip. The fungal types were analyzed for each day. The species were identified on the basis of micro and macro morphology.

#### **RESULT AND DISCUSSIONS**

From the forgoing work following results were obtained. The result shows considerable growth and increase in number of colonies of fungal spore near the Aarey Lake.



Petri Plate No 1



Petri Plate No 2

## **RESEARCH PAPER**



Petri Plate No 3



Petri Plate No 4



Petri Plate No 5



Petri Plate No 6



Petri Plate No 7

# Aeromycoflora: Fungi were identified on the basis of their morphology and colour.

Photo plate No.	Name of Fungi	Colour
1	Aspergillus terreus	
2	Aspergillus terreus	
3 & 4	A. niger	2 black coloured fungi
3 & 4	Penicillium citrinum	Blue-green at periphery
5	Fusarium oxysporum	White cottony growth
6	Asp. Niger	Black coloured
6	Penicillium citrinum	Blue green colour fungi at periphery
7	A. Aspergillus nidulans	Reddish in colour, with granular appearance
	B. Asp. Niger	
	C. Asp. Flavus	
	D. Cladosporium sp.	
	E. Asp. Niger	
	F. Asp. fumigatus	
	G. Fusarium oxysporum	
	H. Asp. Niger	

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I. Asp. Flavus	
L Asp Niger	

Asp. Terreus

The present aero mycological investigation was undertaken to study the aeromycoflora of Aarey Lake, Goregaon. The results of aeromycoflora during entire sampling period showed that the atmosphere was never free from fungal spores. A total of 7 types of fungal species were identified near the Aarey Lake. The identified fungal species were Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus nidulans, Fusarium oxysporum, Penicillium citrinum, cladosporium spp. it was revealed that Aspergillus spp. was dominant in the lake. One of the reasons might be because these spores have the capability to multiply faster than the rest. Main sources of fungal spores are the surrounding area of Aarey Lake, where the food material and vegetable matter and other garbage are thrown by the visitors. Impact of airborne fungal spores including their release, dissemination, deposition and effect is of great significance to identify the health Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

hazards and physiological disorders in living beings. The allergenic nature of Aspergillus, Fusarium, Cladosporium, and Penicillium etc, has already popularly known. Effective disposal of solid waste may improve the air quantity of this lake area. The air current plays an important role in sweeping the aeromicroflora; therefore it is necessary to clean the area of lake at regular interval.

#### CONCLUSION

Study of this kind of aeromycoflora near the lake has tremendous scope to find the significant application in human health. The spores in air are the representatives of the members of microorganisms growing in that habitat. In this context, this study shall certainly enlighten the scientists and planners to make a better environment.

#### AKKOWLEDGEMENT:

Special thanks to Dr.Walay Tagade for helping the authors in identification of fungi

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