

AIR BORNE MICROORGANISMS AT DIFFERENT TRAFFIC LOCATIONS OF MYSORE CITY

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Abstract: The study was conducted at five traffic intersections such as K.R. circle, Metropole circle, Fountain circle, Sub-urban bus stand circle and Vijaya bank circle. The aim of the study includes the study of air borne microorganisms by petriplate exposure method using nutrient agar and Czapek Dox agar media. The study was conducted for two hours at the peak hours of the day at different traffic intersections. The present study was aimed at finding the air borne microorganisms and pollutants of auto exhaust which cause hazardous health effect on human health. Higher concentration of bacteria was found to be present in K.R. Circle and least concentration at Fountain circle. Air borne fungi were found at higher concentration in K.R. circle and Metropole circle while lower levels were detected in Sub-urban bus stand circle of the five sampling sites. The dominant fungi contributing to these differences were species of *Cladosporium*, *Fusarium*, *Aspergillus niger*, *Trichoderma*, *Saccharomyces* and *Alternaria*.

Keywords: Air pollutants, Air borne microorganisms, Mysore city.

INTRODUCTION

Aerobiology has gained paramount importance in recent years due to its wide application in the diagnosis and treatment of allergic disorders. Microorganisms can occur in the air as single cells or aggregates of cells, as well as fragments of bacterial cells, spores of bacilli, actinomycetes and fungi. The variety and complexity of bioaerosol pollutants complicate monitoring for airborne microorganisms and exposure assessment research. Airborne bacteria are important biological components of bioaerosol and play an important role in ecosystem. Bacteria at a high concentration in the atmosphere can result in biological air pollution and all kinds of diseases (Fang *et. al*, 2007).

Monitoring for airborne microorganisms has traditionally focused on the recovery of fungal spores, viable fungal and bacterial cells using spore count and culture techniques (Stetzenbach, 1992). Concentrations of airborne fungi depend on several factors like seasonal and daily variations in meteorological conditions - temperature, humidity, wind speed, rainfall, solar radiation, vegetation, air pollution, agricultural, industrial and other human activities (Horner *et. al* 1995). Airborne fungi are sometimes associated with respiratory diseases, such as aschronic bronchitis, asthma, allergies, hypersensitive pneumonitis and infectious diseases such as aspergillosis. Mysore is the second largest city of Karnataka and a vibrant city teeming with tourists and visitors. It is a prominent historical center which attracts considerable number of domestic and international travelers and is also recognized as the cultural capital of Karnataka. There has been a significant increase in the vehicular density since 1970 in Mysore city. Consequently this growth leads to the deterioration of air quality especially in commercial areas. The quantity and duration of exposure of the automobile pollutants on people and plants will be high in these areas.

The present investigation was undertaken to study the number of fungal colony and bacterial colony on the exposed petriplates containing nutrient media near different traffic intersections with a view to investigate the concentration of the microspora as a result of environmental pollution by vehicles.

MATERIAL AND METHODS

The study was conducted at five different traffic intersections such as K.R. circle, Metropole circle, Fountain circle, Sub-urban circle and Vijaya bank circle. Samples were obtained in two replicates and sampling was carried out at peak hours. The solidified nutrient agar plates were exposed to atmospheric air for about 5 minutes for trapping of bacteria. After exposure the petriplates were incubated at room temperature i.e. 25⁰C for about 48 hours. The number of colonies was counted and they were characterized. The bacterial colonies were Gram tested. The plates with solidified Czapek Dox agar was exposed to air for about 5 minutes to trap the air borne fungi. The exposed plates were incubated at 25⁰C for 2 to 7 days. The number of colonies was counted and they were identified.

RESULT AND DISCUSSION

The predominant fungi in virtually all samples were *Cladosporium* and *Fusarium* species with a smaller number of other species such as *Aspergillus niger*, *Trichoderma*, *Saccharomyces*, *Alternaria etc.* The predominant bacterial types were Cocci and *Bacillus*

species in all locations, with some Gram-positive cocci and rods and some Gram-negative cocci and rods. The number of airborne bacterial colonies and fungal colonies are listed in Tables 1 and 2 respectively. Increased concentrations of aerospora in the city can be a consequence of air pollution, traffic and dust. Monitoring of airborne fungi can be helpful in prediction of their qualitative and quantitative variations depending on meteorological, geographical and seasonal climatic factors, which is of great importance for prevention of fungal allergic diseases.

Table 1. Air borne bacteria detected at the five different traffic intersections

CIRCLES	NUMBER OF COLONIES
Fountain circle	53
Vijaya bank.	60
Metropole	106
Sub-urban bus stand	574
K.R.Circle	604

Table 2. Air borne fungi detected at the five different traffic intersections

Locations	Air borne fungal colonies												
	a	B	c	D	e	f	g	h	i	j	k	l	m
K.R. Circle	+	+	-	+	-	-	-	-	+	+	+	+	-
Fountain circle	+	+	-	+	-	-	-	-	-	+	-	-	+
Sub-urban bus stand circle	+	+	-	-	+	-	-	+	-	-	-	-	-
Metro pole circle	+	+	+	-	+	-	-	+	+	-	-	-	-
Vijaya Bank circle	+	+	-	-	-	+	+	-	-	-	-	-	-

a. *Cladosporium* b. *Fusarium* c. *Trichoderma* d. *Saccharomyces* e. *Alternaria*
 f. *Helminthosporium*. g. *Streptomyces* h. *Mycelia sterilia* i. *Neurospora*
 j. *Aspergillus niger* k. *Aspergillus flavus* l. *Aspergillus oryzae* m. *Penicillium*

+ = Colony present

- = Colony absent

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