RESEARCH ARTICLE

ASSESSMENT OF AIR MICROFLORA IN SELECTED GARDENS IN DAHISAR

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ABSTRACT

The present investigation aims at assessment of the microflora present in the air of some selected gardens in Dahisar. The assessment of microflora of all the four selected sites was carried out using the Koch sedimentation method. The study revealed that the site 1 i.e. Riddhi Siddhi garden had 3913.41 cfu/m^3 microbial load at the morning time which reduces to 1410.23 cfu/m^3 in the evening. Similarly site 2 i.e. BMC garden has 21611.90 cfu/m^3 microbial load which is the highest in the present research study observed during the morning time and it too reduced to 6416.58 cfu/m^3. At site 3 and 4 the same observations have been noted where at site 3 i.e. Ever United garden, the morning microbial load was 10435.76 cfu/m^3 which then reduced to 3149.50 cfu/m^3 in the evening. Devyani garden which is the 4th site has shown the microbial load reduction by almost 5 fold, as the morning readings were 12184.45 cfu/m^3 and the evening readings noted were 2725.99 cfu/m^3. This study reveals that it is necessary to supervise the air quality of all the four sites periodically and take appropriate measures that would protect it from further excessive microbial pollution in the future..

Keywords : Air Microflora, Dahisar Gardens, Koch sedimentation method, microbial pollution

INTRODUCTION

Air contains various biological elements such as seeds, mould spores, yeast, bacteria, viruses, insect eggs, small worms and protozoan cysts. (Krzysztofik, *et al.*1997) Air basically serves as a temporary habitat for a variety of microorganisms. Microorganisms drift by attaching to dust particles of mineral and organic origin, by attaching to vegetal and animal remains, or by getting immersed in water, such substances that carry these organisms are termed as bioaerosols. (Krzysztofik, 1992) Bioaerosols consist of all airborne particles of biological origin, i.e. bacteria,fungi, fungal spores, viruses, and pollen, and their fragments, including various antigens. Particle sizes of bio-aerosolrange from aerodynamic diameters of 0.5 to 100 µm. The number of microbes in the air varies according toatmospheric conditions. Nevalainen *et al.* (1991); Cox *et al.*(1995); Grinshpun *et al.* (2005).

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The surrounding air is the best dispersal medium for pathogenic bacteria and viruses which may cause numerous diseases of the respiratory system (Bugajny *et al.* (2005)).Mould fungi present in the air can cause numerous mycoses, allergies and toxic reactions in humans. Since the number of respiratory allergies is on rise due to the microflora in atmospheric air, the regular study and monitoring of theoutdoor air microflora is becoming of outmost importance. (D´Amato *et al.* (2000).

The present research study aims on assessment of the microflora present in the air of some selected gardens in the Dahisar. Dahisar is the last suburban area of the northern part of Mumbai city. It is one of the main areas of the Mumbai city with many upcoming residential buildings. The Dahisar area contains many small and big gardens which are frequently visited by the large number of people from the nearby residential areas in the morning and evening for the purpose of recreation.

People visiting these gardens are frequently exposed to the microflora present in the garden and so the microflora assessment and testing is being intended through the present research study.

MATERIAL AND METHODS

Study Area: Dahisar is the last suburban region of the Mumbai city. It is subjected to extreme anthropological activities as the area is an upcoming hub of various big and small residential complexes. The region also contains many small and big gardens which are visited by the people on a regular basis. The study area consists of 4 different gardens situated in the Dahisar region. The first being the Riddhi Siddhi garden (Site 1), second the BMC garden (Site 2), third the Ever United garden (Site 3) and the fourth Devyani garden (Site 4).

Assessment: The assessment of microflora of all the four selected sites was carried out using the Koch sedimentation method. According to the Koch sedimentation method, open Petri dishes containing Nutrient Brothagar (Himedia) medium were exposed at all the four selected gardens for 5 minutes, 150 cm above ground level during morning & evening. The plates after sampling were transported to the laboratory, where they were incubated for 48 hours at 37°C.

After incubation the total number of growing colonies was counted. Each colony represents a single colony forming unites (CFU). The results were recalculated per cubic meter of air (CFU/m^3). The colony forming unites (CFU) weredetermined using the Omelianski's formula.

$$CFU/m^3 = a \cdot 10000/p \cdot t \cdot 0.2$$

where:

a – the number of colonies on the Petri plate.
p – the surface area of the Petri plate.
t – the time of Petri plate exposure.
(Krzysztofik B 1992)

RESULTS & DISCUSSION:

The results obtained from the present research study clearly indicate that the concentration of the microflora at all the four study sites is extremely high during the morning time while it reduces drastically until evening.

The site 1 i.e. Riddhi Siddhi garden has 3913.41 cfu/m^3 microbial load at the morning time which reduces to 1410.23 cfu/m^3 in the evening. Similarly site 2 i.e. BMC garden has 21611.90 cfu/m^3 microbial load which is the highest in the present research study observed during the morning and it too has reduced to 6416.58cfu/m^3.

At site 3 and 4 the same observations have been noted where at site 3 i.e. Ever United garden the morning microbial load is 10435.76 cfu/m^3 which has reduced to 3149.50 cfu/m^3 in the evening. Devyani garden which the 4th site has shown the microbial load reduction by almost 5 fold, as the morning readings were 12184.45 cfu/m^3 and the evening results analyzed were 2725.99 cfu/m^3.

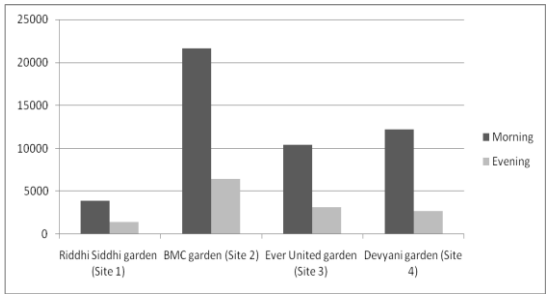
This clearly indicates that the people visiting these gardens during morning time are extremely exposed to the risk of high microbial contamination.

The workers in these gardens have a daily activity to burn the dry dead plant material of the garden in the evening so as to reduce the dry plant waste load and also to restrict the mosquito population. Due to this burning activity the microbial load must also be going down in the evening.

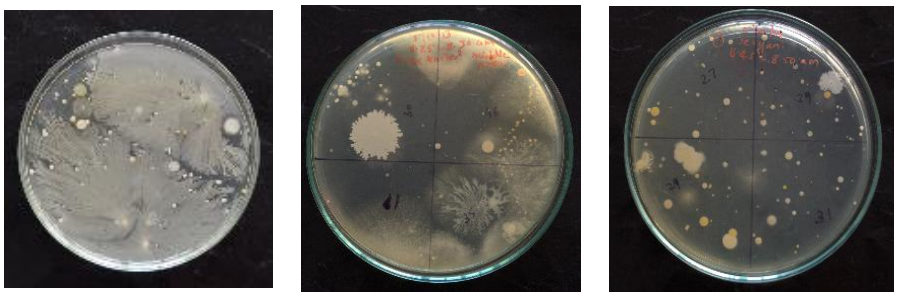
Air, an essential element of the natural environment is being contaminated by a growing number of different pollutants. Rapid urbanization in the surrounding areas of the study site must have led to a menacing concentration of the air pollutant emission.

Table 1: Concentration of microflora in the air of four different gardens of Dahisar region in Mumbai City (cfu/m^3).

Study Area	Sampling Time	
	Morning	Evening
Riddhi Siddhi garden (Site 1)	3913.41	1410.23
BMC garden (Site 2)	21611.90	6416.58
Ever United garden (Site 3)	10435.76	3149.50
Devyani garden (Site 4)	12184.45	2725.99



Photographs of Petriplates



Morning Site 2 **Morning Site 3** **Morning Site 4**

The atmosphere always absorb substantial amounts of harmful contaminants such as different powders, organic compounds, non – organic compounds of nitrogen, sulphur, coal and other compounds as well as various microorganisms.(Marta Małecka-Adamowicz*et al.*(2010); M. Stryjakowska-Sekulska*et al.*(2007); Vinita Katiyar(2013);F.O. Ekhaise*et al.*(2010)).

But the air's ability to self-clean has become very limited at all the four study sites and hence it has become necessary to supervise its quality periodically and take measures that would protect it from further excessive microbial air pollution in the future.

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