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STUDY OF FUNGAL DIVERSITY OF ACC FACTORY AREA AND NON POLLUTED ENVIRONMENT OF JAMUL, BHILAI, DURG, CHHATTISGARH

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ABSTRACT

Fungi are an important microflora found in well diversified ecological conditions. In Chhattisgarh state, Jamul is situated in eastern region of Bhilai .The floral and annual diversity of Jamul is a matter of Interest. Present paper deals with the fungal diversity in Jamul during summer season (from march to may). For study of aeromycoflora, ten sterilized Petri plates containing PDA media were exposed 5 to 10 min. in both ACC and non polluted area of Jamul. These exposed Petri plates brought into the laboratory and incubated at 28±1^{0}C for incubation period.. During the period of investigation, overall 40 fungal species belonging to 15 genera of fungi were observed in ACC factory area and 45 fungal species belonging to 17 genera of fungi were observed in non polluted environment of Jamul.

KEYWORDS: PDA, Microflora, Fungi.

Fungi are ubiquitous in nature. Fungal spores are present in outdoor air throughout the year, still airborne diversity is poorly characterised. The diversity of fungal spores are however not known.

We all know that the air is not free from microorganism. It contains microorganisms viz Fungi, bacteria etc. Airborne fungal spores constitute one of the important components of microbial population of ambient air. The term 'Aerobiology' was initially employed in 1930's. Aerobiology is a branch of biology that studies organic particles, such as bacteria, fungal spores, very small insects, pollen grains and viruses, which are passively transported by the air. Aerobiologists have traditionally been involved in the measurement and reporting of airborne pollen and fungal spores as a service to allergy sufferers. Fungal spores have long been known as one of the important environmental bio-particles causing dermatitis, respiratory and cardiac diseases along with allergic manifestation in human beings (Maunsell, 1954).

Many workers reported that indoor air with natural ventilation to the ambient atmosphere contain seasonally occurring pollen grains and fungal spores (Adams & Hyde, 1965; Agarwal *et al.,* 1969). Therefore, a preliminary study on air borne fungi has been conducted in ACC cement factory Jamul Industrial town of Bhilai .which is one of the biggest industrial towns in the country.

MATERIAL AND METHOD

Jamul is situated in the eastern region of Durg District Chhattisgarh and situated in 21.25°N North latitude and 81.4 East longitudes above 298.60 meter the sea levels. The climatic condition of Jamul city is divided by rainy seasons (July-October) winter (November-February) and summer season (March-June). Our study area is ACC Jamul factory area throughout the year both places are very crowded due to industry and village.

SURVEY OF AEROMYCOFLORA

For study of aeromycoflora, ten sterilized Petri plates containing PDA media were exposed 5 to 10 min. in ACC .These exposed Petri plates brought into the laboratory and incubated at 28±1^{0}C for incubation period. At the end of incubation period fungal colonies were counted, isolated and identified

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with the help of available literature and finally identified by the authentic authority. Targeted fungi were got identified by authentic centre TFRI (Tropical Forest Research Institute) Jabalpur. (M.P.)

Culture Media:

Potato dextrose agar media;

Dextrose - 20 gm

Potato - 250 gm

Agar - 15 gm

Distilled water - 1000 ml

RESULTS AND DISCUSSION

In ACC Jamul factory area 40 fungal species belonging to 15 genera were isolated whereas from non polluted area 45 species belonging to 17 genera were isolated.

A total of 45 species from non polluted area of Jamul were isolated among which Anamorphic fungi were dominant (33 species), followed by Ascomycotina (4species), Zygomycotina (4 species), Basidiomycetes (2species) and mycelia sterilia (2 species). (Table- 1)

Aspergillus species, *Penicillium* species, *Rhizopus* species, *Fusarium* species , Cladosporium species were common in the season.

From ACC cement factory total 40 fungal species were isolated out of which again anamorphic fungi were dominating(30 species) followed by Ascomycotina (4species), Zygomycotina (4 species), and mycelia sterilia (2 species). No species of Basidiomycetes were observed. (Table-2)

Study reveals that *Aspergillus* group has shown maximum occurrence in all three season whereas *cladosporium* species has shown maximum contribution.

It has been observed that maximum fungi were isolated from nonpolluted area of Jamul whereas less in ACC cement factory area. Seema and her coworkers (Verma *et al.,* 2014) also studied aeromycoflora of ACC, Jamul of Chhattisgarh. studied the fungal diversity. Saluja (2005) reported on leaf surface mycoflora of *Cathranthus roseus*, Karkun and coworkers (Karkun & Verma, 2015) evaluated the fungi from leaf surface of *Brassica nigra*. Similar result was also taken by Kunjam (2007) from Rajnandgaon, Lall (2008) from hospital area Raipur. Similar results have been reported by various scientists i.e. Chakraborty *et al*. (2003) from West Bengal, Jothish and Nayar (2007) in poultry farm in Palakkad District, Kerala, Singh and Rakhi (2003) in Hardwar and Padmanabhan *et al.,* (2004) from Kerala and Karkun *et al.,* (2012) from Chhattisgarh.

Table 1: Fungal groups from non polluted area

Name of fungi	March	April	May	frequency	Contri.
Zygomycotina	**Colony number**	**Colony number**	**Colony number**		
Choanephora cucurbitarum		1		33.3	1.38
Mucor hemalis	2			33.3	2.77
Rhizopus oryzae			1	33.3	1.38

Rhizopus stolonifer			1	33.3	1.38
Mycelia sterilia					
Mycelia sterilia(White)			4	33.3	5.55
Mycelia sterilia(Peach)		3		33.3	4.16
Basidiomycotina					
Alysidium resinae		1		33.3	1.38
Sporotrichum		1		33.3	1.38
Ascomycotina					
Chaetomium globussum	1	2		66.6	4.16
Emericella nidulans	1	1		66.6	2.77
T alaromyces flavus			1	33.3	1.38
Thielavia basicola	2			33.3	2.77
Anamorphic fungi					
Acremonium fusidioides	1	1	2	100	5.55
A. roseum		2		33.3	
Alternaria alternata	1	2	1	100	5.55
Alternaria crassa	2		1	66.6	4.16
A. Raphani		1		33.3	
Aspergillus albus	2	1	1	100	5.55
Aspergillus astus			2	33.3	2.77
A. awamoori	4	2	2	100	11.11
Aspergillus aureus	1			33.3	1.38
A. carneus	2		1	66.6	3.45
A.clavatus		3		33.3	3.45
Aspergillus fumigates	2	1	2	100	6.94
Aspergillus japonicas	1	2	1	100	5.55
Aspergillus luchensis	3	1	1	100	6.94
Aspergillus nidulans		1		33.3	1.38
Aspergillus niger	2	2		66.6	5.55
A.neoniveus			1	33.3	1.38
A.niveus		1		33.3	1.38
A.parasiticus	1	2	1	100	5.55
A. sclerotiorum			1	33.3	1.38
A. sulphurous		1		33.3	1.38
Cladosporium cladosporides	2	4	2	100	11.11

Cladosporium oxysporium	1	2	5	100	11.11
Drechslera rostrata	2	2	3	100	10.11
Drechslera tetramer		1		33.3	1.38
D.tuberculata	1			33.3	1.38
Fusarium oxysprum	1	2	1	100	5.55
Fusarium species	2	1		66.6	4.16
Penicillium citrinum	1	2	1	100	5.55
Penicillium herbarum			1	33.3	1.38
Penicillium notatum			1	33.3	1.38
Penicillium oryzae	2			33.3	2.77
Penicillium oxalicum		2		33.3	2.77

Table 2: fungal diversity in ACC area

Name of fungi	March	April	May	frequency	Contri.
Zygomycotina	**Colony number**	**Colony number**	**Colony number**		
Choanephora cucurbitarum	2	1	1	100	5.55
Mucor hemalis	1	1	2	100	5.55
Rhizopus oryzae			1	33.3	1.38
Rhizopus stolonifer	1		1	66.6	2.77
Mycelia sterilia					
Mycelia sterilia(red)		2		33.3	2.77
Mycelia sterilia(Peach)			1	33.3	1.38
Ascomycotina					
Chaetomium globussum		2		33.3	2.77
Emericella nidulans	1	1	1	100	4.16
Talaromyces flavus			1	33.3	1.38
Thielavia basicola	2			33.3	2.77
Anamorphic fungi					
Acremonium fusidioides		1	1	100	5.55
A. roseum	1			33.3	1.38
Alternaria alternata	1		1	66.6	5.55
Alternaria crassa	2		1	66.6	4.16
B. raphani			2	33.3	2.77
Aspergillus albus	2	1		66.6	5.55

Aspergillus astus			2	33.3	2.77
B. awamoori	1	2	2	100	
Aspergillus aureus	1			33.3	1.38
B. carneus	1	4		66.6	6.94
A.clavatus		3		33.3	4.16
Aspergillus fumigates	3	1	2	100	7.94
Aspergillus japonicas	1	1	1	100	5.55
Aspergillus luchensis	2	1		66.6	4.16
Aspergillus nidulans		1		33.3	1.38
Aspergillus niger	2			33.3	2.77
A.neoniveus	1			33.3	1.38
A.niveus		1		33.3	1.38
A.parasiticus	1	2	1	100	5.55
A. sclerotiorum			1	33.3	1.38
A. sulphurous		1		33.3	1.38
Cladosporium cladosporides	2	2	2	100	11.11
Cladosporium oxysporium	1	2	5	100	11.11
Drechslera tetramer		1		33.3	1.38
D.tuberculata	1			33.3	1.38
Fusarium oxysprum	1	2	1	100	5.55
Penicillium herbarum			1	33.3	1.38
Penicillium notatum			1	33.3	1.38
Penicillium oryzae		2		33.3	2.77
Penicillium oxalicum	2			33.3	2.77

CONCLUSION

Control of microorganisms in the ACC Jamul can be done by maintaining humidity and temperature in environment. The gases used for fumigation can also be used to control the growth of fungal species. In factory area cleanliness should be maintained by avoiding the accumulation of organic substances. The chemicals may be used for checking the multiplication of aeromycoflora .The windows and different ventilators ought to be sieved so as to minimize entry of microorganisms .ACC Factory area is a place where number of human being come every day. The air of ACC factory area consist microorganisms which are not good for human being. Therefore it is necessary to survey the aeromycoflora of ACC Factory area.

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