International Journal of scientific research and management (IJSRM)
||Volume||2||Issue||7||Pages|| 1112-1117||2014||
Website: www.ijsrm.in ISSN (e): 2321-3418

A Diversity of Fungal forms Present in Industrial Area of ACC Jamul

Seema Verma , Dr. Arunima Karkun , Dr Kalpana Patle , Dr. Deepak Karkun

Department of Botany, G. D. Rungta College Of Science And Technology, Kohka Kurud Road, Bhilai , Durg, Chhattisgarh, India and Govt. V.Y.T.P.G. Auto. College, Durg, C.G. India
Email: seemaverma72@gmail.com.

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. The air born fungal spores in industrial area of Jamul were studied from June 2013 to January 2014. For isolation of fungi the petriplates containing potato dextrose agar media were exposed in air and incubated at 28"C for 3 -5 days. A total of 36 fungal species were isolated. Out of which 31 species (6 genera) belongs to Deuteromycotina, 2 species (2 Genera) belongs to Zygomycotina, 1 species (1 genera) belongs to Ascomycotina and 2 sterile mycelium. Aspergillus group was found dominant followed by Penicillium and Cladosporium. It was also observed that Cladosporium species were present maximum during rainy season. The incident of fungal spores were correlated with meteorological parameters.

Keywords : Airborn , Meteorological parameters and Microflora .

INTRODUCTION

Aerobiology is a scientific and multi disciplinary approach focused on the transport of organisms and biologically significant materials. Fungi are remarkable for their antiquity, diversity, ubiquitous distribution and longevity . 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. 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. The air of industrial town is almost always contains spores, but their number and types depends on the time of days, weather, season and geographical location . Biosphere pollution by chemicals and heavy metals such as cadmium, nickel, zinc, lead, copper etc., accelerated dramatically during the last few years due to smelting, manufacturing, use of agricultural fertilizers, pesticides, municipal wastes, industrial effluents and industrial chemicals etc. The problem of environmental pollution due to toxic metals has begun to cause concern now in most cities. Heavy metals like Fe, Cu, Zn, Ni and other trace elements are important for proper functioning of biological systems and their deficiency or excess could lead to a number of disorders. Contamination by heavy metals has become a burning issue in recent years because of their potential accumulation in bio systems through contaminated air. Air is a specie rich habitat containing all major groups of microorganisms. It is also actively involved in the cycling of plant nutrients and in the weathering of primary minerals. Environmental pollution with heavy metals is a global issue. It is present everywhere, though to different degrees and is specific to certain parts of the biogeosphere. Numerous organic and inorganic compounds, heavy metals, pollute the environment in particular.

MATERIALS AND METHODS

Jamul is the industrial town of Bhilai . Jamul experiences a hot, arid temperate climate and receives an average 1305.7 mm rainfall annually. Jamul is situated in the eastern region of Chhattisgarh . Jamul is the biggest industrial town.

There is cement plants, and surrounded by industries and numerous open and underground area .This is one of the most polluted cities of India .

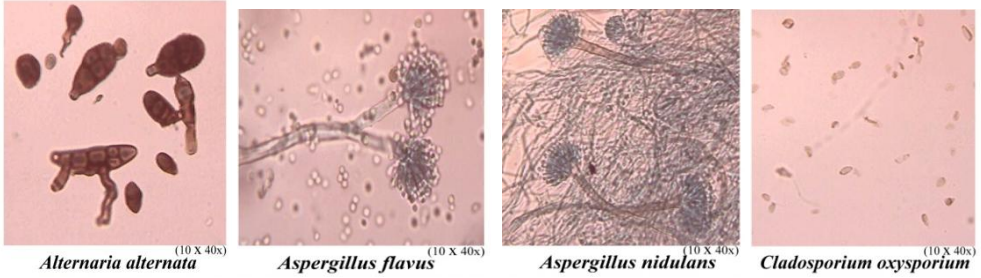
During present investigation an extensive survey was conducted for the air sampling particularly in industrial area. The seasonal air sampling was carried out at the height of 10 feet above the ground level for a period of June 2013 to January 2014. The isolation of microscopic fungi was done using potato dextrose agar media The petriplates were kept for incubation in incubator for 28ºC ± 2ºC. After incubation fungal colonies were counted and identified. Identification of fungi were done by analyzing both morphological and microscopic characters and further by help of available literature.

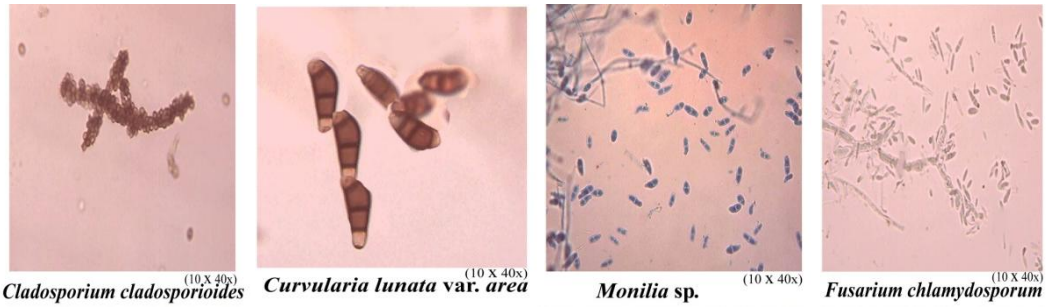
After sampling the slides were mounted and scanned under microscope. Identification of the fungal spores was done on the basis of microscopic examination and with the help of available literature

RESULT AND DISCUSSION

The air mycoflora of a particular region is influenced by topography and meteorological parameter of the concerned area. A total of 36 fungal species were isolated. Out of which 31 from 578 colonies (8 genera) belongs to Deuteromycotina, 2 species (2 Genera) belongs to Zygomycotina, 1 species (1 genera) belongs to Ascomycotina and 2 sterile mycelium. Aspergillus group was found dominant followed by Penicillium and Cladosporium. It was also observed that *Cladosporium* species were present maximum during rainy season. During the study in which *Aspergillus, Penicillium, Mucor* and *Rhizopus* are reported human pathogen. The dominant fungal spores were of *Aspergillus* sp. , followed by *Alternaria* sp. , *Rhizopus* sp. and *Aspergillus fumigates* . Major spores contributors during the study, These all figures show great variation of presence of fungal spores in atmosphere. Hot and dry months show less number of spores, whereas months of rainy seasons show maximum number of spores due to wet condition, humidity, presence of plenty of organic food. It was also reported that the fungal flora were less prevalent in particular month it may be due to the environmental conditions. Fungal species like *Curvalaria lunata* was less prevalent in the month of January . *A. niger* in the month of July to September 2013. *Aspergillus fumigates peaked in September to January* . *Mucor hemalis* were from june 2013 to January 2014. Fusarium sp. were from June 2013to January 2014. *A. species* were from june 2013 to January 2014. *Alternaria species* were from June to December 2013. *Emercilla nidulans* were found only in October and December 2013. *Drechslera tetramer* were found in June 2013to Janauary 2014 .*Monilia* species presents during rainy season. *Mycelia* species present throughout the study. The variation in composition of aeromycoflora in different areas of city probably attributes to co- existance on concentration of pollutants in the air along with the climatic variations. Presence of transportation, congested houses and decaying materials and waste are also affect the aeromycoflora. It may be concluded from present study that aeromycoflora is highly sensitive to environmental factors. Aeromycoflora with a specific area quickly responds to change in environmental conditions.

Different species of aeromycoflora of ACC Jamul industrial area under microscopic observation.





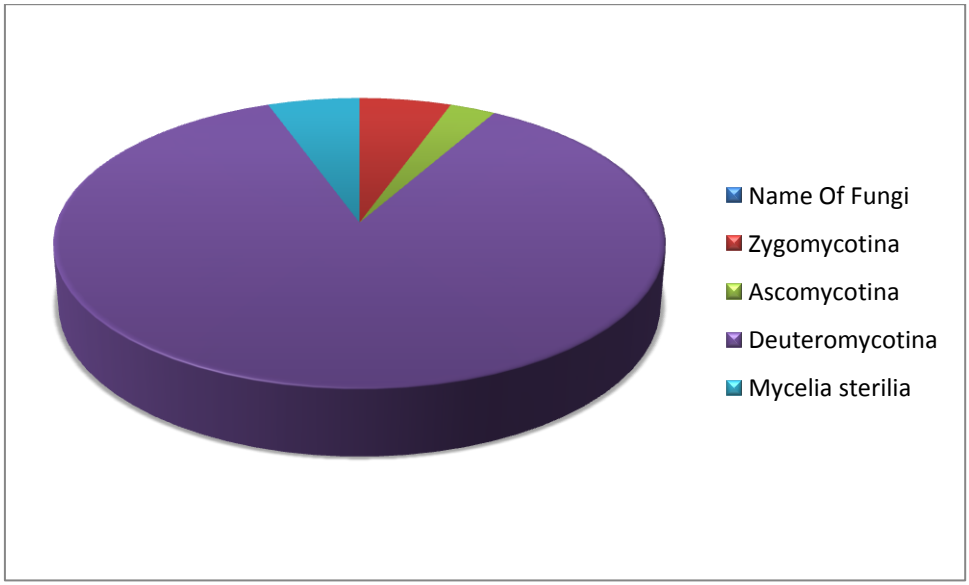


Fig 1: showing dominant fungal group

Table 1: showing fungal diversity of ACC Jamul industrial area

Fungi reported from acc factory area	**June**	**July**	**August**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**
	colony no	**colony no**	**colony no**	**colony no**	**colony no**	**colony no**	**colony no**	**colony no**
Zygomycotina								
Mucor hemalis	2	1						
Rhizopus stolonifer	1	1						
Ascomycotina								
Emercilla nidulans					1		1	
Deuteromycotina								
Alternaria alternata	2	2	3		1	2	4	
Alternaria crassa		2					1	
Aspergillus aureus	2	1		1		1	1	

Aspergillus awamoori	1	2	6	3	3	2	1	1
Aspergillus flavus	1	2			4	7	7	5
Aspergillus fumigates	2	3	7	4	3	5	6	9
Aspergillus japonicus	3	2		5	3	2	1	1
Aspergillus luchensis	2	5	6	2	1			
Aspergillus nidulans	5	3	4	7	3	2	4	3
Aspergillus niger	2	5	6	7	4	2	2	9
Aspergillus parasiticus	4				2			1
Aspergillus terreus	1	3	5	1			1	
Aspergillus versicolor	1	3	2			2		
Aspergillus sp I					3	3		
Aspergillus versicolor	3	3	3	5	1	2	3	1
Aspergillus sp I	1	2	3	1	6	2	3	2
Drechslera tetramer	1	2	3	1	6	2	1	1
Cladosporium cladosporides		8	7	5	2	3		
Cladosporium oxysporium	12	5	6	7	10	4	2	1
Cladosporium-sphaerospermum	9	12	9	9	3	4	1	
Curvularia clavata	3	1	5	2	1	1	1	1
Curvularia lunata	5	3	2	6	2	3	3	1
Fusarium oxysporum	2		2		1	1	1	1
Monilia sp	5	1	1		1			
Penicillium brevicompactum	2				4		1	
Penicillium citrinum	5				2		3	
Penicillium crysogenum	6	3	5	2	3	2	2	2
Penicillium multicolor			3		1		1	
Penicillium notatum	2				3			
Penicillium bicolor	2						2	
Penicillium rubrum	3							
Mycelia sterilia								

Mycelia sterilia (White)	1	3	2	2	5	2	4	1
Mycelia sterilia (Peach)	1	5	2	1	3	2	1	1

CONCLUSIONS

Since, there are changes in meteorological conditions each year therefore present investigation of 6 month is not sufficient to analyze air-borne mycoflora with that of trends of seasonal variations. Although, frequent precipitation in rainy season is an important factor for the spores fall and their germination in hot and wet conditions prevailing in and around industrial town. The season representing mostly saprophytic group of fungi such as *Aspergillus fumigates*, *Penicillium* sp. *Cladosporium* sp. But, the higher percentage of fungal propagules is obtained in rainy season because of the availability of organic substrate either living or dead and humid atmosphere. The abundance of organic matter in rainy season provide opportunity to both the groups i.e., saprophytic and plant pathogenic fungi. During present investigation no area specific fungi could be identified. However, *Drechslera* sp. are obtained as common representative of forest fungi. The present study is 6 months provides a preliminary information on different groups of fungi. The regular monitoring of fungal spores may provide better knowledge for specific group of fungi causing various types of heath disorder in human being. The aim of this study was to provide aeromycological baseline information about ACC factory area .

References:

- Bernett, H.L., 1960. Illustrated Genera of Imperfect Fungi. 2nd Edn., Burgess Publishing Co., Minneapolis.
- Dalal L.P. and Bhadange D. G (2011) Diversity of fungal forms of Wardha city- A caseStudy. Asiatic Journal of Biotechnology Resources; 2 (07) 898 – 9.
- Dutta S, B.K. Dutt, B.K., Nath, P.K (2009) some observations on the Aeromycoflora of Tea factory in Cacher District, Assam. Assam University Journal of Science and Technology, Vol 4: No 1.
- Ellis, M.B., 1976. More Dematiaceous Hyphomycetes. 1st Edn., Commonwealth Mycological Institute, Kew, Surrey, UK., Pages: 507.
- Kin-Ming Tsui", Sally C. Fryar, I. John Hodgkiss, Kevin D. Hyde, Asha D. Poonyth and Joanne E. Taylor.
- Maheshwari, R. (1996). Special issue on genetics of filamentous fungi in honour of Perkins, David, D.: Preface. J. Genet. 75: 239-243.
- Nayar T.S. , Krishna Mohan.Tripathi and Jothis P.S.(2007) studied Status of airborne Spores and pollen in a coir factory in Kerala, India. Aerobiologia Volume , Issue 2, pp 131-14.
- S.Padhamanabhan , Jothish and Themath, Nayar Soman (2004) Airborn fungal spores in a Saw mill environment in Palakkad District Aerobiologia 29:25-81.
- Shazia Iram, Iftikhar Ahmad and Doris Stuben . 2009 Analysis of mines and contaminated agricultural soil samples for fungal diversity and tolerance to heavy metals *Pak. J. Bot*., 41(2): 885-895.
- Wadhwani, K., 1994. Air fungal spores and working environment-Some medical aspect. Curr. Trends Life Sci., 20: 271-277.
- Ziska H.Lewis,Epstein R Paul Rogers A. Christine (2008) Climate change, Aerology and public health in the Northeast United States. Mitig Adapt strat Glob change.13:601-613.