



STUDY OF DOMINANT INDOOR AEROMYCOFLORA OF ARVA RICE MILL INDUSTRY AT DESAIGANJ, (WADSA) DISTRICT - GADCHIROLI. (M. S.)

Nagdeve Seema* & Kukreja S. G.**

*Mahatma Gandhi Art's, Science and Late N. P. Commerce College, Armori, Dist- Gadchiroli
 email: seemanagdeve@gmail.com.

**Sarvodaya Mahavidhyalaya, Sindewahi, District- Chandrapur (M.S.) India.

Abstract:

The present study was focused on dominancy with the percentage of indoor aeromycoflora of Arva rice mill industry. The study of this aspect is highly interdisciplinary in nature and has tremendous scope to find the significant application in human health. During the period of investigation (Jan 2012 – Dec.2013) total 24 genera of indoor aeromycoflora were reported from four different sections of Indoor environment of Arva rice mill industry, Desaiganj (Wadsa) Dist. Gadchiroli. The identified indoor aeromycoflora were such as, *Aspergillus* (38.2%) *Penicillium* (14%) *Curvularia* (8.21%) *Cladosporium* (7.49%) *Alternaria* (5.51%) *Bipolaris* (*Helmiuthosporium* 3.04%), *Rhizopus* (2.66%), *Fusarium* (2.57%), *Nigrospora* (1.48%) *Pithomyces* (1.43%), *Chaetomium* (1.41%) etc. The present investigation concluded that the highest percentage (%) of genera *Aspergillus* (38.2%) was recorded & lowest percentage (%) was of genera *Epicoccum* (0.16%) was recorded during the two year study.

Keywords: Indoor aeromycoflora, Arva rice mill industry, Desaiganj (Wadsa).

INTRODUCTION:

This paper is a revision of the different types of the aeromycological researches published during the last 25 years. The research paper is concern with the seasonal and diurnal occurrence of fungal spore's percentages in indoor environments, the influence of weather conditions on the fungal spore counts in air, the duration and course of fungal spore seasons. Usually the most viable fungal spores surviving in indoor environment in concentration considerably greater than pollen grains but the frequency of allergic respiratory disorders appears possibly due to microfungi is usually much lower than pollen grains of vascular plants (Ivanovici and Tudorica, 2009). The appearance of respiratory allergy by fungal organisms is accounted at 20% to 30% among atopic individuals and up to 6% in general human population (EFSA, 2011). The variable meteorological conditions induce alterations in allergens, viable microbes and other noxious agents that prevail in particular environment. These measures will not only help to monitor the levels of these agents in the environment, but, also aid clinicians in advising and treating patients as well as those at risk before they are exposed and sensitized. Airborne fungal spores are ubiquitous in nature and can survive in both wet and dry environment through scavenging nutrients from the atmosphere (Verma et al., 2013). About 80,000 fungal species have been reported airborne most of which are cosmopolitan in origin (Kendrick, 2000). Several investigations have been carried out on indoor environmental microfungal organisms in many different parts of the globe due to

their relationship with plants, animals and human. They are responsible for causing several serious diseases to animals and other organisms because of their chemical and genetical properties. Fungal organisms in indoor environment caused spoilage of stored grains and food stuff (Nafis and Sharma, 2012), fabrics, leather and other similar articles (Ramamurthy et al., 2011) and biodeterioration of books and other material as well as with the spoilage of library books (Dalal, et al., 2012).

MATERIALS & METHODS:

Study Area: Desaiganj (Wadsa) The town is situated on the banks of river Wainganga and is agriculture dominated. Desaiganj sub-division consists Wadsa, Armori, Kurkheda and Korchi talukas. There are 467 Gram Panchayats and 1688 Revenue Villages. Desaiganj is the most developed town in whole Gadchiroli District, well connected by Railways & roads to the rest part of India. Trains for Hyderabad, Bangalore, Chennai, Raipur, Bilaspur & Darbhanga are available. It's a market hub for rice, cloths, electronics, grocery for Gadchiroli, Gondia, Bhandara and also Chandrapur district. It's a center market for rice trading. Shree Sai Arva Rice Mill and Rajmata steam Rice Mill both are located at Lakhandur Road in Wadsa town of Gadchiroli district of Maharashtra. But the present study was orient on selected Shree Sai Arva Rice Mill from its 4 sections (Paddy godown, machine section, rice godown and husk storage section).

Air sampling was conducted inside the four different sections of Arva rice mill Industry at Desaiganj, (Wadsa) district, Gadchiroli for two

consecutive years (Jan., 2012 - Dec., 2013) using Hi Air sampler (Mark II), Hi media Laboratories, India,. for five minutes on Agar strips, fortnightly. Simultaneously exposure petriplate method containing CDA (Czapek's Dox Agar) with streptomycin, two times in a

month, by keeping them at the height of five feet from the ground level. Petriplates were incubated at room temperature. After 3 - 4 days colonies were observed, counted and sub cultured for identification.

Table no.1.1. EXPOSURE PETRIPLATE METHOD, Total number of Fungal Colonies of different dominant genera in four different sections of Arva Rice Mill Industry & their percent contributions Jan. 2012 - Dec. 2013

Sr. No.	Genera/Species	Total colonies in Jan 2012-Dec 12	%	Total colonies Jan2013-Dec 013	%	Total colonies Jan 12 - Dec2013	%
1	<i>Aspergillus</i>	2677	37.9	2654	38.58	5331	38.2
2	<i>Alternaria</i>	375	5.31	393	5.712	768	5.51
3	<i>Chaetomium</i>	101	1.43	96	1.395	197	1.41
4	<i>Cladosporium</i>	554	7.84	490	7.122	1044	7.49
5	<i>Cunninghamella</i>	91	1.29	69	1.003	160	1.15
6	<i>Curvularia</i>	534	7.56	611	8.881	1145	8.21
7	<i>Drechslera</i>	92	1.3	81	1.177	173	1.24
8	<i>Fusarium</i>	179	2.53	180	2.616	359	2.57
9	<i>Bipolaris (Helminthosporium)</i>	225	3.18	199	2.892	424	3.04
10	<i>Mucor</i>	92	1.3	93	1.352	185	1.33
11	<i>Nigrospora</i>	116	1.64	91	1.323	207	1.48
12	<i>Penicillium</i>	994	14.1	961	13.97	1955	14
13	<i>Pithomyces</i>	98	1.39	102	1.483	200	1.43
14	<i>Phytophthora infestans</i>	72	1.02	68	0.988	140	1.0
15	<i>Rhizopus</i>	181	2.56	190	2.762	371	2.66
16	<i>Trichoderma</i>	76	1.08	69	1.003	145	1.04
17	<i>Torula</i>	48	0.68	55	0.799	103	0.74
18	<i>Sterile mycelia</i>	284	4.02	254	3.692	538	3.86
19	Others	277	3.92	224	3.256	501	3.59
	Total	7066		6880		13946	

RESULTS AND DISCUSSION:

The present study revealed that total 13946 colonies of indoor aeromycoflora was encountered for a period of two years (Jan. 2012 – Dec. 2013). It might be due to the artificial sources of spores from raw materials like paddy grains and their diffusion to the indoor air by the disturbance, agitation, flutteration and trepidation of milling, farming and dehusking machines. During the first and second year of investigation (Jan. 2012 – Dec. 2013) genera *Aspergillus* (38.2%) dominated the indoor airspora which was followed by *penicillium* (14%), *Curvularia* (8.21%), *Cladosporium* (7.49%), *Alternaria* (5.51%),

Bipolaris (3.04%), *Rhizopus* (2.66%), *Fusarium* (2.57%), *Nigrospora* (1.48%), *Pithomyces* (1.43%), *Chaetomium* (1.41%), *Mucor* (1.33%), *Drechslera* (1.24%), *Cunninghamella* (1.15%), *Trichoderma* (1.04%), *phytophthora* (1%). etc. (Table. 1.1).

The fungal airspora were found present throughout the year in the indoor environment of Arva rice mill industry. The concentration of fungal airspora was increased during warmer and humid condition followed by seasonal trend in relative humidity, rainfall and temperature. Out of the total colonies encountered, Oomycota contributed 1%, representing only one genera *phytophthora*.

Zygomycota contributed 5.13%, representing three genera, *cunnighamella*, *mucor* and *Rhizopus*. Ascomycota contributed 56.9%, representing eight genera, *Aspergillus*, *Chaetomium*, *Drechslera*, *Epicoccum*, *Penicillium*, *Pithomyces*, *Phoma*, *Scicaria* etc. Deuteromycota contributed 31.2%, representing 12 genera, *Alternaria*, *Botrytis*, *cladosporium*, *Curvularia*, *Cercospora*, *Fusarium*, *Bipolaris*, *Nigrospora*, *Pyricularia*, *Trichothecium*, *Torula*, *Trichoderma* etc. The conidia of *Aspergillus*, *Bipolaris*, *Alternaria*, *Curvularia* *Penicillium*, remained in greatest abundance in the indoor air even at low humidity, generally during warmer climate (Dalal et al, 2011). *Ascomycota* contributed highest concentration of indoor airspora followed by *Deuteromycota*, *Zygomycota* and *Oomycota*.

CONCLUSION:

The present investigation concluded that the highest percentage (%) of genera *Aspergillus* (38.2%) was recorded & lowest percentage (%) was of genera *Epicoccum* (0.16%) was recorded during the two year study. It was also observed that the number and types of fungal spores varies in indoor environment of various sites of Arva rice mill industry.

These fungal micropropagules are responsible for a variety of respiratory disease in humans, plants and animals. The predominance of fungal spore types such as dominance of *Ascomycota* followed by *Deuteromycota* and other fungal groups excluding *Basidiomycota*, concentration of individual fungal spore types are known to be allergic and pathogenic, to the workers working inside the rice mill industry. The study of this aspect is highly interdisciplinary in nature and has tremendous scope to find the significant application in human health.

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