I J R B A T, Issue (X) Vol (II) May 2022: 311-315
A Double-Blind Peer Reviewed & Refereed Journal
OPEN ACCESS
e-ISSN 2347 – 517X
Original Article

INTERNATIONAL JOURNAL OF RESEARCHES IN BIOSCIENCES, AGRICULTURE AND TECHNOLOGY
 www.ijrbat.in

AEROMYCOLOGICAL SURVEY OF VEGETABLE MARKET OF GONDPIPARI CITY, CHANDRAPUR DISTRICT, MAHARASHTRA

Sanjay Kumar[1,2*] and Sandip Shende[3]
[1]Department of Botany, Janata College Chandrapur (MS)
[2]Chintamani College of Arts and Science, Gondpipari, Chandrapur (MS)
[3]Dr. C.V. Raman Science College Sironcha, Gadchiroli (MS)
Email: sanjaykumar.ram26@gmail.com

Communicated :22.03.2022	Revision : 28.03.2022 Accepted :12.04.2022	Published: 02.05.2022

ABSTRACT: Aerospora consists fungus spores, pollen grains, different forms of bacteria, hyphal fragments, insect's parts, etc. air compose of significant proportion of fungi and tiny practical floating in air. They play an important role in biodeterioration and degradation, act as an allergy trigger, cause of disease in human beings, animals and plants, as well due to their higher concentration in the air creates environmental pollution. Information regarding composition of various fungal spores play important role for identifying different allergens and pathogens present in the air. In vegetable market environment aeromycoflora contains mostly fungal spores which causes the diseases to vegetable and the various allergies to human beings. Aero mycological survey was carried out in the vegetable market of gondpipari region using Rotorod air Sampler for the period of one year. Total 20 fungal forms were recorded during the study period. Aspergillus (11%), Rhizopus (8.1%), Sporidesmium (6.72%), Exosporium (6.46%), and Curvularia (5.4%) were recorded as the predominant forms whereas Alternaria, Bispora, Heterosporium, etc. were found with comparatively low concentration. It was observed the concentration of the spores in the air differ from season to season probably due to variation in meteorological parameters. The most common fungi identified were species of Curvularia, Cladosporium, Alternaria, Penicillium Aspergillus, and Fusarium. The composition and concentration of fungal spores considerably varied from season to season probably due to variation in meteorological parameters. During Winter season it shows higher number of fungal colonies than rainy session and less number of fungal colony is recorded in summer season.

Key words: - Aeromycoflora, vegetables market, Gondpipari, Parameters, Rotorod air Sampler, Allergic, hazards 20 fungal spores.

INTRODUCTION :

The vegetables are included in daily diet. Viz potato, tomato, cauliflower, cabbage, lettuce, spinach, reddish, bitter guard, etc are full of nutrition and are rich in protein, vitamins, carbohydrates, and mineral content. Vegetables are important food and highly nutritious ingredients which are used successfully to build up and repair the body. A fungus takes an important part in biodeterioration of natural material. Fungi are cosmopolitans and are ubiquitous in nature and it has the ability to grow on all substances available in the environment. Vegetable markets are one of many such environments that produce airborne fungi. Spoiled vegetables and dumped waste plant materials and debris play significant role in the growth and dispersal of various types of airborne fungi and its spores. Fungal organisms are present in both indoor and outdoor environments. The fungal spores remain suspended for longer time in the air, their presence depend on the various factors like humidity, temperature, sunlight, seasonal climatic variations. Suspensions of organic and inorganic material also effect the distribution of microbes in the air. Numbers of investigations on the aeromycoflora have been done in order to correlate with different type of diseases and allergic disorders in humans, the different kinds of diseases in vegetable markets in India Kakde (2012),Medhi (2010), Sharma (2001), Tiwari (1999).The adverse effect of inhaled fungal propagules on the immune system have been

well documented by various workers. Day (1986); Burge (1985, 1989); Lacey (1991). Many allergic human diseases like asthma, rhinitis and cardio-respiratory diseases are attributed due to inhalation of airborne fungal spores and pollen grains (Shivpuri and Singh 1971; Chanda and Mandal 1978). Fungal propagules in the ambient air are regularly and continuously inhaled by human beings. In view of the common occurrence of allergic disorders, it is worthwhile to conduct long term survey of airborne spores with clinical studies in different parts of India. The investigation and reports of present study would be going to helpful for better diagnosis and treatment of inhalant allergy. Aerobiological studies enable us to ascertain the concentration of fungal spores in the air and such studies have been developed in different parts of the world. (Tiwari and Jadhav (2004); Kakde et al. (2001) Nagpur; Kawasaki et al. (2010) Jaipur; Satpute et al. (1983) Shilong; Das and Bhattacharya (2008) in West Bengal; Suerdem and Yildirim (2009) in Turkey; Fung et al. (2005) in China; Rao et al. (2009) in Karachi Pakistan. No such studies are reported from this part of Chandrapur Maharashtra and therefore the present study was undertaken to assess the quality of air in the vegetable market in relation to its mycoflora.

MATERIAL AND METHODS:

The aero mycological survey was carried out in the outdoor environment of vegetable market (Gondpipari Vegetable market), district Chandrapur Maharashtra, India from January 2019 to December 2019. It is only major vegetable market of the Gondpipari city of vegetables for the peoples of gondpipari tehsil. The monitoring of atmospheric fungal spores was carried out for one year from January 2019 to December 2019. The fungal spores were captured by using Rotorod air sampler (Perkin 1957). The sampler was operated in morning, for 15 to 20 minutes twice in a week. The sampler was installed at a height of 2 meters from the ground level. After sampling the air, the cello tape was mounted on a 24 X 60 mm glass slide and mounted with glycerine jelly. The stripes were then scanned under binocular microscope Identification of spore was done on the basis of morphological characters and with the help of available literature (Tilak and Srinivasulu 1967).

RESULT AND DISCUSSION:

Altogether 20 types of fungal spore types were recorded, of which Deuteromycotina shows the highest (59.22 %) concentration followed by Zygomycotina (11.33%), and Basidiomycotina (5.93%) whereas other type shows (8.37%) concentration. Major spore types and % contribution is given in Table 1.

An average 7590 spores/m3 in air was recorded. The major fungal types encountered during study were Aspergillus (11%), Rhizopus (8.1%), Exosporium (6.46%), Sporidesmium (6.72%) and Curvularia (5.4%). Major types of spores with their percentage contribution are listed in Table 1. Rhizopus, the only member of Group Zygomycotina was reported during the investigation with 11.33% contribution. Whereas Smut spores (1.78%), Rust spores (2.31%) and Basidiospore (1.85%) were the major contributors from class Basidiomycotina. Other type formed 8.37 % part of the total airspora. It comprises of hyphal fragments (4.61%), epidermal hairs (0.59%) and Insect part 3.16%. A major fraction of unidentified type was also reported with 15.15% contribution may be due to lifting of ground dust during morning hours. Frequency of fungal spore population is closely associated with seasons variation and climatic conditions. Peak concentration was recorded in October and November 2019; Second peak was noticed in the month August and September 2019. It was found that moderate temperature, high relative humidity, and mild rains favoured, fungal growth. The minimum concentration was recorded in the month of March it was due to

the absence of rains and high humidity. The observation suggests the fact that, higher temperatures do not favour fungal growth in the atmosphere. During the period of heavy rains decrease in spore load was recorded. The observation was in conformity with the observation made Tilak, 1989. The Basidiomycotina contributed (5.93%) to the total airspora. The spore population comprised of Rust spores, Smut spores and Basidiospore. The frequency of rust and smut spores was recorded higher in the beginning of November. This may be due to high humidity, which is favourable for release of spores. From group Deuteromycotina, 15 spore types were recorded. Out of which Aspergillus (11%), Exosporium (6.46%), Sporidesmium (6.72%), Curvularia (5.4%), Alternaria (4.68%) were the major contributors. These spores were frequently observed during the investigation period, as they are dry and can be easily blown away by wind while Fusarium is retained in a sticky liquid and is release by water or strong winds (Ingold 1953). Aspergillus (11%) being the most common genus occupied the first position followed by Rhizopus (8.1%),Sporidesmium(6.72%) and Exosporium (6.46%). Highest concentration of Aspergillus was also observed by Wankhade, 1983 at Aurangabad and Rajan, 1952 at Kanpur.

CONCLUSION:

The present study and survey clearly shows that fungal population growth is firmly connected with different seasonal variation, climatic condition, rain, moister, humidity and other environmental factors. These aspects plays a significant role in the concentration of aeromycoflora. there is a need to study aeromycoflora of vegetable market, storage place to record and analyse data based on fungal spore present in that particular area of different spots of vegetables Market. Amongst the recorded fungal spore types of Aspergillus followed by Rhizopus and Exosporium was the dominant contributor of the airspora. Air monitoring is essential and must be performed continuously in order to find out the status of various types of allergic and pathogenic spores at various places and their role in causing health hazards to vegetables, fruits and human beings. The present study strongly supports that the various fungal pathogens isolated in vegetable markets of Gondpipari city, Chandrapur , Maharashtra ,India causing air pollution and damaging the health of vegetable vendors and health hazard to human being.

ACKNOWLEDGMENT:

My sincere gratitude to Dr. M Subhas, Principal JMV Chandrapur, for giving me valuable guidance. I also proud privilege to acknowledge my indebtedness to Dr. M. Gaydhane, Dr. M.B. Shende, Dr. U.B. Deshmukh, Institution of Higher Learning Research and Specialized Study Centre in Botany, Janata College Chandrapur, for providing me all facilities in research work in every possible manner.

REFERENCES:

Burge, H.A. 1989. Airborne Allergenic Fungi; classification, nomenclature and distribution. Immunology and Allergy clinics of North America 9; 307-319.

Burge, H. A. 1985. Fungus Allergens. Clinical Reviews in Allergy 3: 219-229

Chanda's, and Mandal, S. 1978: Aerobiology in India with reference to upper respiratory tract. Allergy and organic environmental pollution Pnc. 1st: 288-306.

Chandel, D. S. 2002: Surveillance of Fungal Aeroallergens in Two Different Vegetable Market Environments (Abstracts from Annual Convention of Indian College of Allergy, Asthma and Immunology, Thiruvananthapuram, 2001) Indian J Allergy Asthma Immunol. 16(1):55-71

Day, J. H., 1986. UFEI- Fungal interaction-working paper provided to the health

and welfare Canada. Ottawa, Ontario, K1AOL2.

Das, S., Bhattacharya S.G, 2008. Enumerating outdoor aeromycota in suburban West Bengal, India, with reference to respiratory allergy and meteorological factors. Ann. Agric. Environ. Med 15: 105-112.

Fung, Z, Ouyang L. Hu, Wang X, Zeng H, Lin, X. 2005. Culturable airborne fungi in outdoor environment in Beijing, China. Sci Total Environ 350: 47 - 58

Ingold, C.T. 1953: Dispersal in Fungi. Clarendon Press Oxford. 268.

Kakde, U.B, Kakde H. U. Saoji A.A. 2001. Seasonal variation of fungal propagules in a fruit market environment, Nagpur (India). Aerobiologia 17: 177-182.

Kakde U.B. and Kakde H.U. Incidence of post-harvest diseases and air borne fungal spores in a vegetable market. J. Acta. Bot. Goat, 2012, 71(1); 147–157.

Kawasaki, T., Kyotani, T., Ushiogi, T., Izumi, Y., Lee, H., and Hayakaawa, T. 2010. Distribution and identification of airborne fungi in railway stations in Tokyo, Japan. J. Occup. Health 52: 186-193.

Lacey, J., 1991. Aerobiology and health- the role of airborne fungal spores in respiratory disease. In Hawksworth, P.L. (ed), Frontiers in Mycology. C.A.B. International. Kew.

Medhi, S. and Sharma, T.C. Study of onion and Ginger store houses of Guwahati, Assam. J. Life Sci. 2010, 28; 155–160.

Perkins, W.A.1957: 2nd Semiannual report, Aerosol leh Standford University, CML., 186: 1-66.

Rajan, B.S.V., Nigam, S.A. and Shukla, R.K. 1952: A study of the atmospheric fungal flora at Kanpur. Proc. Ind. Acad. Sci., 35: B: 33 - 37.

Rao, T.A., Shaik, A.H., Ahmed, M. 2009. Airborne fungal flora of Karachi, Pakistan. Pak. J. Bot 41 (3): 1421-1428

Satpute, M., Dutta, B.K., Rao, R.R., 1983. Contributions to the aerobiology of Shilong. I. Studies on the seasonal variation of atmospheric pollen and fungal spores. Proc. Indian natn. Sci. Acad. B 49 (6): 675 – 686.

Sharma, T.C. and Bhattacharjee, R.N. Occurrence of aeromycoflora of banana fruit market. J. Adv. Pt. Sci. 2001, 42; 177–184.

Shivpuri, D.N. and Singh, K. 1971: Studies in yet unknown allergenic pollen of Delhi state Metropolitan (Clinical aspects). Ind. J. Med. Res., 59(9): 1411-1419.

Suerdem, B.T., Yildirim, I. 2009. Fungi in the atmospheric air of Canakkale province in Turkey. African Journal of Biotechnology 8 (18): 4450-4458.

Tilak, S.T. and Srinivasulu, S.V. 1976: Airspora of Aurangabad. Ind. J. Microbial., 7: 167 – 169.

Tilak, S.T. 1989: Airborne pollen and fungal spores. Vaijayanti Prakashan, Aurangabad, India., 316.

Tilak, S. T. 1991: Fungi and Biotechnology. Today & Tomorrow Publishers, New Delhi India., 137.

Tilak, S. T. 1998: Biology of Airborne organisms; Satyajeet Prakashan., 470.

Tiwari, P. Aerobiological studies of Raipur with special reference to fungal spores. Ph.D. Thesis, Pt. R.S.S.U., Raipur. India 1999.

Tiwari, K.L. and Jadhav, S.K. 2004. Studies of Aeromycoflora over rice field-I at Balodabazar Raipur (CG.). Ecol. Env. and Cons. 10 (3): p 387-390.

Wankhade, G.S. 1983: Airspora at Aurangabad, Ph. D. Thesis Marathwada University Aurangabad.

TABLE-1 Concentration of airborne components in vegetable market Gondpipari from January - 2019 to December -2019.

Sr.no.	Spore type	Spore / cubic meter of air	% of individual aerospora
A	**Zygomycotina**		
1	*Rhizopus*	615	8.103
2	*Albugo*	245	3.228
B	**Basidiomycotina**		
3	*Basidiospores*	140	1.845
4	*Rust spores*	175	2.306
5	*Smut spores*	135	1.779
C	**Deuteromycotina**		
6	*Alternaria*	355	4.677
7	*Cladosporium*	170	2.239
8	*Aspergillus*	835	11.001
9	*Curvularia*	410	5.402
10	*Fusarium*	50	0.659
11	*Fusariella*	210	2.766
12	*Bispora*	375	4.941
13	*Exosporium*	490	6.456
14	*Sporidesmium*	510	6.719
15	*Penicillium*	230	3.030
16	*Heterosporium*	275	3.623
17	*Nigrospora*	50	0.659
18	*Pithomyces*	210	2.766
19	*Memnoniella*	150	1.976
20	*Helmenthosporium*	175	2.305
D	**Other type**		
21	*Hyphal fragments*	350	4.611
22	*Epidermal hairs*	45	0.592
23	*Insect part*	240	3.162
E	**Unidentified group**	1150	15.151
	Total	7590	100

Table-2: Total no. of spores found in each group

Sr.No.	Spore Type	Total numbers of spore types	Spores/m3	% contribution
1	Zygomycotina	2	860	11.331
2	Basidiomycotina	3	450	5.929
3	Deuteromycotina	15	4495	59.223
4	Other types	3	635	8.366
5	unidentified	1	1150	15.151
	Total	24	7590	100

Fig.1: Percentage Contribution of Spore type of each group.