

**REVIEW
OF
LITERATURE**

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Environmental bioallergens like fungal spores and pollen grains may initiate allergic response to susceptible individuals. The importance of aerobiological investigations in the pathogenesis of respiratory allergic diseases, has been recognized since the earliest days of allergology.

P. A. Micheli (1679-1737), working at the Public Garden Florence, concluded that, the spores of molds get distributed through air. Anton Van Leeuwenhoek investigated the minute organisms of atmosphere by hand made lenses and from his observation; he questioned the belief of spontaneous generation. Pasture (1861), made microscopical studies using culture plate techniques to demonstrate the presence of airborne microorganisms. Miquel (1883), studied the microbial content of hospital air in the crowded wards from Gaulhier- Villars, Paris. Maunsell (1954), reported the presence of high spore concentration in the houses.

Hammilton (1959), studied, the daily occurrence of pollens and fungal spores, in the air over London city, using Hirst spore trap. Gregory (1961,1973), compiled the available information on aerobiology and provided a systematic account of major aspects of the field study.

Indoor air is usually exchanged rapidly by ventilation with outdoor air. Because of this exchange, the microbial content of indoor air changes (Gregory 1961). The fungal spores are present inside the buildings viz. dwelling homes, schools, colleges, hospitals, caves, industries and other working environments and infest all the closed spaces. Baruah and Sreeramulu (1961), showed that, the air inside the building was continuously contaminated with micro-organisms from human or animal occupants.

Noble and Clayton (1963), carried out the aerobiological survey of hospital wards by using slit sampler. They observed that, the spore concentration in the air increases with human activity within buildings such as sweeping, bed making and building repair works. Chafee and Setipane (1964), reported daily pollen and spore counts from Rhodes, Island. Davies (1969), surveyed the frequency of pollens and fungal spores in the various city atmospheres of United Kingdom. Muir (1972), enumerated the available information about aeroallergens in his book "air borne allergens". Airborne fungal spores responsible for allergic disorders have been investigated by Agarwal and his associates (1973), from Delhi, Vishnu Mittre and

Khandelwal (1973), from Lucknow, Chitale and Bajaj (1973,1974,1975), from Nagpur region, Tilak (1998), Tilak and Vishwe (1979), from Aurangabad. Gupta et al. (1960), from Jaipur. Spores of *Alternaria*, *Cladosporium*, *Curvularia*, *Aspergillus*, *Penicillium* are the major mycopollutants present in the atmosphere.. The *Cladosporium* is the dominant fungus, followed by *Curvularia*, which cause allergic disorders.

Recently, Singh (2007), has reviewed airborne mold biodiversity of certain workplace environments in North-Eastern India since last five decades. He conducted aerobiological studies on some industrial indoor workplace environments viz. Cinema halls, Saw mills, Rice mills, Paper mills, Bakery places etc. and also non-industrial workplaces as Hospitals, Poultry farms, Libraries, Pig farms, Stored printed paper materials, State Archives, Hotel kitchens, Food Corporation of India (FCI) grain godowns and potato storage chambers etc. According to Madeline and Linton (1974), the microbial flora of the indoor air depends on the number and kind of organisms present and mechanical movements taking place within the enclosed space. Pohajala and associates (1977), carried out the aerobiological experiments in the garbage disposal plants in Turku. They pointed out that, the concentration of *Penicillium* and *Aspergillus* species in the garbage disposal plant was 6,000 times greater as compared to outdoor air. Tilak, Babu, and Talib (1980), carried out survey of allergenic fungal spores inside the hospital wards in Government Hospital, Aurangabad and identified 65 different types of spores therein.

The allergic spores initiate allergic response in susceptible individuals. They cause several types of eye, skin and respiratory disorders. The clinical investigations on mold allergy was done by several workers viz. Acharya (1980-81), Kotimma et al. (1980), Tilak and Babu (1981), Soloman and Mathens (1981), Shivpuri (1982), Babu (1983), Husain (1986), Singh et al. (1987), etc. and suggested significance and possible treatment in preventing the effects of aeroallergens to sensitive individuals. Graveson (1979), has stressed the need for isolation and identification of micro fungi from the environment under which the patients live.

Tilak and Babu (1981), surveyed the fungal spora of hospital wards in relation to allergy from Aurangabad. Tilak and Bhansale (1981), carried out pollen flora of hospital wards from Aurangabad. The other workers viz. Tilak and Saibaba (1985), Malabade (1990), Saoji and Giri (1997). Lebbe et.al. (1987), introduced new and easy method to identify allergenic spores and pollens. El- Ghazaly and Fawzy

(1988), studied, the analysis of airborne bioparticulates using volumetric sampler from Kuwait.

The other workers, like Meredith (1962), Sreeramulu and Ramlingam (1966), and Gregory (1961), classified different categories of spores based on the period of day at which the maximum concentration is obtained. Most of the spores had shown maximum concentration in the fore-noon while minimum are represented at night, post-dawn or both. Raghu et al. (1992), surveyed allergenic molds in house dust and home environment using Anderson's viable sampler and identified the airborne fungal spores within the outside of some slum areas in Chennai. Verma and Chile (1992) reported *Aspergillus*, as a most dominant type isolated from the air of Medical College Hospital, Jabalpur. Singh and his students (1994), reported aeromycoflora from hospitals of Delhi. Agashe and Anuradha (1996), concentrated on airborne fungal concentration in a hospital wards in Bangluru. They found a total of 4331 spore / cm². The dominant fungal components were *Cladosporium* (28.2%) and *Aspergillus* (10.7%).

Ghani, T. and others (1997), studied airborne fungal spores inside the hospital and a clinic at Bhagalpur. Katz, Y. et al. (1999), carried out indoor survey of molds in Israel. Khilare (1998), carried out investigations at four different indoor environments like hospital, library, dairy and vegetable market in Kolhapur city. The indoor environments of all the four sites selected shows, presence of *Aspergillus*, *Penicillium*, *Cladosporium*, *Rhizopus*, *Alternaria*, *Curvularia*, *Memnoniella*, *Didymosphaeria*, and smut spores as common biopollutants throughout the monsoon season.

Bharti (1998), carried out, the aerobiological investigation over garbage disposal plant at Kothrud, Pune and studied quantitative and qualitative analysis of airspora. Kulshreshtha and Chauhan (2004), reported *Aspergillus* as the dominant component in the mycoflora contributing 34.6%, 37.2%, 32.60% inside Medical College, District Hospital and G. G. Nursing Home in Agra city (U.P.) respectively. Sahaney and others (2001), carried out investigations of the indoor airspora of T. B. Chest ward of S.R.N. Medical College Hospital, Allahabad using, gravity slide and petriplate exposure method. About, 56 different types of fungal spores and 17 types of colonies were recorded from the indoor air of hospital wards. They observed *Aspergillus*, *Cladosporium*, *Alternaria*, *Fusarium*, were the most dominant fungal forms of indoor airspora. Saxena, and colleagues (2001), studied diversity of

keratinophilic mycoflora in the soil samples collected from various hospitals, cattle yards, poultry farms, crop fields and playgrounds around Agra city.

Sharma and Dutta (2001), reported fungal airspora of Medical wards, Medical College, Assam using petriplates exposure method. They found *Aspergillus* sp. is contributing 33% of the total population, whereas *Penicillium* sp. contributing 15.2% of the total aeromycoflora. The lowest fungal population was observed, in the operation theatre, where only 12 fungal forms were identified. The *Aspergillus* and *Penicillium* contributed 40.6% and 21.9% of the total population respectively.

Govind and associates (2002), reported cultivable fungi in the asthmatic patient's bedrooms and inside hospital wards in Kerala. They found *Aspergillus niger* as predominant type and *Cladosporium* stands, in second position, whereas *Penicillium* sp was recorded in abundance. Giri and Saoji (2003), took an account of aeromycoflora from hospitals of Nagpur city. They found, indoor spore concentration is much lower in the hospital areas receiving filtered air as compared to the controlled environment. However, in the ventilated hospital wards, the concentration of aeromycoflora was found to be similar to that of outside air. Gioulekas, D. et al. (2004), studied the data of 15-year aeroallergens and their effect on Athens Olympics players. Uday Prakash (2004), published a manual for identification of indoor molds from Chennai. Sharma, and his colleagues (2005), studied indoor survey of fungi in homes of asthmatic or allergic children in Delhi by using Anderson's six-stage sampler and reported 64 culturable fungal types. Their study revealed, that *Aspergillus*, as most frequently occurring fungus in Delhi homes.

In Maharashtra, the work of aerobiological research was carried out by Tilak, S.T.(1967-2008). He established the school of aerobiologists in Aurangabad and Pune. Some recent aerobiological research work was done by Mohammed Sabbir (2003), from Gulbarga; Khilare and Chitnavis (2004), from Kolhapur; Rane and Gandhe (2005), from Jalgaon; Tiwari and Sahu (2007), from Raipur.

Aerobiology is a science of crucial importance to mankind and life on earth. Continuous research would help not only to reduce our various problems but also to reach suitable solutions. There is a growing need of aerobiological studies. In the present hospital survey pieces of work have been done in this direction.