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Mold Allergens in Indoor Play School Environment

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Abstract

Moulds are found in nature for the breakdown of leaves, wood, and other plant and animal materials. The spores of these moulds can be easily drifted by wind and travel distant places. Presence of these moulds in air can cause allergies to susceptible individuals. These moulds can directly enter into a building or their spores being carried by air in homes, offices and play schools. They are usually found to be growing on wood, dry wall, wall paper, fabric, ceiling tiles and carpeting. Air borne fungi can cause asthma and allergic rhinitis. The present study aimed to isolate and identify airborne fungi in different play schools of Visakhapatnam area. Gravity Petri-plate method is used to isolate filamentous fungus. The study was carried out for ten months viz. June 2015-March 2016. In one of the examined schools a high prevalence of fungi was observed. Most of the dominating fungi belonged to genera: *Aspergillus*, *Cladosporium*, *Penicillium*, *Alternaria*, *Rhizopus* and *Curvularia*. *Aspergillus flavus* and *Cladosporium Cladosporiodes* were reported dominating in one of the play schools which show the possibility of allergy. One of the play schools reported more spores in indoor environment. The present study stated that the presence of air borne fungal concentration varied significantly in indoor play school. The study gives a data about allergic fungi in indoor play schools where the children are exposed to these fungal spores. A further detailed research is necessary to assess the exposure levels, influence of a climate conditions as well as the clinical aspects of the presence of allergic fungal spores.

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Keywords: Moulds, Play school, *Aspergillus*, *Penicillium*, Visakhapatnam

1. Introduction

Moulds are found in nature for the breakdown of leaves, wood, and other plant and animal materials. The spores of these moulds can easily drift by wind and travel distant places. Presence of these moulds in air can cause allergies to susceptible individuals [8]. The spores of fungi in air can cause respiratory disorders. The occupational diseases studied by authors [5] and [13] include hypersensitivity pneumonitis, allergic alveolitis, bronchopulmonary aspergillosis, asthma, coccidioidomycosis, blastomycosis.

Studies on the moulds and their growth on wood, dry wall, wall paper, fabric, ceiling tiles and carpeting are common in most of the European and North American countries. Some authors [6, 3, 10] reported different environmental conditions are responsible for growing allergic incidence in public in recent years. Higher frequencies of air borne fungal spores have been recorded from different such working environments [18, 20].

Some of the mould spores present in the air can cause mycoses and other allergic reactions. Environmental samples of *Aspergillus* species with clinical report stated the prevalence of asthma. *Aspergillus fumigatus* was identified by [12] as a potential air contaminant on the occurrence of respiratory and coetaneous mycoses.

Author [2] examined the relationships between the concentrations of ambient inhalable airborne fungi relating with temperature and relative humidity in Ohio USA. The temperature, seasonal variation and humidity have shown influence on the increase concentration of fungal spores. Suerdem TB and Yildirim I [22] determined the density of molds and their spores in the air varies in accordance with geographical regions and seasons. In addition, climatic conditions such as rainfall, speed of wind, height, and floral combination also influence the type of fungi present in the air.

The aim of the present study was to isolate and identify airborne fungi in different play schools with reference to variation in two seasons of Visakhapatnam city.

1.2 Experimental Analysis

1.2.1 Study Area

In our study two play schools were selected. One of them was very close to market area where every day tones of vegetables were loaded and unloaded. The other play school was chosen in the residential area. In the first play school, inside walls were damped on one side, as the overhead tank was leaking due to which the wall was wet and small mould growth was observed during the study. Where as in the second play school the walls were painted, no mould growth was seen.

1.2.2 Sampling Procedure

Air samples were collected once in a week from a height of 0.6m from ground level. Considering the height of the children present in the play school and inhaling position, height of the air sampling was fixed. The study was carried out for 10 months viz. June 2015 to March 2016. Open Petri-plate method was used to extract fungal spores from air. The Petri-plates consists of Potato dextrose agar and Sabouraud agar medium for trapping mould spores. These plates were exposed to air for 15 minutes to trap the spores. As less time period no proper growth of fungi was observed. More time of plates exposed to air overlap of spores was identified. After exposure to air the Petri-plates were closed and airtight with parafilm and placed in a sterile container and carried to the laboratory for isolation and identification of air borne fungi. The study was carried out in monsoon and winter seasons.

1.2.3 Examination of mould flora

The Petri-plates were incubated in an incubator for 5 days at 25°C. After incubation the Petri-plates were taken out and mycelium formed on plates were made into pure cultures on potato dextrose agar. These pure cultures were examined under compound microscope and identified using fungal keys provided by [9, 21].

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