Analysis of the *Anemophilous mycobiota* of a university in the state of Pernambuco - Brazil

https://doi.org/10.56238/homeIIsevenhealth-124

Elson Cruz Oliveira
Virgínia Michele Svedese

1 INTRODUCTION

Fungi known as anemophiles are the main contaminants in the air of artificially air-conditioned environments, and the number of fungi in the indoor environment reflects the amplification of pollutants from the external environment that originate from indoor pollutant sources. Site conditions directly influence the amount of spores in the air. Abiotic factors including rainfall, relative humidity, ambient temperature, sunlight incidence, wind speed and direction, seasons and geographical location are examples of such conditions, with humidity and temperature being basic factors in these aspects. Opportunistic fungi are responsible for causing different types of pathologies in humans, such as urinary tract infections such as pyelonephritis and cystitis, fungal keratitis, nail infections, otitis, as well as the presence of fungi directly in the blood. Fungi of the genera *Penicillium sp.*, *Aspergillus sp.*, *Cladosporium sp.*, *Candida sp.*, *Fusarium sp.*, are the main culprits causing these diseases. The quantity, quality of samples and frequency of fungal sampling, as well as the total exposure of a person to their environment, must be known to determine the relationship between airborne fungi and diseases such as allergic asthma and rhinitis. This is due to the fact that there is still little widespread information about the anemophilic mycobiota to which people are constantly exposed and their relationship with certain allergic conditions.

2 OBJECTIVE

Perform the isolation and identification of the anemophilic mycobiota in the classrooms of a university in the city of Petrolina-PE from a qualitative and quantitative analysis of anemophilic fungi inside the classrooms of a university in the city of Petrolina-PE, aiming to identify at the genus level the fungi collected on site and verify which may be pathogenic.

3 METHODOLOGY

The collections were carried out in the morning shift, in July 2022, where, after the growth of fungal colonies, collections were made where they were arranged and exposed in the rooms for 15 min, Petri dishes containing dextrose Sabouraud agar medium, plus antibiotic Tetracycline 50mg/L, all at an approximate height of 1.5m from the floor for correct sedimentation of fungal spores (BRASIL, 2003). According to SILVA et. al. (2021), the plates must be arranged 8.5m apart from each other. In this way, two plates will be used in each room, for better control of the results and plates will also be arranged in the external area of the rooms.

After exposure of the plates and after their proper identification, the samples were transported directly to the Microbiology Laboratory of Univasf - Federal University of Vale do São Francisco (Campus Centro), where, at room temperature, between 25º and 28º Celsius, they underwent an incubation and observation period of seven days (BRASIL, 2003).

4 DEVELOPMENT

Of the 27 plates used, 143 CFUs of fungi could be counted, where, after identification, the genera with the highest prevalence were the genera *Cladosporium sp. with* 40.55% occurrence (58 CFUs), followed by *Aspergillus sp.* with 10.48% (15 CFUs) and *Nigrospora sp.* having 4.89% occurrence (7 CFUs). Other genera were also identified with lower occurrence rate, which is the case of the genera *Rhizopus sp.* with 4.19% (6 CFUs) and *Curvularia sp.* with 1.39% (2 CFUs). Some samples could not be identified due to contamination of certain purifications in the tubes and also, in some cases, due to the difficulty of finding their reproductive structures or even the absence of these structures.

Fungi of the genus *Cladosporium sp*, can digest proteins found in the epidermis, which can be a factor in the proliferation of these fungi in the body. This causes small reddish patches or large rashes on the skin and can even cause infections that can be fatal such as septicemia. These fungi can degrade the skin and even affect other organs (MENEZES et al., 2017).

Fungi of the genus *Aspergillus sp.* can be causative of many diseases in hospital patients with weakened immune system. It is considered one of the main etiological agents responsible for fungal infections in the hospital environment, with aspergillosis being an infection caused by these fungi that can manifest as allergic reactions, intracavitary fungal ball, corneal inflammations or invasive infections (DE ANDRADE JÚNIOR et al., 2019).

Fungi of the genus *Nigrospora sp.* can occasionally cause opportunistic infections, with isolated reports involving contamination and development of invasive infections, in the ocular regions and on the skin (DE FARIAS BORBA et al., 2021).

Fungi of the genus *Rhizopus sp.*, as well as others of the order Mucorales, can cause progressive, necrotic and usually fatal infections. These fungi cause mucormycosis, which is an invasive, severe and opportunistic mycosis (CAVALCANTI et al., 2017).

Many species of fungi of the genus *Curvularia sp.* are causative of diseases in humans and animals. These species are attributed to causing certain problems such as various allergies, sinusitis, and pneumonia. However, most species of this genus have saprobic habit, which means that they grow on organic matter found in soil or plant substrates (GUSMÃO et al., 2005).

5 FINAL CONSIDERATIONS

The results obtained are of great importance to evaluate the quality of the environment of the classrooms of this university, since several factors involving cleaning, ventilation, humidity, temperature, luminosity, among others, are directly related to the development of microorganisms, including anemophilic fungi, which, in high quantities, can be potential causes of pathologies, such as respiratory allergies, in people who remain in these environments, and further studies are essential for the prevention of these diseases, as well as maintaining the well-being of individuals and the healthiness of these places. If these closed environments, with artificial air conditioning, have inadequate cleaning conditions, thus allowing a greater development of these fungi, alternatives will be necessary to control this mycobiota, such as improving ventilation, luminosity, maintenance of air conditioning units, in addition to constant cleaning on site, among other techniques.

REFERENCES

BRASIL. Agência Nacional de Vigilância Sanitária. Resolução n° 09, de 16 de janeiro de 2003. Dispõe sobre padrões referenciais de qualidade do ar interior em ambientes climatizados artificialmente de uso público e coletivo. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, 20 jan. 2003. Seção 1, p. 35.

CAVALCANTI, Raqueline Maiara Costa Bezerra et al. Estudo do efeito do carvacrol contra Rhizopus orizae e Rhizopus microsporus. 2017.

DE ANDRADE JÚNIOR, Francisco Patricio et al. Presença de Aspergillus em hospitais brasileiros: uma revisão integrativa. 2019.

DE FARIAS BORBA, Carolina et al. Prospecção de fungos anemófilos e contaminantes de incubadoras de unidade de terapia neonatal de hospital escola em Pernambuco, Prasil. **Brazilian Journal of Development**, v. 7, n. 5, p. 45210-45222, 2021.

GUSMÃO, Luís Fernando P.; BARBOSA, Flávia R.; DA CRUZ, Alisson Cardoso R. Espécies de Curvularia (Fungos anamórficos-hyphomycetes) no semi-árido do estado da Bahia, Brasil. **Sitientibus Série Ciências Biológicas**, v. 5, n. 1, p. 12-16, 2005.

MENEZES, Camilla Pinheiro; DE LIMA PEREZ, Ana Luiza Alves; OLIVEIRA, Edeltrudes Lima. Cladosporium spp: Morfologia, infecções e espécies patogênicas. **Acta Brasiliensis**, v. 1, n. 1, p. 23-27, 2017.

SILVA, Davi Porfirio et al. Fungos anemófilos isolados de bibliotecas de instituições de ensino da Região Nordeste do Brasil. **Revista Pan-Amazônica de Saúde**, v. 12, p. 8-8, 2021.