AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE
ISSN: 2996-5101 (online) | ResearchBib (IF) = 10.81 IMPACT FACTOR
Volume-4| Issue-3| 2026 Published: |30-03-2026

HYGIENIC ASSESSMENT OF FOOD PRODUCT SUSCEPTIBILITY TO ASPERGILLUS AND PENICILLIUM FUNGI IN HOT CLIMATE CONDITIONS.

https://doi.org/10.5281/zenodo.18857380

Khakberdiev Khusan Rakhmatullaevich
Bakieva Mukhabat Tursunkulovna
Tashkent State Medical University, Tashkent, Uzbekistan

Annotation.

This article examines the prevalence of food and fungal sensitivities in warm climates and their prevention. Fungi are now recognized as a causative factor in allergic diseases in various countries, and modern diagnostics based on a complete patient history allow for the study of sensitivities to fungal allergens. In warm climates, success can be achieved by using an approach aimed at identifying antibodies to molds such as Aspergillus and Penicillium, as well as diagnosing, treating, and preventing these diseases.

Key words

food products, fungal allergens, atopy, environmental factors.

Relevance of the problem. Currently, mold is considered to be very important in the development of allergic sensitization in the body; it can cause IgE-mediated allergic reactions [4, 8]. As a result of constant contact with the fungus, colonization of the respiratory tract occurs and symptoms of the disease appear [6]. Fungi of the genus Aspergillus are among the most important inhalant allergens in different countries of the world, with a prevalence of 15.3-38%. The allergenic components of this fungus include: Asp n 14 (β- xylosidase) is a professional allergen used in baking, which can cause sensitivity symptoms in approximately 4% of bakers. Asp n 18 (vacuolar serine protease) and its homologues have been identified in Aspergillus fumigatus (Asp f 18) and Penicillium (Pen ch 18 and Pen o 18). Asp n 25 (3-phytase B) is a glycoprotein with a molecular weight of 85 kilodaltons , which is often used as an enzymatic additive in the processing of phytate- rich foods such as cereals and legumes, is recommended as a beneficial food additive and helps improve the digestibility of phytate- rich foods [1, 13, 14, 15]. Long-term contact with fungal spores can induce immune reactions leading to the production of IgG and IgA [9]. Mycogenic allergy is often accompanied by polyvalent sensitization. Observations show that fungal allergens are the cause of 20–65% of people suffering from allergic diseases, and bronchial asthma develops in 20–25% of them

[2]. In approximately 3–6% of cases, fungal spores can cause the development of bronchial asthma. High levels of fungal spores are closely related to the sanitary and epidemiological characteristics of human living conditions, geographic region, environmental factors, and season. Penetration of fungal spores into the human respiratory tract depends on their size, and the smaller they are, the deeper they penetrate into the respiratory tract (most often, their size ranges from 1 to 40 μm) [2, 9]. Researchers noted that 76.5% of homes had high concentrations of fungal spores, exceeding the conditionally permissible level (500 colony-forming units/m³). Among all the fungi detected in indoor air, high concentrations of Penicillium were found. spp . (92.5%), Aspergullus spp . (81.1%), Cladosporium spp . (34.4%) and Rhizopus spp . (34.4%). A high correlation was found between specific IgE to fungal allergens in the serum of the owners of these houses and micromycete spores in the indoor air. Fungi of the genera Rhizopus and Cladosporium were found to be among the most common components of house dust [5, 9]. Fungi of the genus Rhizopus are known to be dangerous because they live in humid conditions and usually spread as black mold during improper storage of bakery products. Species of the genus Cladosporium also thrive in relatively humid conditions and are very sensitive to moisture deficiency. These fungi are found in cheese, cereals and plants [13]. Often, general practitioners, without taking into account the characteristics of the allergens, prescribe empirical therapy. Only a complete and thorough anamnesis can be used to make a positive diagnosis of a mycotic disease. It is recommended to pay attention to the following points:

Contact with household mold. Most patients are unaware that their symptoms are related to their living or working conditions. It doesn't even occur to them to tell their doctor that their symptoms developed after a change in their living or working conditions. Sometimes, after collecting a complete medical history, the doctor must independently search for the "culprit" allergen. This is because microscopic, invisible fungi in living spaces influence the course of bronchopulmonary diseases in sensitive patients. In this case, climatic conditions and geographic region to a certain extent influence the composition of micromycetes and biochemical processes. Conidia of some fungi (Alternaria) alternata , Mucor spr ., Penicillinum spr ., Aspergillus spr .) penetrate through the respiratory tract and cause allergic reactions, mycoses of internal organs (Aspergillus flavus , Asp . fumigatus , Asp . niger), mycotoxicoses (Alternaria alternata , Aspergillus flavus , Asp . fumigatus) [3, 5]. It should be noted that the growth and development of fungi indoors directly depend on humidity and temperature, and they multiply in flower pots, food storage areas, products stored

in unsuitable conditions (bread, vegetables and fruits), showers, old furniture, garbage cans, organic substrates (wool). They are more common in wooden houses than in concrete ones, in conditions of high humidity. Fungi of the genus Aspergillus fumigatus have also been found in pillows. Penicillium fungi can even be found in the foundation of a house [10]. Cladosporum herbarum is widespread in the environment and is a major source of inhaled fungal allergens. Cladosporum herbarum is found in fallen grass leaves and tree branches, textiles, and food products. Cladosporum herbarum is also found on plant leaves under favorable conditions in temperate climates, and its allergenic proteins can cause life-threatening asthma attacks and upper respiratory symptoms [13]. Some fungi, such as Alternaria, Aspergillus, Penicillium, and Cladosporum, have airborne spores and are widespread in various parts of the world. Alternaria Alternaria alternata is commonly found on plants and is a member of a family of allergenic fungi. Its segmented, liver-colored mycelium develops apical spores, or conidia, which can form singly or in chains. Immature spores can be distinguished by their shape, size, color, cell count, and cell wall thickness. alternata is found in soil, rotten wood, corn, various plants, foods, and textiles and can cause dark spots on fruits, vegetables, and nuts . alternata has been observed in residential areas, such as air conditioners, causing allergic rhinitis and asthma in susceptible individuals [13]. In our practice, it has been found that Alternaria Alternaria alternata caused asthmatic symptoms in a 13-year-old boy who roomed with him because of persistent dampness in the house. After improving living conditions and moving the child to another room, these therapeutic measures began to produce positive results. Alternaria spores are present in the air of some cities year-round, with peak concentrations in spring, summer, and fall. A number of meteorological factors, including air temperature and barometric pressure, correlate with Alternaria spore concentrations [13]. Alternaria is a major allergen causing illness in children; in temperate climates, Alternaria spores are found from May to November, with the highest concentrations in summer and fall. Spore dispersal occurs during the dry season, when wind speeds are high and humidity is low, and at midday when the sun is directly overhead. Despite the large size of the spores, they can be transported over long distances; On dry, windy days, in areas with cereals and wild grasses, Alternaria spores can be dispersed in 1 cubic meter of air at a rate of 500 to 1000. In open air, up to 7500 spores per 1 cubic meter have been observed, and in room air, up to 280 spores per 1 cubic meter [13, 15].

Occupational exposure to fungi. Fungi are widespread and widely used in livestock farming, poultry farming, horticulture, and the food industry for the production of flour, cheese, beer, and wine, as well as in pharmaceuticals for the

production of yeast and enzyme preparations. Patients with allergic diseases often develop a sensitivity to fungi, which can manifest as suffocation or attacks of illness after exposure to fungi in damp rooms, basements, vegetable and fruit warehouses, archives, swimming pools, and subway stations [7].

Presence of atopy . The presence of atopy or " atopic march" in the family tree of adult and child patients.

Seasonality of the disease. In patients with respiratory diseases, frequent illnesses, and a history of fungal infections (candidiasis, sputum culture and nasal swab, detection of fungi in stool analysis, onychomycosis , dermatophytosis , etc.), the condition may worsen, especially in the autumn-spring months (the period when fungi form spores). When collecting anamnesis from patients, it is usually necessary to pay attention to the fact that they often have colds, a history of rhinosinusitis and obstructive bronchitis. Patients living on the ground floor or in humid conditions are often diagnosed in outpatient records with "asthmatic bronchitis" or "bronchitis with an asthmatic component." In most patients, bronchial asthma develops after clinical manifestations of recurrent obstructive bronchitis [7, 10].

Food history. Improper food storage, hygiene, and transportation create conditions conducive to the growth of various pathogenic fungi, including Candida (most commonly found in dairy products), Rhizopus (black mold on bread, vegetables, and fruits, especially onions), and Alternaria . alternata (in the form of black spots on potatoes, tomatoes), Botrytis cinerea (gray mold on grapes, cabbage, lettuce, tomatoes), Aspergillus (black spots on tea bags, ground black pepper, coffee, fruits, confectionery). In children with atopic dermatitis and sensitivity to fungi, symptoms develop after consuming contaminated dairy products, fruits and vegetables, blue cheeses, sourdough bakery products and home-canned food, while in adults, symptoms develop after consuming vegetables, jam, beer, champagne, wine, kvass, kefir (i.e., fermented products), yeast bread and bread with yeast. Most often, allergic reactions are caused by fungi of the genera Candida , Alternaria and Aspergillus [13]. When an allergen enters the body enterically (i.e., after consuming mold-containing foods), allergic diseases of the gastrointestinal tract, skin, and respiratory system may be exacerbated. Contact with fungi can cause skin lesions such as urticaria, angioedema , and atopic dermatitis (Candida and Malassezia fungi can live on the skin) [10].

Diagnostics in In vitro detection of specific IgE antibodies to food, plant, fungal, epidermal , latex, and other environmental allergens is of great importance in the diagnosis of bronchopulmonary diseases, allergic dermatoses , and other atopic diseases. It is considered safe for the patient, since the patient does not come

into contact with the allergen; the test can be performed even on infants and pregnant women during periods of exacerbation of the disease; there are no age restrictions and it applies to various chronic diseases. In our republic, the possibility of detecting specific IgE antibodies to allergens such as (Cladosporum herbarum , Penicillinum notatum , Candida albicans , Alternaria alternata , Aspergillus flavus , Aspergillus fumigatus , Aspergillus niger , Aspergillus versicolor , Mucor mucedo , Rhizopus The use of immunoblot panels to identify allergens (nigricans) has expanded . These allergen panels now enable diagnostics and effective treatment in children, pregnant women, nursing mothers, and people of all ages.

Conclusion. Today, the ability to determine susceptibility to fungal diseases has expanded, requiring new approaches to developing preventive, diagnostic, and treatment programs for physicians working in various fields of medicine. An individualized approach to each patient and a complete medical history can help prevent the development of serious complications.

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