

General characteristics of microbiotas of vegetable and melons, growing in Azerbaijan

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Abstract

Research has shown that some vegetables and melons used for food in Azerbaijan differ in the number and species composition of mycobiota. During the analysis, the diseases caused by fungi in vegetables and melons were identified, and the ways to prevent them were thoroughly studied, and the regularities of their growth, development and spread were studied.

Keywords: vegetables and melons, pathogenic fungi, mycotoxins, phytosanitary situation, toxigens.

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1. Introduction

From the second half of the twentieth century, humanity began to face a shortage of energy, nutrients, as well as raw materials for various industries. One of the main reasons for this is the steady growth of the world's population and the fact that this process takes place within a stable area, as a result of which traditional food sources are not able to meet the growing demand. The solution of these issues, ie the elimination of the observed shortcomings, naturally specifies the tasks facing modern sciences, which now cover two areas - the creation of new sources and increasing the efficiency of existing sources [1; 2; 3].

Against the background of the tasks set by the research in this direction, special attention is paid to the provision of the world's population with agricultural products, primarily from vegetables and melons. We know that plant products are an indispensable component of the human diet. Therefore, in connection with the provision of the population with fresh vegetables and melons, high-yielding plant varieties have been created, and now the purchase of targeted products from them is considered one of the main ways to eliminate food shortages. However, some of the products produced each year are lost for various reasons, the main causes of which are diseases caused by various organisms, and it is no coincidence that today extensive research is being conducted around the world to prevent this [4; 5; 6].

Among these types of diseases, fungi are of particular importance, at least because

during the epithet of a disease caused by one or another fungus, crop losses can increase up to 50%, and the annual crop losses due to fungal diseases are measured in millions of tons. In order to prevent the diseases caused by natural fungi, it is necessary to study them thoroughly, the laws of their growth and development, and their distribution. At the same time, it is very important to develop effective measures to combat them.

2. Research objects and methods

The important role of the agrarian sector in the economy of the Republic of Azerbaijan, the widespread cultivation of vegetables and melons allow us to emphasize the importance of these issues for our country [7; 8]. Thus, the richness of nature, the diversity of natural climatic conditions have led to the spread of a number of disease-causing fungi in Azerbaijan, and a lot of research has been conducted on their study. Most of the research has focused on the study of pathogenic fungi that cause disease, mainly in fruit plants and tree species that form the main forest. Although research on the mycobiota of vegetables and melons has been conducted for a long time, the results of research conducted so far do not allow to generalize not only the vegetables and melons widely grown in Azerbaijan as a whole, but also the mycobiota of a particular variety [9].

If we add that the seeds of plants also have a special role in the transmission of any disease caused by fungi, and this issue has been completely ignored in research in Azerbaijan, then there is no doubt that research is needed in this direction [10, 11, 12].

Cucumbers, eggplants, cabbages, potatoes, tomatoes, peppers, carrots, watermelons, melons, pumpkins, beans, peas, soybeans, etc. grown in the specified areas of Azerbaijan as the object of research for the intended mycological research, such as vegetables and melons were selected. For this purpose, samples were taken from the vegetative and generative organs of vegetables and melons grown in these areas during the years of the study, which are likely to be fungi. Sampling methods for permanent route and stationary observations, which are widely used in mycological research, were also used in sampling [13, 14]. Sampling was also carried out by chapters. In total, about 2,200 samples were taken during the study and analyzed in accordance with the purpose of the study, according to the mycological methods currently widely used in this type of work [15, 16].

As a result of the analysis of samples taken from vegetables and melons grown in different zones of Azerbaijan, it was determined that the number of fungi in the studied plants is 174 (more precisely, 173 species and 1 form) and their taxonomic structure is given in Table 1.

Class	Line	Family	Generic	Type
Oomycota	1	2	3	9
Zygomycota	1	1	2	7
Ascomycota	2	2	3	5
Bazidiomycota	2	2	4	8
Deyteromycota	3	6	27	145
Total	9	13	39	174

Table 1. Taxonomic structure of isolated fungi in the course of research.

Apparently, representatives of unknown fungi (Deyteromycota) predominate among those registered. Thus, 80.3% of the fungi registered in the study fall into this group. In second place are representatives of the Oomycota department -5.2%. The share of basidiomycota, zygomycota and ascomycota divisions is 3.6%, 4.1% and 2.7%, respectively [17, 18].

Among the registered fungi, the most common species are representatives of the genus

Colletotrichum. Thus, as a result of research of this genus, 17 species (9.8% of the total species) are distributed in garden and melon crops grown in Azerbaijan. The species Ascochyta, Phoma, Fuzarium, Septoria and Penicillium can also be considered numerous, and their number varies between 11-14 species (Table 2).

Family title	Quantity of types
Colletotrichum	17
Phoma	14
Ascochyta	13
Fuzarium	12/1
Septoria	12
Penicillium	11
Alternaria, Phyllosticta	7-8
Aspergillus, Cladosporium, Diplodina, Mucor, Phytophthora, Vertisillium	4-6
Botrytis, Cephalosporium, Cercospora, Cylindrosporium, Diccoccum, Eryshiphe, Hormiscium, Macrophoma, Macrosporium, Monilia, Peronospora, Pestolotia, Phomopsis, Plasmopara, Plectosphaerella, Puccinia, Rhisopus, Sclerotina, Spongospora, Sporotrichum, Stagonospora, Stemphylium, Trichothecium, Trichoderma, Urocystis, Uromyces, Ustilago	1-3

Table 2. Distribution of species of fungi found in vegetables and melons.

3. Results and discussions

Comparing the results with those obtained in other studies conducted in Azerbaijan, it is clear that many of them are recorded in one or another biotope in Azerbaijan. However, the distribution of a number of species recorded in our research has not yet been found in the nature of Azerbaijan, and the number of those that meet this characteristic is 26 (Table 3).

Division	Types
Zygomycota	Mucor corticola Hagem, M.plumbeus Bon.,
Deyteromycota	Ascochyta anethicola Sacc., Ascochyta anethicola Sacc., Asc. pinodes (Berk.et. Blox) Jones., Asc. pseudopinodella Bond – Mont et. Xassi, Aspergillus melleus Lukavva, Diplodina lactucae (Oudem) Sacc., Diccoccum asperum(Corda) Saccardo, Hormiscium stilbosporum (Corda) Saccardo, Fuzarium sporotrichiella Bilai., F.argillaceum.(Fr) Sacc., Penicillium stoloniferum Thorn., P.puberulum Bainier, P.griscolum Smith., P.stoloniferum Thom., P.sartorii Zikai., Verticellium pulverulentum Couwenteg., V.lateritium Berk., V.terrestre (Link) Lindau, Phoma subvelata Sacc., Ph. roumii Fron., Ph. minulella Sacc et. Penz., Phomopsis dauci Arx., Septoria petroselini Desm., S. sojina Thuern

Table 3. Taxonomic relevance of fungal species whose distribution was first recorded in the nature of Azerbaijan.

In the course of the research, when clarifying the distribution of the registered fungi in the vegetable and melon growing zones of Azerbaijan according to the ecological-trophic relations, it became clear that the general indicators of the registered Azerbaijan are confirmed in the zones with a small difference [19, 20].

The fact that the rich vegetation of any area is due to the wide diversity of other living organisms, especially fungi, is not a matter of debate among the scientific community. If we consider the rich nature of Azerbaijan as a known fact, the same picture should be observed in Azerbaijan. Such a situation can be attributed to the geographical regularities of the distribution of fungi inherent in the nature of Azerbaijan.

When mushrooms grown in vegetables and melons grown in different regions of Azerbaijan are grouped according to this system, it becomes clear that the numerical

advantage belongs to the representatives of the boreal type [21]. Thus, 56.0% of the 168 species whose range is determined belong to this area. The predominance of boreal elements among fungi recorded in vegetables and melons is a fact confirmed by other studies, ie the leading role of the northern regions in the formation of mycobiota identified for Azerbaijan is clearly felt.

4. Conclusion

As a result of the research, the phytosanitary condition of the cultivated agrocenoses of vegetables and melons in Azerbaijan was assessed from a mycological point of view. It should be noted that today there is no universal, ie universally accepted, approach to the assessment of agrocenoses, so it is advisable to use different approaches to assess the phytosanitary status of different cenoses.

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