



Microbiological safety of some food items and substances with functional activity (Review)

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Abstract

In the presented research were analyzed principles of microbiological insecurity of substances used for food purposes on based of literature data, touched issues waiting its solving, shown necessity to improve the existing normative documents from time to time. Additionally, were grounded ecologically security, economic efficiency, technically easy to use of fungi for obtaining functional active food additives.

Keywords: food products, microbiological safety, normative documents, food additives, fungi.

Introduction

For the continue the activities of life of every living creature on earth it is important to always take food from the environment. This situation also completely keeps itself in relation to the people (Suleymanova V.O. et al., 2017). Regardless of the source of the acquisition, the composition of all nutritional products intended for living things are rich in both organic and inorganic substances and their high nutritional quality and ecologically safety has always been necessary, becomes, and will always keep its importance.

Ingredients of food products also have the ability to play the same role for other other micro-creatures,

primarily for bacteria and fungi. In contrast to a number of living things, microorganisms at the same time they use these nutrients to continue their life activity also enrich those nutrients with metabolites that are formed as a result of life activities (

. ., et al., 2011, Muradov P.Z. et al., 2016). Among these metabolites along with useful ones, there are also enough insecure for human health (http://www.e-osnova.ru/PDF/osnova_1_0_3.pdf). In spite all the security measures, taking into account that microorganisms are natural contaminants of nutrients then evaluation of all products intended for food purposes according to by microorganisms (bacteria and fungi) should be considered as one of the priority directions of the research conducted in this field.

The quality and safety of foodstuffs are determined according to existing regulatory documents organoleptic characteristics of the consumer, with a complex physical-chemical and microbiological indicators normalization according to by microbiological indicators of products intended for food purposes reflects itself tasks like control of production, storage of products, control of storage and transportation of products and ensuring the safety of products in the epidemiological aspect (Biryukova M.V. et al., 2010, delev D. . et al., 2010). In all cases, the implementation of these is determined with fast identification of pest microorganisms, the possible access of source to their production area, collection at different stages of the technological process, and the falling to the finished product. The result of all these is the prevention of the development of external microbiota at the expense of preventive measures.

As is known, the placement of microorganisms in products produced for food purposes can occur at any stage of their production, processing, and consumption (. . , et al., 20110). The role of sources of access of microorganisms in food products can play soil, fecal pollutants (human and animal manure), water (irrigation and contaminated water), animals, participants in the harvesting process, equipment used for processing and transportation.

For the evaluation of microbiological safety of food, the used criteria are determined based on the following group microorganisms contain in foodstuffs (Biryukova M.V. et al., 2010) that in general can be divided into 6 groups:

1. Mesophilic aerobic and facultative anaerobic microorganisms;
2. Sanitary-indicative microorganisms;
3. Conditional pathogenic groups;
4. Pathogenic microorganisms;
5. Yeast and mold fungi;
6. Fermentative and probiotic microorganisms.

Determination of the quality of food products obtained from any source (animals, plants, fungi, etc.) depends from the quantity and quality indicators of microorganisms in the product produced belonging to the six groups mentioned above. So, if there are favorable conditions they are developing and causes the processes (decay, fermentation, spoil, etc.) to occur which has led to a change in the quality of the product.

These issues are taken into account in the carried out of microbiological safety studies of foodstuffs, more accurately in the food-based products and firstly, characterization of the microbiota of these or other products according to the number and species content is put forward as a task. In this regard, the general result of researches allows note characterization of various raw materials used for the production of food products as one of the settlements of microorganisms and involvement of large taxonomic groups of microorganisms in the formation of their mycobiota (Perevedentseva L.Q.. 2012).

The actuality of assessment of food items in terms of microbiology has recently attracted attention for another reason. According to statistical calculations, about 13 million people die each year from this or other infectious disease dies and about 40% of them are under five, ie children. The fact that involvement of microorganisms directly or indirectly in the creation of many these diseases ending the lives of people is a fact that has been confirmed in the carried out of researches and the reality is no doubt. Characterization of food as one of the residential places of microorganisms and the presence of pathogens (true and conventional or opportunistic) among of them also allows characterizing food ingredients as one of the sources of microorganisms to enter in the human body. So that, lately often occurred foods poisoning is confirmed it. Its more occurrence, increasingly expansion at the modern stage of socio-economic development although is regrettable but it is a reality. For this reason, anywhere, primarily in industrialized cities and settlements, as well as in rural areas research to the prevention of food poisoning and toxicosis, the transmission of various diseases from food has been great importance in recent years.

In connection with the foregoing is necessary to mention one issue. Change the economic relations formed in the Republic of Azerbaijan of the last century connection with the independence led to the formation of new relationships, which is at the same time the geography of some products brought to the country, including food has changed and expanded. The absence of the necessary information on the epithetic, epizootic and microbiological situation of states imported products to the country, as well as products included in it, strengthens the character of food items from harmful aspects. Therefore, the preparation of microbiological safety principles of food products is important and actuality and is no

doubt matter. From time to time to make change these principles and improvement taking into account the specificity of local conditions is an actual issue of today. Should be added to what was said that today the required basic data to ensure the microbiological safety of food substance, nor normative documents reflecting their sanitary-hygienic assessment from the point of view of modern requirements of food microbiology are insufficient and researches aimed at solving these issues fully retain their relevance.

It would be worthwhile to touch issues about food safety, especially those microorganisms which found in this or other food product. Thus, today in the regulatory documents that available the defined indicators related to mycological safety of food matters is assigned with their number composition or a total amount of mycotoxins (in some cases several). In our view, this approach is incorrect and the reason for this is the following.

Firstly, the number composition does not reflect the manifestation of the ecology-trophic specialization of fungi (allergic, toxicity, opportunistic) and for that reason, number composition cannot be characterized as an indicator of the danger of this or that product.

Secondly, in connection with the development of science and technology, many new compounds, including the mycotoxin determination method from time to time is changing and are being developed fixing method of new compounds. Would be better to note one fact. Approximately 10 years ago, the number of mycotoxins known to science was 300 and the number of toxic fungi 250, currently these figures are respectively 500 and 300 (http://www.e-osnova.ru/PDF/osnova_1_0_3.pdf) and there are some mycotoxins, which to determine its dangerous limit to human organism is impossible, that any amount is dangerous to the human organism. In the existing regulatory documents, the names of most mycotoxins and the allowable limit are not indicated. All of these, as well as the above-mentioned, at the moment, to prepare the principles of microbiological safety of food products is an open question both for researchers and practitioners. This issue also concerns the Republic of Azerbaijan as part of the world and have more actuality. Due to the southern climate special attention is required to the storage conditions of food products manufactured in here. Thus, the average annual temperature in the environment is relatively favorable for the development of microorganisms.

Production of many food items mainly from the microbiological point of view carried out in non-sterile conditions and microorganisms, including fungi, are the natural contaminants of the raw materials used (especially for plant origin) for food items. Due to the fact that the temperature and ingredients of those food products are favorable for fungi allows noting that these conditions are more suitable for the spread and growth of fungi. At first, if even the number of fungi is in the permissible limits, after a short time rapid increase in the number of fungi is inevitable. For this reason, sometimes for prolonging the storage period of those nutrients make various additions to them and sometimes among of them are also found chemical synthesis products. Among of ingredients derived from natural sources these types are also sufficient and in recent years, is being conducted extensive research in this area and food supplements obtained from natural sources becomes the center of special attention. Thus, one of the research direction conducted in future should be dedicated to the acquisition of functional activity supplements obtained from natural sources and allowing to extend the storage period of food products.

It should be noted that at present for the obtain such supplements are used almost all taxonomic groups of living organisms but their activity and influence effect, as well as the economic aspects of production technologies, are different. Therefore, the issues to be addressed in this direction in future should be related with to select of sources for obtained of food additives, the more accurately with producers, the cost of products to be produced and environmental and technological aspects of the production process. According to the above noted, if we analyze the sources used to obtain food supplements will be clear that is more convenient to use fungi, especially xylophagous macromycetes among of eukaryotic organisms. As a reason for this would be better to show the following:

Firstly, due to the high growth rates. So that, organisms used as the source of any product which relatively in a short period forms biomass large amounts of biomass is one of the key indicators for the sources of resources intended for the industry. Plant, animal, and fungi used for the obtaining of food-based products, including supplements differ from each other by growth rate (uradov P.Z. et al, 2014). For example, if fungi require hours to increase its biomass twice, plants and animals do not have enough to do so,

that is, fungi can produce biomass at least 24 times more than plants and animals.

Secondly, fungi are organisms that possess the characteristics of plants and animals but have different traits from them (Perevedentseva L.Q., 2012). This is also reflected in their biosynthetic properties and their component composition are the more balanced and biological point of view, it is considered more valuable. For example, the main component of a plant cell is polysaccharides, but in animals are proteins and fats. In plants fats and proteins and in animals polysaccharides are less, sometimes completely absence. In fungi, all these are encountered, more precisely in the composition of the fungi cells proteins, fats, polysaccharides are always present, although their quantity is relatively small compared to separately found in plants or animals but always happens. On the other side, in a number of researches, has been confirmed that functional active compounds (enzymes, polysaccharides, antibiotics, small molecules of organic acids, etc.) presence in the biomass formed by fungi (Suleymanova V.O. et al., 2017, Trenin A.S. et al., 2014, Wu H.T. et al, 2014), that use to obtain of different products(feed, food, medical and technical) have a great importance. Some of them are now produced on an industrial scale and from year to year, their scope, range and application areas are also expanding.

Third, because of their nutrition. As is known, fungi and animals are heterotrophic and plants are autotrophic(https://bstudy.net/611416/estestvoznanie/tipy_pitaniya_zhivyh_organizmov) . For this reason, for nutrition of plants, there is always a need to sunlight similar need of fungi and animals to sunlight is not necessarily as in plants. Comparing animals to fungi this need is a bit less in fungi, that is for their nutrition essential needs is least observed in fungi which also gives preference to their cultivation. In other words, in terms of simplicity to meet the needs during cultivation fungi differs from both plants and animals in a positive way.

Fourth, according to environmental considerations. Due to the increased demands of the world's population is also rising intervention people's in nature and it makes inevitable emergence of various problems with the ecological character. Its prevention is one of the actual problems of the modern era. One of the causes of environmental problems is the formation of products, which are created during various production processes and are not suitable for

use. In general, current forms relating to these materials, called "waste" are not favorable due to the environmental considerations and now they are one of the environmental pollution sources (Muradov P.Z., 2003). In the solution of these issues, namely in the utilization of these waste, in particular, plant origin already fungi as a favorable object attracts attention (Muradov P.Z. et al., 2011; 2011a). The interesting aspect of this is that, from the practical point of view fungi have the ability to transform these types of wastes to food, as well as to food-based products ie. fungi are important sources for the solution of such problems as making useful from practical point of view of materials that lead to environmental problems, to extend raw material of industry based on biotechnology, as well as solve problems such as feed and food shortages. This issue is also important in terms of economic considerations. A similar idea is not to say unequivocally about plants and animals.

As a result of the above mentioned about fungi as a generalized view, we can say that the use of fungi for different purpose primarily feed and food products and supplements are favorable for both ecological, economic and technological considerations.

Thus, defining the principles of microbiological security mainly substances that are produced for food purposes in the world, including in Azerbaijan and its improvements from time to time is one of the topical issues of today. In addition, for the improve the quality of traditional products produced is also necessary to obtain functional active food additives so that, the use of fungi for this purpose is ecologically safe, economically efficient and technologically easy.

References

1. Alizade, .S., Khakramanova, F.Kh., Muradov, P.Z. Evaluation of edible products by microbiological indicators.// Bulletin of MSRU, a series of "Natural Sciences"., 2011, 4, p 30-33.
2. Biryukova, M.V., Garnet, M. V., Edelev, D.A., Yermalaev, G. . et. al. Safety of food raw materials and food products. ., 2010, p 27.
3. Edelev, D. ., Kanter, V. ., Atison, V. . International experience in ensuring the safety and quality of food. // Food industry, 2010, 12, p.70-71.
4. Hygienic requirements for food safety and nutritional value. Sanitary and epidemiological rules and norms. Baku, 2010, p116.

5. https://bstudy.net/611416/estestvoznanie/typy_pitaniya_zhivyh_organizmov
6. http://www.e-osnova.ru/PDF/osnova_1_0_3.pdf
7. Muradov, P.Z. Fundamentals of conversion of plant substrates. Baku: "Elm" publishing house, 2003, p 114.
8. Muradov, P.Z., Khakramanova, F.Kh., Attarguseyni, M.E., Aliyeva, G. et. al. Prospects for the use of xylo-trophic basidiomycetes in the disposal of plant waste.// Bulletin of MSRU, a series of "Natural Sciences », 2011, 5, p.5- 8.
9. Muradov, P.Z., Khakramanova, F.Kh., Attarguseyni, M.E., Danishver, . . et. al. Ecological-biotechnological aspects of the use of xylo-trophic basidiomycetes in the conversion of lignocellulosic wastes.//Journal of the Society of Microbiologists of Georgia "Microbiology and Biotechnology», 2011a, v.3,s.13-19.
10. Muradov, P.Z., Khakramanova, F.Kh., Hasanova, V. Y. et. al. Basidiomycetes as a producer of substances with pharmacological and radioprotective properties. // Successes of medical mycology, 2014, v.12, p.326-328
11. Muradov, P.Z., Bakhshaliyeva, K.F., Gasimova, M.L., Namazov, N. R., Dzhabrailzade, S.M., Hadzhyeva, N.Sh. Medicinal plants of Azerbaijan: Mycobiota and principles of mycological safety of their usage.// Ciencia e Tecnica vitivinicola (Portugal), 2016, vol 31, 10, p.2-8.
12. Perevedentseva, L.Q. Mycology: fungi and fungi-like organisms. SPk.: Publishing house "Lan", 2012, p 272.
13. Rubina, . . Physiology of nutrition. M.: Publishing Center "Academy", 2014, p 208.
14. Suleymanova, V.O., Aliyev, F.T., Karayeva, A.M., Muradov, P.Z., Machnunova, A.A. Fungi from the genus of teammates quel which spread in Azerbaijan as producers of biologically active substances//Jökull journal (slandiya, S ndexsed), 2017,v. 67, 5, p.45-50
15. Trenin, A.S., ts, N.Y., Tsviqun, . . et. al. The ability to create new drugs based on basidiomycetes // Biotechnology, and quality of life, 2014, p. 146-147
16. Wu, H.T., Lu, F.H., Su, Y.C. et. al. In vivo and in vitro anti-tumor effects of fungal extracts// Molecules, 2014, v. 19, 2, p. 2546-2556.

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