

Veterinary and sanitary quality assessment of long-life pickled mushrooms

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Abstract. Vinegar pickled mushrooms are a specific product. On their proper preservation, sorting and primary processing depends on the life and health of consumers. The purpose of this study - to assess the quality of long-life pickled mushrooms sold in retail stores in Ussuriysk. The assortment of pickled mushrooms sold in retail stores in Ussuriysk was studied. It was found that this type of product is represented by a wide range of manufacturers. An Internet survey of consumer preferences for this type of product was conducted. In the conditions of the laboratory of veterinary and sanitary expertise of the Institute of Animal Breeding and Veterinary Medicine of the Federal State Budgetary Institution of Higher Education "Primorskaya State Agricultural Academy", the consumer packaging and labeling of the selected samples of canned mushrooms under study in the amount of three was assessed. The results of quality assessment by organoleptic and physical and chemical indices were obtained and described. Evaluation by organoleptic and physical and chemical indicators was carried out according to the generally accepted methods. Organoleptic method determined the appearance, flavor, odor, color, consistency, pouring quality. The laboratory method showed non-compliance of the mass fraction of mushrooms (below the norm by 7 and 18.5%), to the requirements of the controlling regulatory document. Titratable acidity was determined by the titration method, there were increased and decreased values of this indicator in the two tested samples (deviation by 0.5%). Elevated index of mass fraction of table salt was found in one of the examined samples - 3.5%, which is 0.5% higher than the highest limit set. As a result of veterinary and sanitary examination of long-life pickled mushrooms, the following conclusion was made: according to organoleptic and physicochemical quality indicators, only one sample out of those submitted for examination completely corresponds the standard. The studied indicators of the other two samples have deviations from the specified standard, which raises doubts about their quality. **Keywords.** Long-life pickled mushrooms, organoleptic characteristics, titratable acidity, mass fraction of table salt, mass fraction of the main product.

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1 Introduction

Mushrooms occupy an important place in the diet of the vast majority of the inhabitants of our latitudes. From the scientific point of view, mushrooms are a vast and independent realm of wildlife [1].

In recent years, the possibility of cultivating wood edible mushrooms, with their subsequent use, in the food industry has been studied [8]. Mushrooms are boiled and fried, dried, frozen, as well as canned and pickled. Canned mushrooms are a very popular product that is in constant demand, this type of product can be purchased in many grocery stores, however, up to now most amateur mushroom growers canned mushrooms at home [13].

There is a large variety of mushrooms on the consumer market. The question of quality and safety of mushrooms always arises when buying them [14]. Among the main types of canned mushrooms, we can distinguish the following: canned porcini, blubber mushrooms, saffron milk caps and chanterelles, as well as chives, butter mushrooms, aspen mushrooms, birch boletuses, boletuses and others, also often made assortment of canned mushrooms.

Regardless of the method of canning mushrooms as the final product retain their specific taste, aroma, smell consistency. The caloric value of canned mushrooms, as well as the vitamin and mineral composition of the product depend, first of all, on the variety of natural raw materials, which were used in the canning process. The average level of calories of canned mushrooms is at a fairly low level and is only 18 Kcal, which are per 100 grams of product [9, 11, 16].

Thermal processing, the use of a preservative, if all the requirements are met, can extend the shelf life of this product up to 5 years.

At the same time, canned mushrooms can be very dangerous to human health and even life. The first danger lurks in the presence of acetic acid or E 260. If it is contained in the marinated mushrooms the norm, then there is no danger.

To protect themselves from trouble, unscrupulous manufacturers, are trying too much acetic acid to get rid of the toxicity of mushrooms, resulting in the destruction of the stomach. In order to buy the right mushrooms, it is necessary to choose those that are lighter in color and contained in a light solution. A dark solution may indicate that it contains a large amount of acetic acid. The presence of large amounts of monosodium glutamate or E 621, a food additive, can negatively affect the internal organs of the person and consequently cause irreversible processes. Sometimes to extend the shelf life of canned mushrooms, unscrupulous manufacturers introduce into the product additive E 240 (formaldehyde). The danger lies in the fact that when such a substance interacts with water, a poisonous substance (formalin) is formed, which in turn has a deleterious effect on the human CNS. Based on the above stated, it can be said that the composition of good-quality canned mushrooms should include mushrooms, water, citric acid and spices, but if there are other additives, it is better not to buy such a product 10.

At the present time, a large number of canned mushrooms from different manufacturers in the assortment of retail chain in Ussuriysk, but as mentioned above, it is possible to get on the shelves of stores low-quality products.

Practical significance of the work lies in the fact that the results of the study can be useful to consumers when buying canned mushrooms in retail stores, selling these products, and in making recommendations to enterprises engaged in the production of canned mushrooms.

2 Purpose of the study

Based on the above stated, the following goal was formulated: to assess the quality of long-life pickled mushrooms sold in retail stores Ussuriysk.

The following tasks were defined on the basis of the goal:

- to study the assortment of pickled mushrooms sold in retail stores in Ussuriysk and consumer demand for these products,
- to conduct organoleptic evaluation of the quality, the studied samples of pickled mushrooms,
- to determine the physical and chemical parameters of the studied samples of pickled mushrooms,
- to make a conclusion about the quality of the samples under study.

3 Material and research methods

Pickled mushrooms sold in retail stores in Ussuriysk were chosen as the objects of the study.

Evaluation of the range of sold canned mushrooms in Ussuriysk was carried out in retail stores that sell this type of plant products. Consumer preference was assessed by interviewing (questioning) random buyers. Sampling and organoleptic evaluation was carried out according to the requirements of the normative document for the type of this product. The physical and chemical parameters (mass fraction of the main product, table salt, titratable acids) were determined according to generally accepted methods set forth in the normative documentation [2, 3, 4, 5, 6, 7, 12, 15].

The quality of the canned mushrooms selected for the study was examined in the laboratory of veterinary and sanitary examination of the Institute of Animal Breeding and Veterinary Medicine of the Primorskaya State Agricultural Academy.

4 Results

Assessment of the range and consumer preference for canned pickled mushrooms sold in retail stores in Ussuriysk showed that this type of product is represented by a wide band of manufacturers: "Barco", "Bonduelle", "Green Ray", "Lutik", "Mikado" and «Skatert Samobranka», "TM Zolotaya Dolina". The represented manufacturers produce such types of canned mushroom products as: pickled beech mushrooms, butter mushrooms, milk mushrooms, hazelnuts, assorted mushrooms and champignons.

Twenty people took part in an Internet survey to find out consumer preference for pickled mushrooms. The results of the survey showed that the highest demand among respondents use mushrooms - 8 people (35%), 6 people (25%) - prefer to buy pickled mushrooms, 4 (20%) - pickled beech mushrooms, 2 people (10%) prefer the mixed mushroom.

In the next stage of the research, organoleptic analysis of canned pickled mushrooms was carried out. To do this, we purchased pickled, sliced mushrooms from the following manufacturers in the shopping centers of Ussuriysk:

- Sample No. 1 – “Skatert Samobranka”,
- Sample No. 2 – “TM Zolotaya Dolina”,
- Sample No. 3 – “Bonduelle”.

Initially, the product packaging and labeling were checked. All tested samples were packed in consumer glass packaging, sealed lids, the presence of damage, dirt, deformations of the lids were not observed. The consumer packaging of each sample was provided with a colorful label with complete information about the product. Completeness of the labeling was assessed for compliance with the Russian State Standard GOST R 51074-2003 [4, 5].

The labeling of all tested samples included: the name of the product, the manufacturer, composition, nutritional and energy value, terms and conditions of storage, as well as the date of production, all these indicators were consistent with the requirements of the current regulatory document. However, in all labels, there is no indication of the normative document, according to which canned mushrooms were produced.

During the organoleptic evaluation of the quality of the samples under study, the following indicators were determined: appearance, flavor and odor, color, consistency, and quality of filling, the analysis was carried out according to the requirements of GOST R 54677-2011 [6].

According to the results of organoleptic evaluation, the following was noted: in sample no. 1 and no. 2, there are mechanical damages of the main product. In sample number 2, mushrooms are heterogeneous in size. The presence of worm holes, burns and stains in all samples is not observed. In the sample no.1, sour taste and smell are noted. In sample no.2, the taste is almost neutral, acidity is slightly felt.

Color, consistency, filling quality in all samples are fully consistent with the requirements of GOST. Sample no.3 fully meets the requirements of the normative document by organoleptic indicators (Table 1).

Table 1. Organoleptic quality indicators of the studied canned mushrooms.

Indicator name	Requirements of GOST R 54677-2011	Results		
		Sample 1	Sample 2	Sample 3
General Appearance	Mushrooms are whole or chopped, of the same species, homogeneous in size, without mechanical damage, traces of worms, without stains and burns	Mushrooms are chopped, uniform in size, there are mechanical damages, without stains and burns	Inhomogeneous in size, with mechanical damages, chopped, without stains and burns, without worm holes	Mushrooms are chopped, uniform in size without mechanical damage, traces of worm holes, without stains and burns
Taste and smell	Natural, peculiar to this type of mushrooms. Taste of pickled mushrooms slightly acidic or sour	There is a sour taste and odor	The taste is neutral, the smell is characteristic of this type of mushroom	Taste is slightly acidic, the smell is characteristic of this type of mushroom
Color	Close to the natural type of mushrooms	Yellowish	Yellowish	Yellowish
Consistency	The flesh of mushrooms is dense, elastic, laminae mushrooms - fragile	The flesh of the mushrooms is dense, firm	The flesh of the mushrooms is dense, firm	The flesh of the mushrooms is dense, firm,
Quality of the dressing	The dressing is translucent, slightly viscous. Floating threads are allowed	The dressing is translucent	Semi-transparent, slightly viscous, no floating threads	The dressing is translucent

To fully assess the quality of canned pickled mushrooms further we conducted a laboratory study of the tested products, according to the physical and chemical parameters [2, 3, 7]. The results are presented in Table 2.

Table 2. Results of laboratory evaluation of the quality of canned pickled mushrooms.

Indicator name	Requirements of GOST R 54677-2011	Results		
		Sample 1	Sample 2	Sample 3
Mass fraction of mushrooms in the net weight of preserves, %, no less	60.0	53.0	41.5	60.0
Mass fraction of chlorides, %	2.0-3.0	3.5	0.75	2.4
Mass fraction of titratable acids, %	0.5-0.7	1.20	0.45	0.62
Impurities	Not permitted	Not detected	Not detected	Not detected

According to Table 2, none of the tested samples showed the presence of impurities. In samples no. 1 and no. 2, the index of mass fraction of mushrooms is 53% and 41.5%, which is 7 and 18.5%, respectively, below the established norm. As it was established earlier, in sample no. 1, sour taste and smell were noted that is confirmed by the parameter of mass fraction, titratable acids (was established on acetic acid), it was 1.2 %, that on 0.5 % above the higher limit of the established norm. In the sample number 2 there is a low content of titratable acids, it was 0.45%, which is 0.5% below the lower limit of this indicator, as confirmed by the earlier organoleptic study. The increased indicator of the mass fraction of table salt is set in the sample no.1 -3.5%, which is 0.5% higher than the highest limit set.

5 Conclusions

As a result of the conducted veterinary and sanitary examination of canned pickled mushrooms, we can make the following conclusion: according to organoleptic and physical and chemical indicators of quality, only sample number 3 fully complies with the standard. Examined indicators of samples no. 1 and no. 2 have deviations from the specified standard, which raises doubts about their quality.

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