

FORMATION OF THE QUALITY OF FUNCTIONAL FOOD PRODUCTS

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ABSTRACT

From pumpkin seeds it is possible to obtain a unique prescription component for flour confectionery - powder. Pumpkin seed powder has a diverse chemical composition of biologically active components, which proves its effectiveness as a functional food raw material. The article discusses the composition of pumpkin seed powder and the possibility of using it as a raw material for the production of flour culinary and confectionery products.

KEYWORDS: *Pumpkin Seed Powder; Rational Nutrition; Functional Food Product; Sand Semi-Finished Product, Biscuit Semi-Finished Product.*

INTRODUCTION

According to the fundamentals of the concept of state policy in the field of healthy nutrition, which consists in maintaining and strengthening the health of the population through rational nutrition, as well as in the prevention of diseases caused by inadequate and unbalanced nutrition, it is necessary to develop food products that not only satisfy human nutritional needs, but and have a positive effect on the health of the body. Such products can be flour culinary and confectionery products with the addition of secondary vegetable raw materials in the form of powder from pumpkin seeds.[1-8]

World trends in the field of nutrition are associated with the creation of products that improve health with daily use and are called functional.

The most promising in the field of functional additives is vegetable raw materials:из-занизкойстоимости;

Due to the wide variety of chemical composition of biologically active components;

In all areas of the food industry, by-products are formed that, if not used, pollute the environment. Such secondary vegetable raw materials contain many biologically valuable functional substances and can be used in the future in food production.

Today, market conditions dictate the need for manufacturers to create products that could be in demand by consumers who care about healthy eating. To do this, manufacturers of various food products strive to produce products that not only satisfy organoleptic quality indicators, but also improve people's health with daily consumption, that is, functional products. These products can be obtained by changing the recipes and production technologies of already known food products by adding functional additives during the technological cycle, such as vitamins and minerals,

dietary fiber, antioxidants, bifid bacteria, polyunsaturated fatty acids, oligosaccharides, microelements, non-traditional and secondary vegetable raw materials, complex additives and many others.[9-16]

One such type of functional raw material is pumpkin seed powder. This powder, when added to daily food products, which can be flour confectionery products, in particular shortbread, waffle dough, biscuit dough, can become the basis of a healthy diet for all population groups. This confirms the expediency of research, creation and development of the production of specialized semi-finished sand products enriched with various biologically active additives, including one of the most balanced in terms of the content of biologically active substances - powder from pumpkin seeds. The benefits of pumpkin seeds are also undeniable for people suffering from hypertension and diabetes: they have the ability to stabilize blood pressure and lower blood sugar levels. In addition, pumpkin seeds are a good diuretic and choleric agent. Rich in zinc, they enhance memory, improve brain function and reduce fatigue.

Pumpkin powder is distinguished by its truly unique vitamin and mineral composition, which the product inherited from nature. The chemical composition of pumpkin powder contains a significant amount of vegetable protein, which in turn is perfectly absorbed by the human body, and also contains a number of essential amino acids.

Pumpkin powder contains arginine, a natural compound that helps strengthen the body's immunity, as well as avoid diseases such as obesity, hypertension, fatty liver, diabetes and others. The benefits of pumpkin powder for the human body are invaluable and are due to the vitamin and mineral composition of the product, which contains such important compounds as lysine, isoleucine, glycine, glutamine, as well as phenylalanine and cucurbitine.

A study of pumpkin powder (Table 1) showed that it contains a fairly large amount of proteins, fats, dietary fiber, linolenic and linoleic acids, sodium, potassium, calcium, magnesium, phosphorus, iron, zinc, and vitamins.

TABLE 1 CHEMICAL COMPOSITION OF FLOUR AND PUMPKIN POWDER, % PER 100 G OF DRY MATTER

Index	Wheat flour premium	Pumpkin powder
Squirrels	11,97	25,85
Squirrels	1,28	51,76
Carbohydrates	82,09	11,30
Alimentary fiber	4,07	29,24
Ash	0,58	5,04
Sahara	1,86	1,48
PUFA:		
Omega-3 (linolenic)	0,03	0,127

Omega-6 (linoleic)	0,56	22,00
Minerals, mg %:		
Na	3,49	15,83
K	141,86	851,54
Ca	20,93	45,37
Mg	18,60	564,52
P	100,00	1238,79
Fe	1,40	10,55
Zn	0,70	10,55
Cu	0,10	1,48
Vitamins, mg%:		
B1	0,20	0,28
B2	0,05	0,16
PP	1,40	5,27
C	-	2,00
Energyvalue, kkal	388	590

During the study, it was revealed that pumpkin seed powder has a unique composition. It contains a large amount of vitamins, especially B vitamins, alpha-tocopherol, biotin, unsaturated fatty acids, as well as minerals, proteins, carbohydrates and phytosterols, which are involved in the formation of a balanced functioning of the human body [2 ; four]. The richest composition of this product should be mentioned:

Amino acids	Tryptophan, arginine, phenylalanine, tyrosine, valine, isoleucine, leucine, histidine, cysteine, threonine, methionine, lysine.
Minerals	Manganese, phosphorus, magnesium, copper, zinc, iron.
Saturatedacids	Myristic, palmitic, stearic.
vitamins	E, K, C, B1, B2, B4, B5, B6, B9, alpha and beta carotene, cyanine, lutein.

Unsaturated acids	Omega 3 and 6, linolenic, arachidonic, linoleic, oleic.
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Pumpkin seeds include more than fifty useful substances, which in turn are directly involved in all vital functions of the body.

The benefits of pumpkin seed powder depend mainly on a wide variety of vitamin composition, in which the first place in content is: vitamin B1, vitamin B6, vitamin B9, alpha-tocopherol, biotin, and they are also rich in such vitamins us, as pantothenic acid, vitamin B2, vitamin PP, choline. Pumpkin seeds are also rich in minerals such as magnesium, phosphorus, potassium and others (Table 2).[17-23]

Sunflower seed powder contains natural antioxidants represented by phenolic compounds. Among them are such chemically active antioxidants as caffeic acid, chlorogenic acid.

table 2

Vitamin and mineral content of sunflower seed powder		
Nameofvitamin/mineral	Content, mass fraction per 100 gproduct, g	
Vitamins: Vitamin B1(тиамин)	1,48-2,10	
Vitamin B6 (pyridoxine)	0,800-1,345	
Vitamin E (alphatocopherol)	33,20-35,17	
Biotin	0,67	
betacarotene	30,0	
mineral вещества:	645,0	
Calcium	367,0	
Magnesium	354,0	
Sodium	160,0	
Sulfur	180,8	

Phosphorus	705, 0
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Sunflower seed powder also has a rich content of lipids, which can be divided according to the ability to interact with alkalis into: acyl and isoprenoids. The group of acyl lipids includes ethers and esters. And the group of isoprenoids includes carotenoids, fat-soluble vitamins and provitamins, sterols, chlorophylls and other compounds. All lipids have certain biological functions in the human body: they are involved in the construction of cell membranes, metabolism, regulation of hormonal functions, etc. Sunflower seeds have a high content and diverse composition of not only fats and vitamins, but also a wide variety of proteins, amino acids (including essential ones) and carbohydrates.

Such a diverse composition of pumpkin seed powder makes it possible to use it as a functional component for the manufacture of food products, in particular for the manufacture of semi-finished sand products.

Powder from pumpkin seeds is obtained by cleaning from the outer hard shell of seeds, subsequent grinding and sieving. When grinding sunflower seeds, a partial destruction of the cell wall and intercellular interactions occurs, therefore, the chemicals that make up sunflower seeds interact better with the rest of the prescription components when adding powder from sunflower seeds to the dough for the preparation of sand semi-finished product. This makes it possible to facilitate the process of formation of a stable fat emulsion with a high degree of dispersion of fat globules during dough kneading, and this improves the structure and organoleptic characteristics of the sandy semi-finished product.[24-29]

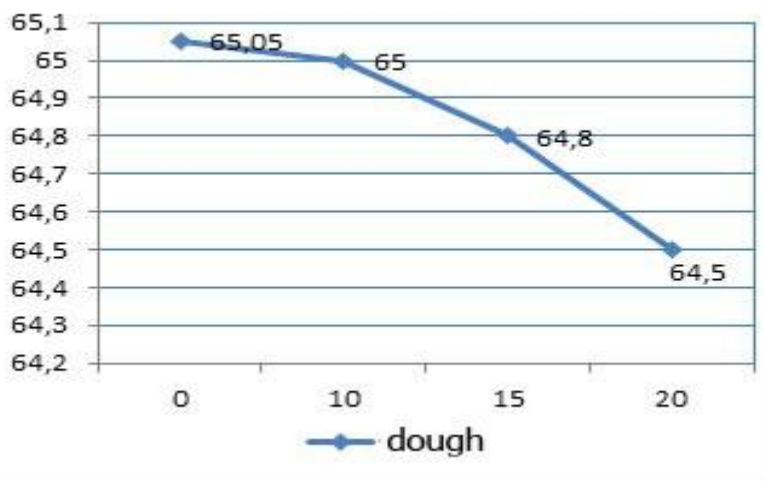
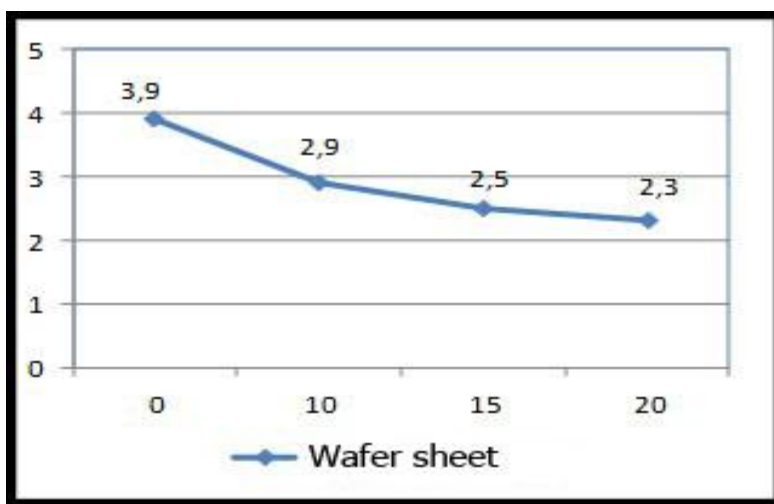
Based on the research and experimental data obtained, a production technology was developed and the optimal recipe for a semi-finished sand product was selected using powder from sunflower seeds.

We have investigated the possibility of obtaining a prophylactic wafer test using pumpkin powder (TP).

To achieve this goal, it was decided to use the recipe of sheet wafers as a control sample, and add an additive in the form of pumpkin powder to the recipe in the amount of 10, 15 and 20% of the mass of flour in the mixture.

Was in accordance with GOST 5900 "Confectionery products. Methods for determining moisture and solids" determined the dependence of the moisture content of products (%) and dough (Fig. 2) on the content of pumpkin flour in them.

According to Figure 1, we can conclude that the moisture content of the dough is within normal limits, but with an increase in the dosage of pumpkin powder, the moisture content of the waffle dough drops, since the moisture content of pumpkin powder is lower than that of wheat flour. The same dependence can be traced in finished products. The mass fraction in the wafer sheet is in the range of 2.5 - 3.9%. The values of the mass fraction of moisture in finished products with 10 and 15% pumpkin powder are within acceptable limits.



4,5,2,7

Dosage of TP, %

Figure 1. Dependence of moisture (%) of wafer dough and sheet on the dosage of pumpkin powder. The increase in humidity can be explained by the fact that dietary fiber and pectin, which are part of the pumpkin powder, are able to absorb and retain moisture, preventing its free removal during baking.

When studying the structural and mechanical properties of the studied samples and control, it was found that with an increase in the dosage of pumpkin powder to 15% of the mass of flour, the relative density of the wafer dough increases (Fig. 2). Moreover, with the introduction of 10% fibers, it amounted to 1.062 g/cm³, which is 6.2% higher than the control sample.

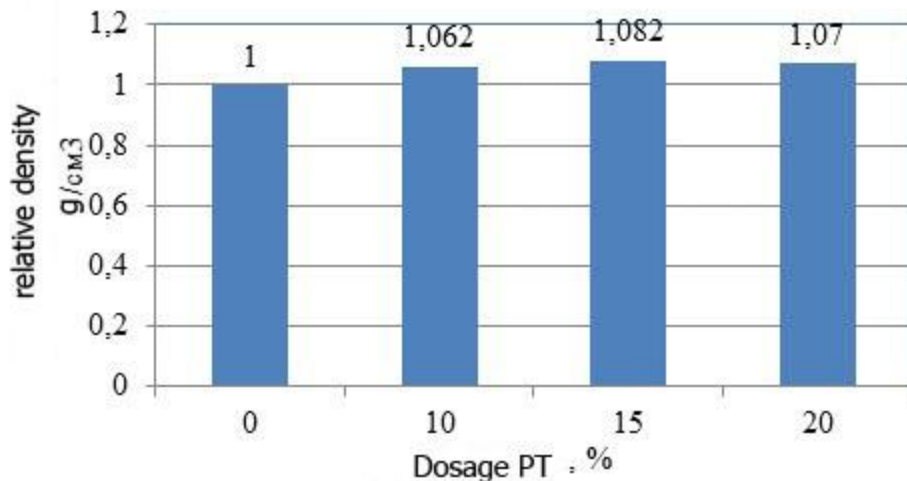


Figure 2 Dependence of the relative density of wafer dough on the dosage of pumpkin powder

Figure 3 shows the results of determining the degree of wetting of a wafer sheet, carried out in accordance with GOST 10114 “Flour confectionery products. Method for determining wetness” [1]. It has been established that with an increase in the dosage of pumpkin powder in the wafer sheet recipe, the wettability of products decreases by 7.4% with the addition of 15% TP from the mass of flour and by 10.5% at 20%. This can be explained by the presence of pectin substances in the powder, which retain a significant amount of water.

TABLE 3 A RECIPES FOR USING PUMPKIN POWDER TO ENHANCE THE FUNCTIONALITY OF BISCUITS.

Nameofadditives	The content of additives, mg. %		
	Sample-1	Sample-2	Sample-3
Pumpkinpowder	50	40	30
Margarine	12	14	18
Almondflour	5	9	11
Peanutextract	0,5	0,9	1,0
Powderedsugar	10	12	14
Syrup	5	8	10

Premium wheat flour v/s	14,2	13.61	12,7
Water	3,3	3.3	3.3

According to the analysis of the results of Table 3, pumpkin powder was added to the product formulation in different amounts, as a result of which the amount of remaining raw materials decreased, and the functionality of the product increased. It should be noted that pumpkin powder has a positive effect on the quality of the product, as well as on its cost, since most of the almond flour and walnut extract are imported to Uzbekistan as raw materials.

Analysis of the results shows that the nutritional and biological value of the herbal supplements we choose lies in a rich set of vitamins and minerals necessary for human health. From the point of view of the concept of healthy nutrition, it allows you to create therapeutic and prophylactic and dietary products with a low sugar content and enriched with protein and vitamin supplements. The use of pumpkin powder in the production of cookies and cakes is due to the fact that this supplement is an excellent source of amino acids that contribute to the production of the joy hormone serotonin. In addition, pumpkin helps lower blood cholesterol levels, increase hemoglobin levels, and have a positive effect on the functioning of the heart and blood vessels. Eating them has a positive effect on digestion and prevents bowel cancer. Also, the use of pumpkin is one of the best ways to create dietary products that are indispensable for people with diabetes.[29-33]

The proposed methods are practically unacceptable for small confectionery enterprises, since they do not set the task of mass distribution of their products, but sell it on the spot. Therefore, they rely on traditional methods with minimal mechanization and the use of all kinds of modern ingredients (mixtures). This allows them to be original, mobile in assortment, and also maintain a high level of product quality. During the experimental tests, a soft biscuit recipe based on pumpkin powder was developed and the product was prepared (Table 4.)

TABLE 4 A RECIPE FOR USING PUMPKIN POWDER TO ENHANCE THE FUNCTIONALITY OF SOFT BISCUITS

Nameofadditives	The content of additives, mg.%		
	Sample-1	Sample-2	Sample-3
Pumpkinpowder	30	20	12,5
Soyflour	10	5	3
Milk	10	8	5

Arichosaextract	0,5	0,5	0,5
Powderedsugar	9,5	9,5	9,5
Syrup	5	5	5
Premiumwheatflour	25	42	54,5
Water	10	10	10

According to the analysis in Table 4, the first sample is functional compared to the rest of the samples, since the remaining samples show a high content of flour, which, due to the presence of gluten in the composition, reduces the functionality of the product. A mixture of pumpkin not only increases the functionality of the product, but also contains vitamins A, C, E, K, T, PP and vitamins B1. , B2, B5, B6, beta-carotene, manganese, zinc, iodine, copper, cobalt, chromium, barium, sulfur, selenium, phosphorus, titanium, magnesium, potassium, iron and other trace elements. The composition of this product is rich in easily digestible carbohydrates, natural sugars and dietary fiber. The inclusion of pumpkin and pumpkin powder in the recipe as a sugar substitute allows you to get dietary products that help lower cholesterol, improve cell renewal, strengthen blood vessels and normalize bowel function. With regular use of pumpkin and pumpkin powder, cholesterol levels decrease, cell renewal improves, blood clotting improves, and intestinal microflora normalizes. Pumpkin and pumpkin powder contains a complex of antioxidants, 30-45% of which are flavonoids. Comprehensive evaluation of pumpkin powder in experimental studies has shown that it is absolutely harmless. In normal concentrations, pumpkin ingredients do not have side effects on the body, do not have mutagenic properties and do not cause allergic reactions.

CONCLUSIONS:

The studied theoretical data confirm the expediency of using pumpkin seeds as a sweet, rich and pleasant flavoring agent in the preparation of flour confectionery. This allows you to get low-calorie, highly biological, environmentally friendly products enriched with vitamins and minerals. In addition, the use of this plant material will significantly reduce the inflow of imported raw materials. It also increases the possibility of obtaining products that can be recommended in dietary and preventive nutrition.

BIBLIOGRAPHY

1. GOST 8756.10-70 Fruit and vegetable processing products. Method for determination of pulp content. - Input. 01/01/1970. - M.: Publishing house of standards, 1970 - 11 p.
2. GOST 8756.22-80 processed products of fruits and vegetables. Method for the determination of carotene. - Input. 01/01/1980. - M.: Publishing house of standards, 1990 - 18 p.
3. GOST 24556-89 processed products of fruits and vegetables. Methods for determining vitamin C. Interstate standard. Introduction 01/01/91. M.: IPK Publishing house of standards, 2003. - 10 p.

4. Tretyakov N. N., Koshkin E. I., Mokrushina N. M. Physiology and biochemistry of agricultural plants / ed. N. N. Tretyakova. M.: Kolos, 2008
5. Shatnyuk L. H., Nagoytseva Yu. A. New types of flour confectionery for dietary purposes. M.: Agro NIITEI pishcheprom, 1991. Issue. 5.
6. Burns E. E., Talley L. J., Brummett B. J. Sunflower utilization in human foods // *Cer. sci. today*. 1972 Vol. 17, no. 9. P. 289-298.
7. Determination of caffeic and chlorogenic acids and their derivatives in different sunflower seeds / M. M. Pedrosa, M. Muzquiz, C. Garcia-Vallejo, C. Burbano, C. Cuadrado, G. Ayet, L. M. Robredo // *J Sci Food Agric*. 2000 No. 80. R. 459-464.
8. Optimization of the Extraction of Total Phenolic Compounds from Sunflower Meal and Evaluation of the Bioactivities of Chosen Extracts / F. S. Taha, G. F. Mohamed, S. H. Mohamed, S. S. Mohamed, M. M. Kamil // *American Journal of Food Technology*. 2011. No. 6. R. 1002-1020.
9. Rustan A. C., Drewon Ch. A. Fatty Acids: Structures and Properties // *Encyclopedia of life sciences*. 2005. Sept. P. 1-7.
10. Schmidt S., Pokorny J. Potential application of oilseeds as a source of antioxidants for food lipids - a review // *Czech J Food Sci*. 2005 No. 23. R. 93-102.
11. K.S.Rakhmonov. Influence of leavens of spontaneous fermentation and phytoadditives on the provision of microbiological safety of bread // T. I. Atamuratova, N. R. Djuraeva, I. B. Isabaev, L. N. Haydar-Zade // *Journal of Critical Reviews* //2020, Vol.7, Issue 5, pp. 850-860.
12. S.K. Jabborova. Application of products of processing mulberries and roots of sugar beet in the production of cupcakes // I.B.Isabaev., N.R. Djuraeva., M.T. Kurbanov., I.N. Khaydar-Zade., K.S. Rakhmonov // *Journal of Critical Reviews* //2020, Vol.5, Issue 5, pp. 277-286.
13. K.S.Rakhmonov. Application of phito supplements from medicinal vegetable raw materials in the production of drugs // T. I. Atamuratova., M.E. Mukhamedova., N.K.Madjidova., I.Sh. Sadikov // *Journal of Critical Reviews* //2020, Vol.7, Issue 12, pp. 934-941.
14. Djurayeva N, Mixtures of Vegetable Fat as a Potential Raw Material for Bakery// Barakayev N, RakhmonovK,Atamuratova T, Mukhamedova M, MuzaffarovaKh. // *International Journal of Current Research and Review*// october 2020, Vol.12, Issue 19, pp. 140-148. DOI: <http://dx.doi.org/10.31782/IJCRR.2020.12192>
15. Djurayeva N, Plant-fat mixtures as a potential raw material for bakery production// Rakhmonov K, Barakayev N, Atamuratova T, Mukhamedova M, MuzaffarovaKh. // *Plant Cell Biotechnology and Molecular Biology* 2020 21(45-46), pp. 29-42
16. Ravshanov S.S, The impact of ultrasonic activated water on hydrothermal processing of wheat grains grown in dry climate conditions // Rakhmonov K.S., Amanov B.N. // *Plant Cell Biotechnology and Molecular Biology* 2020 21(45-46), pp. 29-42
17. Kuliev N.SH, Udk 664.8 baking properties and quality expertise wheat flour// Rakhmonov K.S. // *European Journal of Molecular & Clinical Medicine*, 2020, Volume 7, Issue 2, Pages 6333-6340

18. Ravshanov S.S, The Effect Of Drinking And Activated Water On Field Scales Of Wheat Grains Grown In Arid Climatic Conditions// Rakhmonov K.S. Ergasheva H.B., Yuldasheva Sh. J.// European Journal of Molecular & Clinical Medicine, 2020, Volume 7, Issue 3, Pages 3065-3070.
19. Rakhmonov K.S., Confectionery Products for Therapeutic and Preventive Purpose with Medicinal Herbs Uzbekistan// L.N. Khaydar-Zade., N.SH. Kuliev, G.H.Sulaymonova // Annals of the Romanian Society for Cell Biology, Vol. 25, Issue 2, 2021, Pages. 4126 – 4140.
20. Ravshanov S.S., Influence of the Use of Activated Water during Hydrothermal Treatment on the Quality of Bread// Rakhmonov K.S., Radjabova V.E., Pardayev Z.T. // Annals of the Romanian Society for Cell Biology, Vol. 25, Issue 2, 2021, Pages. 4091 – 4102
21. Barakaev, N., Justification of the parameters of parts of a walnut cracking machine// Mirzaev, O., Toirov, B., Alimov, A.// Journal of Physics: Conference Series, 2021, 1889(2), 022061.
22. Azim Oltiev., The role of catalysts in fat transesterification technology// MatlubaKamalova., KakhramonRakhmonov., OrifjonMamatqulov// IOP Conf. Series: Earth and Environmental Science 848(2021) 012220
23. Rakhmonov KS, Spontaneous fermentation starter cultures - an effective means of preventing the potato disease of bread // Isabaev IB. // Journal "Storage and processing of agricultural raw materials" .- M., 2011.- No. 12.- P.23-25.
24. Rakhmonov KS, Influence of the substrate of the nutrient medium on the composition of the populations of microorganisms in the starter cultures of spontaneous fermentation // Isabaev IB, Akhmedova ZR // Journal "Storage and processing of agricultural raw materials". M, 2012 ..- No. 9.- P.40-43
25. Rakhmonov KS, Analysis of typical sources of microbial contamination of bread // Buxorodavlatuniversitetiilmiyaxboroti. // 2014.- No. 3.- P.37-43.
26. Rakhmonov K.S. Potato Bread Disease and a Method for Its Prevention // T.I. Atamuratova // Russian Bakery Magazine. M, 2014.- No. 5.- P.37-38.
27. Rakhmonov KS, Biotechnological aspects of ensuring the microbiological purity of bread // E. Muratov, T.I. Atamuratova // Kimyovakimyotexnologiyasi. 2015.- No. 2.- P.64-68.
28. Rakhmonov K.S. Wheaten ferments spontaneous fermentation in biorechnological methods// Isabayev I.B. // Austrian Journal of Technical and Natural Sciences. 2016. - № 7-8. - P. 9-12.
29. Rakhmonov KS, Methods for improving the composition of the nutrient medium of sourdough cultures for bakery products from wheat flour // T.I. Atamuratova. Isabaev I.B. // Bakery of Russia. 2016. –№2. - P.22-24.
30. Rakhmonov KS, Optimization of the recipe composition of wheat breads using spontaneous fermentation starter cultures // Isabaev IB, U.M. Ibragimov, Molchanova E.N. // Bakery of Russia. 2018. –№3. - S. 33-37.

- 31.** I.B. Isabaev, The use of feed flour as a substrate for the nutrient medium of wheat starter cultures in the production of bread // T. I. Atamuratova., Rakhmonov K.S. // Buxorodavlatuniversitetiilmiyaxboroti.- 2018. No. 2.- P.24-30.
- 32.** Ravshanov S.S, Radjabova V.E, Rakhmonov K.S, Pardayev Z.T. Influence of the Use of Activated Water during Hydrothermal Treatment on the Quality of Bread // Journal Annals of the Romanian Society for Cell Biology - Romania, 2021. Vol. 25, №2 ISSN: 1583-6258, pp. 4091-4102.
- 33.** Ravshanov S.S, Rakhmonov K.S, Ergasheva H.B, YuldashevaSh.J. The Effect Of Drinking And Activated Water On Field Scales Of Wheat Grains Grown In Arid Climatic Conditions // European Journal of Molecular & Clinical Medicine. Volume 07. Issue 03. 2020. -pp 3065-3070.