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PHYSICOCHEMICAL PROPERTIES OF A FUNCTIONAL SAUCE FOR FISH CANNED PRODUCTS

TOSHBOYEVA SAMARA

PhD student, Tashkent Institute of Chemical Technology, Tashkent, Uzbekistan
Phone.: (0897) 371-8886, E-mail.: toshboyevasamara@gmail.com
**Corresponding author*

DADAMIRZAYEV MUZAFFAR

Associate professor, Namangan State Technical University, Namangan, Uzbekistan
Phone.: (0897) 374-7222, E-mail.: d_muzaffar@inbox.ru

Abstract: This article presents an analysis of the organoleptic and physicochemical properties of sauce–paste semi-finished products developed for fish canned products. The study focuses on current and highly relevant issues related to meeting the growing consumer demand for meat products, which are among the most widely consumed natural food products today. Particular emphasis is placed on expanding the assortment of natural and affordable products, as well as on the development of new and high-quality product types. In this context, the results of research aimed at improving the quality and functional characteristics of sauces intended for fish canning are highlighted.

Keywords: High-quality, safe, combined, energy-related, biological, regulatory and legal documents, semi-finished product, sensory, production cost, modification, viscosity, fat, protein.

Introduction. Worldwide, extensive scientific research is being conducted in the food industry on the processing of raw materials rich in proteins, fats, carbohydrates, minerals, and vitamins, as well as on the production of high-quality canned products and the development of related industrial sectors. Based on the measures implemented in this field, particular attention is being paid to the efficient use of natural raw materials and products as meat substitutes in industrial production, the expansion of new product lines, the reduction of production costs, and the supply of the population with high-quality and safe combined fish products, while enhancing their nutritional, biological, and energy value.

In this regard, effective measures are being implemented in our country to increase fish stocks in rivers and lakes and to enhance their processing. The production of safe, high-nutritional-value, and import-substituting fish canned products through the use of new types of filling semi-finished products, as well as the expansion of their product assortment, is considered particularly important.

Over the past five years, 1,016 projects with a total value of 2.2 trillion UZS have been implemented in the fisheries sector of Uzbekistan, resulting in a sixfold increase in fish production. In 2021, fish production in the country reached 400 thousand tons, and fish consumption increased by 5.7 times compared to 2016.

The implementation of tasks stipulated in the Decree of the President of the Republic of Uzbekistan No. PF-2939 dated May 1, 2017, “On Measures to Improve the Management System of the Fisheries Sector”; the Resolution No. PQ-83 dated January 13, 2022, “On Additional Measures for Further Development of the Fisheries Sector”; the Decree No. PF-67 dated February 11, 2022, “On Additional Measures for the Accelerated

Development of the Fisheries Sector"; as well as the Resolution of the Cabinet of Ministers No. 274 dated May 4, 2021, "On Measures for the Comprehensive Development of the Fisheries Sector," and other relevant regulatory and legal documents, is being carried out at an accelerated pace.

In this article, the quality and nutritional value of the developed sauce–paste semi-finished products and ready-made sauces intended for fish canned products were evaluated by analyzing their dry matter content, major nutrients (protein, fat, and carbohydrates), as well as vitamin and mineral contents. In parallel with the developed products, sauces prepared using conventional technology were studied as control samples for comparative assessment of product quality. The quality of the finished products was determined based on sensory evaluation, as well as bacteriological and microbiological indicators.

The organoleptic evaluation of the sauce–paste semi-finished product developed for fish canned products, conducted using Ye.D. Tilgner's modified method, yielded the following results.

The tomato sauce developed for fish canned products was evaluated for its organoleptic properties at the UzTest DM Namangan branch in accordance with the requirements of GOST 8756.1-79 and 26323-2014, and the following results were obtained. The conducted assessments were carried out separately for the sauce and the paste, and the results were analyzed according to the GOST standards. The experiments conducted.

Organoleptic Properties			
1	Appearance and Consistency	Dense, homogeneous concentrated mass, without dark spots or small particles. A small amount of seeds and peel particles is permissible.	Dense, homogeneous concentrated mass, without dark spots or small particles. Seeds and peel particles are absent.
2	Color	Uniformly distributed red, fiery red, or bright red. A slightly brownish hue is permissible.	Deep red color.
3	Odor	Characteristic of cooked, heat-processed tomatoes; without bitter or foreign taste and odor.	Characteristic of cooked, heat-treated tomatoes; free from bitter or foreign taste and odor.

In addition, the overall physicochemical properties were tested in accordance with GOST 26671-2014. The dry matter content was determined according to GOST ISO 2173-2013, the mass fraction of mineral compounds according to GOST ISO 762-2013, and the pH value, viscosity, and protein content were analyzed in accordance with GOST 3343-2017. The proportions of these components in the tomato paste were established, and their compliance with GOST requirements was confirmed.

The physicochemical quality indicators of a 6% sauce prepared by diluting 30% tomato paste with fish head broth in ratios of 1/3 and 1/5 are presented.

	Physicochemical Properties		
2	Mass fraction of soluble solids (excluding chlorides), %	4,4	
3	Mass fraction of mineral compounds, %, not excessive	0,060	0,00
4	Plant and foreign matter	*Fish broth, rice flour, carrot, onion, garlic*	
5	pH value	4,52	
6	Viscosity	0,62 dPas	
7	Protein content	18,69	

Physicochemical properties obtained for 30% tomato paste

1	Physicochemical Properties		
2	Mass fraction of soluble solids (excluding chlorides), %	25	32,05
3	Mass fraction of mineral compounds, %, not excessive	0,060	0,00
4	Plant and foreign matter	*Baliq bulyoni, Gurunch uni, Sabzi, Piyoz, Sarimsoq*	
5	pH value	4,15	
6	Viscosity	281 dPas	
7	Protein content	4,2	
9	Total carbohydrate content	20,6	

All tests were conducted using a QUINTIX224-10RU analytical electronic balance, thermometers, Abbe refractometer Abbemat-200, pH meter, muffle furnace, drying oven СЭШ-3М, and centrifuge. Measurements and analyses were carried out under climatic conditions of 22.3°C temperature and 55.3% relative humidity.

The dilution method allows for the quantitative description of sensory quality indicators such as odor and taste, using factors like storage duration and processing time as measurable parameters.

In the organoleptic study, a scoring system was also used to assess the significance level of the quality indicators.

Since the appearance of fillers has decisive physiological and psychological significance, product evaluation is primarily based on visual assessment. Deformation of the product, poor shaping, or the emergence of an unusual color indicates product deterioration. Such conditions can also be negatively influenced by technological factors during the production process.

In conclusion, it can be stated that the organoleptic and physicochemical properties of the sauce–paste semi-finished products developed for fish canned products comply with GOST requirements and are suitable for consumption.

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CONTENTS

TECHNICAL SCIENCES: COTTON, TEXTILE AND LIGHT INDUSTRY

Saloxiddinova M. Improving the separator design to prevent cotton fiber loss.	**3**
Juraeva G. Optimizing cotton fiber quality during the production process.	**9**
Mamadaliev F. Analysis of problem in the aerodynamic system of cottonseed lintering equipment in cotton processing plants.	**16**
Kozokov S. Conducting experiments with newly designed saw gin ribs in the cotton cleaning process for different cotton varieties.	**23**
Usmonov I., Abdullajonov S. Methods and results for determining the parameters and operating modes of irradiating watermelon seeds with ultraviolet rays.	**30**
Majidov A. Theoretical foundations of the technological parameters of a straight-flow fiber separation device.	**36**
Rahmatova S. Scientific approach to considering properties in the design of garments made from knitted fabrics.	**44**
Rahmatova S. Technology for obtaining knitted fabrics from various raw materials.	**48**
Turaboyev G. Methodology for determining the tribotechnical properties of structural materials interacting with raw cotton.	**54**

TECHNICAL SCIENCES: AGRICULTURE AND FOOD TECHNOLOGIES

Khurmamatov A., Boyturayev S. Results of industrial water treatment from mechanical impurities.	**58**
Khurmamatov A., Alimardonov Kh., Akhmedova K. Two-stage installation for deep air purification from fine-dispersed solid particles.	**65**
Mamatusmonova D., Mamatov Sh. Technical characteristics of the use of vibrating conveyors for drying rosa caninas.	**73**
Toshboyeva S., Dadamirzayev M. Physicochemical properties of a functional sauce for fish canned products.	**79**

Saribayeva D., Maxmudova D. Study of protein–lipid composition in food products.	**83**
Gulomkhojaeva N., Zokirova M. Study of polyphenolic compounds in jujube (ziziphus jujuba mill.) grown in Uzbekistan.	**88**
Gulomkhojaeva N., Zokirova M. Investigation of the amino acid composition in black and white mulberry (morus nigra l. and morus multicaulis perr.) varieties.	**94**
Kadirov A., Vokkosov Z. New technology for growing microorganisms of the bacillus sp, rhizobium sp, azotobacter sp.	**101**
Rakhimova G. Development of an effective technology for producing soy milk from local soy raw materials, studying its composition and physical and chemical properties	**107**

CHEMICAL SCIENCES

Khabibullaev J., Shomurotov Sh. Oxidation of various cellulose containing materials using the HNO_3/H_3PO_4–$NaNO_2$ system.	**112**
Nuritdinov A., Abdullaev O. Technical parameters and energy efficiency of an oil sludge processing unit	**122**
Okhundadaev A. Study of the effect of various factors on the synthesis of vinyl esters of wine acids	**127**
Usmonova Z. Effectiveness analysis of thermally and steam activated plum seed adsorbents	**133**
Kaxarova M. Technological scheme for extracting naphthalene from pyrolysis oil by the extraction (phase separation) method	**139**
Oribzhonov M., Bektemirov A., Arislanov A., Azizov V. Method for producing biosuperphosphate fertilizers containing humic compounds	**143**
Erkinov R., Soliyev M., Arislanov A. Synthesis of sulfur containing organic compounds by reaction of thiol-en and thiol-in	**151**
Yusupov M., Nuritdinov A. Elemental analysis of carboxyl-modified copper phthalocyanine pigment	**156**

Nuritdinov A.
Thermal analysis of carboxyl-modified cobalt and calcium metal phthalocyanine pigments **162**

Isakov B.
Development and study of an anti-caking additive to improve the physico-mechanical properties of ammonium nitrate **168**

TECHNICAL SCIENCES: MECHANICS AND MECHANICAL ENGINEERING

Gulamova D., Bobokulov S., Eshonkulov E.
Resistance and voltage anomalies above 200k bscco synthesized by solar technology **173**

Kutbidinov O., Abdullabekov D., Usmonov D., Xushbakov M.
Analytical and experimental model for assessing the depreciation rate of transformer oil based on physicochemical factors **182**

Obidov A., Abdurasulov A.
Basis of implementation of resource-effective shaft production **188**

Utaev S.
Calculation of oil change intervals in diesel-based gas engines **193**

Isomiddinov A.
Derivation of differential equations for spindle oscillation in a system of rectangular coordinates **200**

Dedakhanov A.
Determination of fuel consumption for drying cotton raw materials **209**

Atambaev D.
Difference of the individual yarns in the composition of a wrapped yar on the quality of the yar and determination of acceptable values of the main factors affecting their production **215**

Rokhmonov D., Sulaymonov J.
Development of a control algorithm for a smart irrigation system based on soil moisture and meteorological data **224**

Mamakhonov A., Khikmatillaev I.
Modeling of a vibratory cleaning device with cosinosoidal and sinusoidal shapes in matching the longitudinal and transverse cutting surface **227**

Soliyev A.
Theoretical study and characteristics of yarns in the production of circular knit fabrics **239**

Nomanov M.	
With improved blade mixer results of research work on the development of the 5lp linter	**246**
Lastochkin P.	
The influence of carding parameters optimization on the useful time coefficient of a rotor spinning machine	**259**
Mirzaakbarov A.	
Improving the efficiency of the ginning process to enhance fiber quality	**260**

ADVANCED PEDAGOGICAL TECHNOLOGIES IN EDUCATION

Abdumanonov A.	
Enhancing the methodology for applying intelligent control systems in the teaching of technical sciences	**265**
Makhmudov Z.	
Increasing students' activity and knowledge level using test assignments	**271**

ECONOMICAL SCIENCES

Sarimsakov B., Mirzabdullayev R.	
The role of contemporary HR technologies in improving business performance	**275**