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THE STUDY OF QUALITY INDICATORS OF NEW SEMI-FINISHED VEGETABLE PASTA SAUCES

The article considers the results of a study of the quality indicators of semi-finished vegetable pasta sauces. Organoleptic indicators, physicochemical properties are studied; the energy value of semi-finished vegetable pasta sauces is calculated.

Keywords: *semi-finished product, pasta sauce, organoleptics, dietary fiber, tomatoes, pumpkin, acidity, carotene.*

Relevance of research topic.

The cultivation of fruits and vegetables around the world is growing rapidly, and it is important to conduct research and develop their own technologies for their storage, deep processing and production of processed foods. Because providing the population with high-quality, expensive finished and semi-finished products in a short time become one of the most pressing problems of our time.

Improving the processing of agricultural products on a global scale, including the processing of fruits and vegetables and the production of various products from them, is one of the urgent problems of today, aimed at bringing consumption to the level of dietary standards. In this regard, the creation and implementation of new technologies in production, obtaining high-quality products, preserving the nutritional and biological value of products, saving basic raw materials, efficient use of natural

raw materials and products, reducing the cost of finished products and catering. Extensive research is also underway to develop and expand supplies.

Despite the fact that a number of achievements in the field of agriculture and horticulture, cultivation, storage and processing of vegetable products, the quality, cheapness and variety of fruits and vegetables, as well as standards for their consumption, do not meet physiological requirements. The development of technologies for processing fruits and vegetables and bringing their consumption to the required level remains one of the most pressing problems today.

Formulation of the problem. On the basis of plant materials, the optimal ratios of formulations and technological modes of production of a new type of semi-finished pasta sauces that perform a functional function were determined:

- determination of the organoleptic characteristics of semi-finished vegetable sauces and pastes;

- study of the structural-mechanical, rheological and physico-chemical properties of pasty semi-finished products;

- study of the quality and nutritional value of semi-finished pasta sauces.

Analysis of recent researches and publications.

The production of plant raw materials is growing and growing, but the population does not consume these raw materials in accordance with the requirements of physiological norms, and to solve this problem it is necessary to increase consumption due to the canning industry and catering.

The recent researches allow to improving the production technology of vegetable semi-finished products and pastes, preserving the biological and nutritional value of raw materials, easy heat treatment, efficient use of their juices in the preparation of products and enrichment with various useful additives to increase their diet, as well as those ready for canning and catering. The recent researches allow to expanding the production of semi-finished products, simplifying the production process, increasing the productivity of equipment and labor, energy consumption, time standards. It is also necessary to achieve effective use.

During the research, the following materials were used: tomatoes, pepper, paprika, pumpkin, carrot, heads, legs, spinal bone of poultry, wheat flour, rice flour, chickpea flour, onion and pumpkin seeds and sunflower seeds. All products met the requirements of GOST and OST. To study the quality, we used: Organoleptic analysis according to the Tilgner method (5), solids using the refractometric method (6), acidity according to GOST (7), carbohydrate content according to GOST (8), methods for determining fat according to GOST (9) protein content according to GOST (10), chloride content according to GOST (11), vitamin C content according to GOST (12).

Presenting main material. During the years of independence, a lot of work has been done to improve living conditions and special attention is paid to organizing and providing food products with increased nutritional and biological value. As agriculture is the main source of raw materials for the food processing industry, the leadership of

our independent country paid special attention to the development of this industry. Today you can feel the results of ongoing reforms in the shelves of shops, bazaars as horticultural and fruit products have become high-quality, diverse and cheap. During the mass ripening, the prices for the products of sheep-growing and horticulture are very low. Despite such an abundance of fruits and vegetables, according to the Ministry of Health of the Republic of Uzbekistan, the population does not consume these products according to the physiological norms presented in the diets [1]. Uzbek cuisine is really tasty, high-calorie, diverse and the population consumes a lot of carbohydrate food. Therefore, today among the population one can notice the spread of diseases such as obesity, diabetes, hypertension. This is all the result of malnutrition and non-compliance. If there are enough fruits and vegetables in the population's diet, our body will be provided with enough vitamins, minerals, dietary fiber, and pectin. The above listed food components will stimulate the metabolism, because dietary fiber will help improve metabolic processes, prevent various diseases and provide the human body with vitamins and minerals. Assimilation of these components is interconnected. After analyzing the menu of consumers in public catering enterprises, we noticed that the assortment of consumed sauces is very narrow and that they mainly prepare tomato sauce. In our opinion, expanding the assortment of various types of vegetable sauces will increase the consumption of vegetables, enriching and consuming dishes with minerals, vitamins, dietary fiber and improve metabolic processes and increase the preventive role of nutrition in the prevention of various diseases. The restraining factor of a narrow assortment of vegetable sauces, in our opinion, is that sauces are used in small quantities, and cooking requires manpower, time, equipment, electricity and others. Therefore, many catering enterprises pay little attention to the preparation of these types of culinary products.

Considering the above mentioned, to solve the problems of increasing the assortment of vegetable sauces, it is necessary to establish a centralized production of semi-finished vegetable pasta sauces. This would help mechanize the production of sauces, expand the range, improve the quality and increase the nutritional value of sauces. Based on the above mentioned, we have developed the technology of semi-finished vegetable pasta sauces [2, 3, 4]. These semi-finished products were new products and we found it necessary to study their organoleptic and physico-chemical characteristics.

Organoleptic analysis of semi-finished sauces pastas was carried out in the laboratories of the department «Food Technology» of Namangan Engineering and Technology Institute. When conducting research on the organoleptic characteristics of semi-finished sauces, we used a rating system according to the degree of importance of the indicators.

When conducting an organoleptic analysis of the quality of semi-finished vegetable sauces and ready-to-eat sauces, they were evaluated by the following indicators: appearance, color, texture, smell and taste.

The appearance of semi-finished vegetable sauces has a decisive physiological and psychological significance. When choosing dishes, the consumer is mainly guided by visual assessment. If during the design of dishes the form is broken or carelessly formed and an unusual color appears, it may indicate damage of the product.

Another important indicator of the semi-finished products of vegetable sauces and their derivatives is the smell. During the preparation of semi-finished vegetable sauces, a bouquet-smell was formed, which was formed during the technological process of the product under the influence of complex chemical transformations.

One of the important indicators of the quality of vegetable semi-finished sauces and its derivatives is consistency. When studying the consistency of vegetable semi-finished sauces, we examined the degree of importance of the state of aggregation (liquid, solid, pasty). These two indicators in the developed semi-finished products met the requirements, as the semi-finished products had a pasty consistency, and the prepared sauces prepared from these semi-finished products had a uniform consistency.

The main indicator of the quality of semi-finished vegetable sauces and sauces prepared from these semi-finished products according to organoleptic indicators is taste. The added sauce prepared from semi-finished products should make up and improve the taste of consumed dishes. The taste indicators of sauces met the requirements and were characteristic of this type of sauces. The results of organoleptic analysis are shown in table 1.

Table 1

Organoleptic characteristics of semi-finished vegetable sauces

	Name of private qualities	Semi-finished products of vegetable sauces
	Taste and odor	Pure, pronounced, characteristic for this type of vegetable and used for the preparation of raw materials, without extraneous tastes and smells
	Consistency	Pasty, uniform throughout the mass
	Color	Uniform, characteristic for this type of semi-finished vegetable sauces

For a complete picture of the nutritional value of semi-finished vegetable sauces, we examined some physical and chemical indicators. The study was carried out jointly with the Institute of Plant Chemistry of the Academy of Sciences of the Republic of Uzbekistan. Here are the results of a study of the physico-chemical parameters of vegetable semi-finished pasta sauces (table 2).

The main physico-chemical parameters of semi-finished vegetable pasta sauces

№	Name of indicators	Semi-finished pasta sauces		
		Tomato sauce	Gluten-free vegetable sauce	Pumpkin sauce
1	Mass fraction of total carbohydrates, %	1,7	3,2	5,25
	fiber, %	2,4	5,3	3,8
2	Mass fraction of lipids, %	1,65	0,92	2,12
3	Mass fraction of proteins, %	3,71	3,57	7,4
4	Solids, %	39,28	38,00	40,00
5	Acidity, %	0,61	1,07	0,85
6	Mass fraction of sodium chloride, %	1,25	1,17	1,12
7	Mass fraction of vitamin C, %	38,16	30,0	18,0
8	Energy value, Kcal / kJ	36,76/151,98	31,04/144,54	52/285,92

The solid content in the samples was in the range of 38–40% shows as the data in table 2. Moreover, its maximum content in the semi-finished pumpkin sauce is 40%, and the minimum content in the semi-finished vegetable sauce without gluten is 38%. The mass fraction of lipids in the semi-finished products of vegetable pasta sauces was in the range of 0.92% to 2.12. The highest content can be seen in the semi-finished pumpkin sauce, its content was 2.12%. The high lipid content in the semi-finished product of pumpkin sauces can be explained by the fact that in the process of preparation, a mixture of pumpkin and sunflower seeds was added to the preparation of this semi-finished product. As it is known, seeds are rich in fats and consist mainly of unsaturated fatty acids. These components not only enrich them with unsaturated fatty acids, but also contribute to the good absorption of carotenoids in the pulp of the pumpkin, providing our body with carotene. Unsaturated fatty acids that are contained in seeds, unlike saturated ones, help to remove cholesterol from the body and in addition they participate in the exchange of other nutrients, for example, helps the absorption of vitamins A and D.

As the studies showed, the protein content in semi-finished vegetable sauces is in the range of 7.4–3.87%. The highest protein content in semi-finished pumpkin sauce is up to 7.4%. This can be explained by the fact that the seeds of pumpkin introduced into the pumpkin sauce recipe are rich in proteins and, in addition, chickpea flour, which is also a source of proteins, was used as a thickener. The protein content in chickpea flour is up to 22.4% [4].

The significant content of lipids and proteins in semi-finished products of tomato, vegetable gluten-free and pumpkin vegetable sauces can also be explained by the fact that during the preparation, semi-finished broth for sauces from poultry was used as a liquid base. As you know, this semi-finished broth is also rich in lipids and proteins, which contributed to the enrichment of developed products with these nutrients.

As can be seen from the data in table 2., in terms of carbohydrate content, the high rates in pumpkin sauces is 5.25%, and the fiber index is 5.25 and 4.3%, it is important because sauces are fillers of dishes, enriching them with vegetable fiber, which stimulates digestion. Acidity, sodium chloride and vitamin C content were also studied in the samples.

Acidity in samples of semi-finished vegetable sauces – pastes was in the range of 0.61–1.07%, which meets the requirements of the standards.

The salt content is also in the range of 1.12–1.25%. It also meets the requirements of standards and salt has a preservative effect when storing developed products.

The highest content of vitamin C in the semi-finished tomato sauce was up to 38.6 mg / 100 ml, and in the remaining samples it was from 0.7 to 30 mg / 100 ml, respectively.

The energy value of semi-finished products was also calculated. These indicators also indicate that these fillers have low energy value, while enriching the consumed dishes with various nutrients, minerals, vitamins, increasing their nutritional value and medicinal properties.

Conclusions. The studies of the quality indicators of semi-finished vegetable pasta sauces show that they have good organoleptic characteristics. According to physical and chemical parameters, they contain solids from 38-40%, carbohydrates 1.7-5.25%, fiber 2.4-5.3%, lipids 0.92-2.12%, proteins 3.71- 7.4%, acidity 0.61-1.07%, sodium chloride 1.12-1.25%, vitamin C 18-38.16% and has a low energy value ranging from 31.04-52.7 kcal / 100g. The use of vegetable sauces in catering establishments helps to expand the assortment of sauces to increase the nutritional value, enrich the consumed dishes with minerals, vitamins, dietary fiber, which favorably affect the metabolic processes of the body. The use of various components in the formulation of semi-finished vegetable sauces increases their prophylactic and therapeutic properties.

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