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Research on the Quality Indicators of Semi-Finished Vegetable Sauce-Pastes

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Abstract: The article examines the results of studying the quality indicators of semi-finished vegetable sauce-pastes. Organoleptic characteristics were investigated, physicochemical properties were analyzed, and the energy value of semi-finished vegetable sauce-pastes was calculated.

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

Introduction: In the years of independence, significant work has been done to improve living conditions, with special attention paid to organizing and supplying food products with enhanced nutritional and biological value. Considering that the main source of raw materials for the food and processing industries is agriculture, the leadership of our independent country has devoted particular attention to the development of this sector. Today, the results of reforms can be observed on the shelves of shops and markets, as fruit and vegetable products have become high-quality, diverse, and inexpensive. During periods of mass ripening, prices drop to very low levels.

Despite this abundance of fruits and vegetables, according to the Ministry of Health of the Republic of Uzbekistan, the population does not consume these products in quantities that meet the physiological norms recommended in dietary guidelines [1]. Uzbek cuisine is indeed tasty, caloric, and diverse, and the population consumes large amounts of carbohydrate-rich foods. Therefore, today one can observe the growing prevalence of diseases such as obesity, diabetes, and hypertension. All of these are consequences of improper nutrition and failure to follow dietary guidelines.

If the population’s diet contained a sufficient amount of fruits and vegetables, the body would receive adequate vitamins, minerals, dietary fiber, and pectin. These components stimulate metabolism: dietary fibers help improve metabolic processes, prevent various diseases, and

supply the human body with essential vitamins and minerals, since the absorption of these components is interconnected.

After analyzing the menus of public catering establishments, we noticed that the assortment of sauces consumed is very limited, and mainly only tomato sauce is prepared. In our opinion, expanding the assortment of various vegetable sauces would increase vegetable consumption, enrich prepared dishes with minerals, vitamins, dietary fiber, and improve metabolic processes, enhancing the preventive function of nutrition in preventing various diseases.

A limiting factor in the narrow assortment of vegetable sauces, in our view, is that sauces are used in small quantities, while their preparation requires labor, time, equipment, electricity, etc. Therefore, many public catering enterprises pay little attention to preparing such culinary products.

Taking the above into account, in order to solve the problem and increase the assortment of vegetable sauces, it is necessary to establish centralized production of semi-finished vegetable sauce-pastes. This would promote mechanization of sauce production, assortment expansion, improved quality, and enhanced nutritional value. Based on the above considerations, we developed technologies for producing semi-finished vegetable sauce-pastes [2,3,4]. Since these semi-finished products are new, we considered it necessary to study their organoleptic and physicochemical indicators.

Materials and Methods of Research

The following materials were used in the research: tomatoes, sweet bell peppers, pumpkin, carrots, poultry heads, feet, and backbone, wheat flour, rice flour, chickpea flour, onions, and pumpkin and sunflower seeds. All products met the requirements of GOST and OST standards.

To assess quality, the following methods were used:

Organoleptic analysis using the Tilgner method (5) Dry substances by refractometric method(6) Acidity according to GOST (7) Determination of carbohydrate content according to GOST (8) Determination of fat content according to GOST (9) Determination of protein content according to GOST (10) Determination of chloride content according to GOST (11) Determination of vitamin C content according to GOST (12)

Results and Discussion :Organoleptic analysis of the semi-finished sauce-pastes was carried out in the laboratories of the “Food Technology” Department of the Namangan Engineering-Technological Institute. A point-based evaluation system was used, taking into account the importance of each indicator.

During organoleptic evaluation of the quality of vegetable sauce semi-finished products and ready-to-eat sauces, the following indicators were assessed: appearance, color, consistency, aroma, and taste.

The appearance of semi-finished vegetable sauces has a decisive physiological and psychological influence. When choosing dishes, consumers primarily rely on visual evaluation. If the shape is distorted or the appearance is sloppy, or if the color is abnormal, this may indicate spoilage.

Another important indicator of the developed semi-finished vegetable sauces and their derivatives is aroma. During the preparation of the semi-finished products, a bouquet-aroma was formed as a result of technological processing, influenced by complex chemical transformations.

One of the key indicators of the quality of vegetable sauce semi-finished products and their derivatives is consistency. When evaluating consistency, we examined the aggregate state (liquid, solid, paste-like) according to the degree of importance. These indicators met the required standards: the semi-finished products had a paste-like consistency, while the ready-to-use sauces prepared from them had a uniform consistency.

The main indicator of the quality of vegetable sauce semi-finished products and sauces prepared

from them is taste. The added sauce prepared from the semi-finished product should complement and enhance the taste of the dishes consumed. The taste characteristics met the requirements and were typical for the corresponding types of sauces.The results of the organoleptic analysis are presented in Table 1.

Table 1. Organoleptic Indicators of Vegetable Sauce Semi-Finished Products

№	Name of Specific Quality	Semi-finished products of vegetable sauce
1	Taste and smell	Distinctly expressed, characteristic of the given type of vegetables used for preparation; free from foreign tastes and odors
2	Consistency	Paste-like, uniform throughout the entire mass
3	Color	Uniform, characteristic of the given type of vegetable sauce semi-finished products

For a complete understanding of the nutritional value of semi-finished vegetable sauces, we investigated some physicochemical indicators.

The research was conducted jointly with the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan.

We present the obtained results of the study of the physicochemical indicators of semi-finished vegetable sauce pastes (Table 2).

Table 2. Main physicochemical indicators of vegetabe sause- paste semi finished products

Nu	Name of Indicators	Semi-finished products of sause-paste		
		Tomato sause	Gluten-free Vegetable sause	Pumpkin sause
1	Mass fraction of total carbohydrates % Including dietary fiber %	1,7 2,4	3,2 5,3	5,25 3,8
2	Mass fraction of lipids. %	1,65	0,92	2,12
3	Mass fraction of protein. %	3,71	3,57	7,4
4	Dry matter. %	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 , kkal /kJ	36,76/151,98	31,04/144,54	52/285,92

As the data in Table 2 show, the dry matter content in the studied samples ranged from 38-40%. The maximum content was in the pumpkin sauce semi-finished product at 40%, and the minimum content was in the gluten-free vegetable sauce semi-finished product at 38%. The mass fraction of lipids in the semi-finished vegetable sauce pastes ranged from 0.92% to 2.12%. The highest content can be seen in the pumpkin sauce semi-finished product, at 2.12%. The high lipid content in the pumpkin sauce semi-finished product can be explained by the fact that during preparation, a mixture of pumpkin and sunflower seed meal was introduced into the recipe. As 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 found in pumpkin pulp, providing our body with carotene. Unsaturated fatty acids, contained in seeds, unlike saturated ones, contribute to the removal of cholesterol from the body and, moreover, participate in the metabolism of other nutrients, for example, promoting the absorption of vitamins A and D.

As the conducted research showed, the protein content in the semi-finished vegetable sauces ranges from 3.57% to 7.4%. The highest protein content is in the pumpkin sauce semi-finished product, up to 7.4%. This can be explained by the fact that the seed and pumpkin meal introduced into the pumpkin sauce recipe is rich in proteins, and furthermore, chickpea flour was used as a thickener, which is also a source of protein. The protein content in chickpea flour is up to 22.4% [4].

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

As can be seen from the data in Table 2, in terms of carbohydrate content, high rates are observed in the pumpkin sauce (5.25%), and the dietary fiber indicator is 5.3% and 3.8% respectively, which is important because sauces serve as fillers for dishes, enriching them with plant fiber that stimulates digestion. Acidity, table salt content, and vitamin C were also studied in the samples.

The acidity in the samples of semi-finished vegetable sauce pastes ranged from 0.61% to 1.07%, which meets the requirements of the standards.

The table salt content is also within the range of 1.12-1.25%. It also meets the requirements of the standards, and table salt has a preservative effect during the storage of the developed products.

The highest vitamin C content is in the tomato sauce semi-finished product, up to 38.16 mg/100g, while in the other samples it was from 18.0 to 30.0 mg/100g, respectively.

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

Conclusions: The study of the quality indicators of semi-finished vegetable sauce pastes shows that they have good organoleptic indicators. According to physicochemical indicators, they contain dry matter from 38-40%, carbohydrates 1.7-5.25%, dietary fiber 2.4-5.3%, lipids 0.92-2.12%, proteins 3.57-7.4%, acidity 0.61-1.07%, sodium chloride 1.12-1.25%, vitamin C 18.0-38.16 mg/100g and have low energy value ranging from 31.04-52.7 kcal/100g. The use of vegetable sauces in public catering establishments contributes to the expansion of the sauce assortment, increased nutritional value, enrichment of consumed dishes with minerals, vitamins, and dietary fiber, which favorably affects the body's metabolic processes.

The use of various components in the recipe of semi-finished vegetable sauces enhances their preventive and therapeutic properties.

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