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## **PUMPKIN FLOUR PASTE FOR FUNCTIONAL NUTRITION**

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The problem of providing high-quality and safe food, protecting and promoting the health of the nation has been and remains one of the global challenges at all stages of the development of human society. Functional food products are becoming increasingly popular these days. They help maintain health and performance, prevent the development of many diseases, prolong life expectancy [1].

The health status of the population of Kazakhstan is currently characterized by negative trends: indicators of physical development and health of children of all age groups are declining, morbidity and mortality of the adult population have increased. Healthy nutrition is one of the fundamental factors in the prevention and treatment of diseases. The cause of many diseases, in particular iron deficiency anemia (IDA), is a violation of the principles of balanced nutrition.

Anemia is considered one of the acute public health problems both in the world and in Kazakhstan. In the prevention of anemia, an important place is taken by products with the addition of functional dietary supplements with prophylactic and therapeutic properties based on meat, which makes up for the deficiency of vital substances, improves the physiological processes of the body, increases resistance to diseases, and help maintain an active lifestyle.

The growth of the global market for functional foods is explained by consumer demand - the desire to optimize health through food. The domestic food market does not meet public demands for the release of new food products with desired qualities.

One of the directions for increasing the assortment and improving the quality of meat products is the integrated use of raw materials of animal and vegetable origin. Of particular note is the question of the maximum use of raw materials, the production of which is cost-effective in a particular region.

The development of technologies for meat and vegetable products of a new generation, enriched in raw materials with high biological and technological potential, contributing to the prevention of diseases, increasing the life expectancy of people, and improving working capacity are highlighted in the works of many domestic and foreign scientists [2, 3].

Given the current problems of the economy, new approaches in the field of meat technology and healthy human nutrition, it is extremely urgent to develop new technologies for high-quality meat and vegetable products, which rationally

use regional meat and vegetable raw materials, existing production facilities and equipment, due to which the finished product has a low-cost price. The introduction of such technologies to produce a product with desired properties is beneficial for manufacturers and meets modern consumer requirements [4].

This research aims to develop a technology of meat and vegetable pastes based on offal with the addition of pumpkins for the functional nutrition of people predisposed or suffering from IDA.

The development of the technology of functional meat and vegetable paste based on offal with the addition of pumpkins, characterized by a balance of amino acid and fatty acid composition, high content of animal protein, macro- and microelements, rich vitamin composition is an urgent problem and meets the goals and objectives of the state policy in the field of healthy nutrition of the Republic of Kazakhstan.

Pumpkin (*Cucurbita maxima*), a member of the Cucurbitaceae family, is grown under a wide range of agro-climatic conditions in Kazakhstan. It is considered as the marvel of the vegetable world due to its unusual and extravagant characteristics. When ripe, the fruit is sweet with yellow or orange flesh and a valuable source of carotenoids and ascorbic acid [5]. Besides, being nutritionally rich, pumpkin also possess many medicinal properties. The pulp of the fruit is considered sedative, emollient and refrigerant [6].

The research part of the work included the development of paste formulas for functional purposes, the development of meat and paste formulations functional orientation and determination of the main quality indicators in prototypes. The research work was carried out in the experimental-production workshop for meat processing and production of meat products of the university.

The technological process for preparing beef liver paste with pumpkin consists of the following steps.

1. Acceptance of raw materials: the raw materials obtained for production are checked following current technical specifications and standards.

2. Preparation of raw materials and auxiliary materials: the beef liver is thawed in a defroster at an air temperature of 18 - 22°C. The liver is thoroughly thawed, integument films, bile ducts, calcareous and other inclusions are removed. After trimming, soak in running water for 2 hours to remove blood clots. Cut the raw venous liver into slices and blanch (water to a liver ratio 3: 1) for 25 minutes. Blanch each serving of liver in freshwater by immersing in boiling water. After blanching, rinse the liver with cold water and, secondly, live.

3. Cooking pasta. Soy flour is pre-mixed with bone broth. Grind the blanched liver on top through a wire rack with 2 mm holes and cut it for 20 minutes, adding fried onions, sweet red pepper, refined beef fat with bones, containing spices, vegetable lecithin, vitamin E, bones with soy flour dissolve salt in it. At the end of the cut, the paste should be homogeneous, pasty, smeared with small grains of red bell pepper. Cooked pasta immediately sent to the packaging. Storage of cooked pasta for more than 30 minutes is not allowed.

4. Filling and capping. Use metal lacquered cans for packaging. Insert the paste into pre-cooked clean jars. Immediately fill the cans with vacuum sealants.

Rinse sealed cans with warm water, then place in autoclave nets and send for sterilization.

5. Sterilize after capping. Between banks for capping and their sterilization no more than 30 minutes. After that, the banks are cooled and sent for storage and further sale.

Depending on the capabilities of the laboratory base of the department, we determined organoleptic and physicochemical indicators.

In the formation of demand for a product, a decisive role is played by organoleptic indicators, while its chemical composition and nutritional value by most consumers are taken into account only secondarily. The assessment of these properties is carried out by the organoleptic method.

There are several methods of organoleptic analysis. The first group of methods is distinguishing, used in the organoleptic analysis to detect differences between the two products. Practically used to compare the level of quality (that is, for example, which product is more salted), selection of equivalent products, determination of product defects, research on the replacement of ingredients.

The second group of methods of organoleptic analysis - methods using scales and categories. This is a rank method, a grouping method, a rating method or a scale method, a point method or a scoring method, and a sorting method.

The third group is the descriptive methods of sensory analysis. They are based on the fact that the sensory properties of a product consist partly of precisely defined aromatic, taste and other characteristics and part of a combination of characteristics that are not individually determined. Practically applied to improve or develop products, study the effects of aging products, determine production standards, compare products with others available on the market. When assessing organoleptic indicators, qualitative methods were used, which are a description of the appearance, color, texture, taste, and smell.

Samples were stored at a temperature of 2 – 6°C; analyzes were performed 8 hours after fabrication. The temperature of the samples of meat and vegetable paste for tasting was - plus 5°C.

During conducting an organoleptic assessment, it was necessary to note defects of taste and smell (sharp, bitter, with extraneous taste and aroma, sour, lack of aroma, empty, unexpressed taste, too salty, oxidized), defects of appearance (atypical color or shade, wrinkling, surface disturbance), defects of consistency (mucous, granular or granular, too dense, not dense). Samples were stored at a temperature of 2 – 6°C; analyzes were performed 8 hours after fabrication. The temperature of the samples of meat and vegetable paste for tasting was - plus 5°C.

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Table 1 - Organoleptic characteristics of a beef liver paste with pumpkin

The name of indicators	Characteristic
Appearance	A uniform finely groundmass with a small amount of melted fat and broth
Color	Gray to cinnamon gray
Smell and taste	Pleasant, without the extraneous, characteristic of meat paste, with aromas of spices, without extraneous smell and taste
Consistency	Paste shaped, uniform throughout the mass
Foreign matter	Not allowed

The determination of the quantitative content of protein is one of the most important indicators of product quality, which determines its nutritional value, is the protein content. The physic-chemical characteristics of the paste are shown in Table 2.

The nutritional value of 100 g of the paste is 206,55 Kcal. Table 2 in bold indicates substances that provide a daily requirement of 50% to 80%. Vitamins and minerals are highlighted in green, the daily supply of which is more than 80%.

Table 2 - Calories, vitamins, minerals, prepared paste with pumpkin

Indicators	Daily ration (result)	Percent Daily Requirement
Calorie content	1212 Kcal	
Protein	95 g	
Fats	69 g	
Carbohydrates	52 g	
Cellulose	11 g	
Vitamin A	42585 mcg	<b>4259%</b>
Vitamin B1	1.73 mg	<b>115%</b>
Vitamin B2	11.16 mg	<b>620%</b>
Vitamin C	204 mg	<b>291%</b>
Vitamin E	28 mg	<b>280%</b>
Vitamin PP	67.9 mg	<b>339%</b>
Potassium	2259.5 mg	<b>90%</b>
Calcium	166.5 mg	17%
Magnesium	153 mg	38%
Phosphorus	1733 mg	<b>173%</b>
Sodium	538 mg	22%
Iron	36.9 mcg	<b>264%</b>

The table shows that the paste from beef liver, enriched with pumpkin, is rich in vitamins A, B<sub>1</sub>, B<sub>2</sub>, C, E, PP and minerals potassium, phosphorus and iron.

Thus, the prospects for the further development of offal pastes, due to the use of some cheap sources of fiber, such as pumpkin, can find growing popularity in the field of functional nutrition.

At any level of economic development of the meat industry, pastes of the middle price segment are in quite wide demand due to the lack of the need to cook before use for food.

Currently, as a result of constantly growing competition, it is necessary to create new generation recipes and technologies for food products. Products made using raw materials that make up the shortage of essential substances (protein, dietary fiber, vitamins, minerals, etc.) increase the body's resistance to extreme situations, normalize mental and physical performance. In this regard, the theme of the research work is relevant.

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