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# Production Technology of Beverage with Functional Significance from Pumpkin Fruits

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**Abstract:**
it is known that pumpkin fruits have a rich mineral and vitamin content. The pulp of pumpkin fruits is rich in dietary fibers; therefore, they are used in the production of a wide range of functional food products. In this article, a technological scheme for producing a nutritious, functional drink from pumpkin fruits is developed. The amount of dry matter in the resulting drinks is equal to 14%, which fully satisfies the daily consumption of these substances.

**Keywords**: pumpkin, proper nutrition, functional food products, micronutrients, vitamins, juice, technological process.

## Introduction

One of the most important and decisive factors for human health for thousands of years is proper nutrition. Nevertheless, due to the destruction of the ecological environment, as well as the rapid growth of industrial sectors, the problem of providing the population with quality food is becoming more and more difficult to solve.

As a result, we are increasingly unable to satisfy the body with the required nutrients. Therefore, increasing the nutritional value of daily consumed food products is becoming an increasingly urgent issue.

In the diet of the residents of Fergana region, the carbohydrate diet is dominant, and the level of protein consumption is low. Consumption of fish and fish products remains below recommended standards by 33.8%, consumption of milk and milk products by 54.9%, and consumption of meat and meat products by 74.4%. The lack of micronutrients in the diet of the population, including a significant lack of vitamins and micronutrients, is confirmed by the fact that the consumption of fruit and vegetable products is 78% less than the recommended standards, and the consumption of fruits and berries is 42.5% less than the recommended standards. At the same time, it can be noted that the consumption of soft drinks is growing in the region. They are especially popular among the population such as young children and teenagers, as well as the elderly.

Therefore, today, in the conditions of modern food production, the development and assortment of food products, which reduce the risk of the origin and development of diseases and have a positive effect on human health, such as functional food products, remains an important direction.

In any country of the world, a mandatory condition for maintaining and strengthening

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human health is to provide the population with high-quality, harmless food. Regulatory documents aimed at the development of healthy nutrition have been adopted in our country at the legislative level.

Decree of the President of the Republic of Uzbekistan No. PF-5303 dated 16.01.2018 "On measures to further ensure food safety of the country", Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 37 dated 20.01.2022 "Further support for food producers in the Republic Resolution No. 85/52 of the Cabinet of Ministers of the Republic of Uzbekistan dated February 27, 2023 "On measures that cannot be delayed to maintain price stability in the domestic market and ensure the guaranteed supply of basic food products to the population" has been ratified.

The cited documents note that despite the positive trends in the population's diet, the death rate from chronic diseases is much higher than in most European countries, which is primarily related to the nutritional factor. Although a long time has passed since the adoption of this document, the development of the industry for the production of products intended for healthy eating remains an important issue.

In the context of the implementation of the concept of healthy nutrition for the population of our republic, the main attention is paid to scientific and technical educational institutions (universities) in the development and research of scientifically based recipes and technologies for the production of functional food products and to increase the literacy of the population in matters of healthy nutrition. The conducted studies show that the level of consumption of functionally important products in our Republic is relatively low, which, according to experts, is explained by the low interest of buyers in this group of goods. This situation has arisen due to insufficient awareness or general lack of information about functional food products among the population. In the framework of innovative activities, it is not only the development of functional products and the creation of conditions for their development, but also the customers of this type it is important to form a sense of preference in relation to the products, through which it is possible to provide the population of our country with healthy food products.

Pumpkin fruits are of great importance in the production of functional food products with a balanced composition.

Industrially grown pumpkin is a valuable source of a number of important biologically active compounds. Its fruits contain a lot of zinc, which is very necessary for the brain. Pumpkin is a dietary vegetable.

Pumpkin contains many vitamins and vitamin-like substances, especially vitamin C, which strengthens immunity and accelerates metabolic processes. Unlike citrus fruits, which contain 4 times more allergenic substances, 100 g of pumpkin contains 14 mg of vitamin C, but does not cause allergies.

The main share of dry matter of vegetables is digestible - mono - (glucose and fructose), di - (sucrose) and non-digestible polysaccharides (pectin substances). Simple sugars give pumpkin a sweet taste, they are considered the main source of energy and help in the absorption of nutrients. Sugars mainly consist of sucrose (2.9%). Pectin substances mainly consist of protopectin (1.1%), which provide the density of the pulp, expressed in large quantities, which determine the density of the pulp. Easily digestible carbohydrates

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contained in pumpkin fruits are necessary for the nutrition of all cells.

The biological value of the vegetable is not very high, because it contains 0.89% of proteins, most of which are not complete proteins. The mineral content is characterized by potassium, magnesium and small amounts of phosphorus and calcium. The vitamin value of pumpkin is related to the high content of beta-carotene, which is necessary for the growth and development of the body, the formation of the skeleton, epithelial cells and mucous layers of the eyes, breathing, digestion and normal functioning of the urinary tract.

Nutrient fibers of pumpkin serve as nutrient medium for anaerobic bacteria. They help digest food and prevent the development of pathogenic intestinal microflora, absorb harmful substances and remove them from the body, acting as an enterosorbent.

Pumpkin flesh also contains vitamins of group B. Vitamin B1 has a beneficial effect on the nervous system, improves heart function. Vitamin B2 affects the quality and formation of blood, improves vision, vitamin B3 helps with depression, high cholesterol and protects against various infections. This vitamin does not break down even during heat treatment of pumpkin, so pumpkin is useful in any form. Due to folic acid in pumpkin, erythrocytes and leukocytes are formed. Zucchini also contains the unique vitamin T, which helps the formation of platelets and regulates blood clotting. Vitamin E is a powerful antioxidant.

Zucchini also contains macroelements, including a large amount of potassium - 200 mg/100 g, which, in particular, has functions such as normalization of heart activity, removal of excess fluid from the body, as well as provision of the necessary amount of calcium and phosphorus necessary for the normal condition of bone tissue. does. Magnesium also regulates metabolic processes and is extremely useful for the nervous system.

Zucchini contains elements such as iron, iodine, zinc, manganese, copper and rare cobalt. It is thanks to these microelements that the immune system is activated, the work of the thyroid gland improves, and the brain and blood vessels are strengthened.

Pumpkin meat is a very light, low-calorie food product. Due to the presence of plant fibers and pectin in its composition, it is an excellent preventive measure against atherosclerosis. Pumpkin contains a lot of water and potassium powder, so it is a good diuretic.

Pumpkin flesh is widely used to create functional food products, including new types of products based on innovative processing technologies.

Research methods and objects: Prospects for the use of pumpkin raw materials as a source of food fibers, including pectin, vitamins, minerals and other components important for life in the production of functionally important products are very wide.

Obtained results and their discussion: The technological process of functional beverage production includes a number of sequential operations: receiving raw materials, washing, inspection, cleaning, cutting, blanching, rubbing, homogenizing, mixing components, packing and sealing. , to sterilize the drink.

Delivery of raw materials for processing. Raw materials for processing are sent to washing machines for washing.

Washing. The purpose of the process is to reduce the level of microbiological contamination of raw ash or removal of various impurities, soil residues, residues of toxic chemicals from the surface. During the washing process, it is necessary to avoid mechanical damage to the fruit, as this leads to the loss of soluble substances.



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Soil and other visible contaminants are washed from the surface of the raw material until it is completely cleaned. If the level of contamination of raw materials is high, it is recommended to freeze the fruits in running water.

Inspection is a technological operation in which the suitability of raw materials for a certain type of processing is visually determined, and at the same time, samples of raw materials unsuitable for processing are removed.

Quality control of raw materials is carried out on belt inspection conveyors and sorting conveyors.

During the inspection process, raw materials that do not meet the requirements of DAST, infected with diseases and pests, unripe, and other defective raw materials, as well as foreign impurities are removed.

In order to soften the flesh of the fruit, the raw material must be subjected to heat treatment by blanching. Pumpkin pieces are blanched in autoclaves with hot steam at a temperature of 95-105 °C for 10-20 minutes. Increasing the parameters of the process beyond the recommended values leads to the decomposition of vitamins and the deterioration of the taste of the product.

During blanching, a partial transfer of dry matter from the raw material to water occurs, so the blanched pumpkin is placed on sieves.

The water left over from blanching is used in the preparation of sugar syrup and is added during the multiplication, and the pumpkin is rubbed to give the mass a homogeneous consistency.

As a result of heat treatment of pumpkin, oxidizing enzymes that cause darkening of the product and deterioration of taste are broken down. Blanched raw materials should be cooled to a temperature of at least 70 ° C, as enzymes are inactivated as a result of cooling, and product darkening is prevented.

Apple fruits are crushed to facilitate the process of juice separation. During the crushing process, it is necessary to try to ensure that at least 75% of the pulp cells are crushed.

Apple fruits are crushed into particles of 2-6 mm size, depending on the density of the tissue and the type of press used. The denser the apple tissue, the smaller the pulp particles can be.

Apple fruits of technical maturity with a dense texture are crushed into particles of 2-5 mm size, and they should make up at least 75% of the total mass of the dense phase of the pulp. Prepared raw materials should be easily rubbed.

During the inspection process, raw materials that do not meet the requirements of DAST, infected with diseases and pests, unripe, and other defective raw materials, as well as foreign impurities are removed.

The starting mass is then fed to the homogenizer for homogenization.

Since the particle size of the crushed raw material is relatively large and consists of whole cells and groups of connective tissue fibers, the prepared mass must be homogenized, which leads to a decrease in the particle size and also to a decrease in the layering of the crushed mass.

As a result of the operations, we receive semi-finished pumpkin and apple products and use them in further production.

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Based on the experimentally established original combinations of the main and additional raw materials, a recipe was created that ensures the optimal balance of the main nutrients while maintaining the high taste characteristics of the finished product. Sugar has been removed from all developed recipes.

The correct use of components according to the recipe made it possible to obtain a preventive drink with a general healing and refreshing effect.

Deaeration of juice. In the process of production, the juice is significantly saturated with oxygen, which causes the breakdown of vitamins and oxidation, and as a result, darkens the finished drink and worsens its organoleptic properties.

Removing dissolved air and other gases from the beverage composition improves the quality of the product, prevents it from foaming during packaging, and ensures good preservation during storage.

Packaging. The produced drink is packed in glass bottles at a temperature of 90 °C, which are sent for hermetic sealing.

Sealing (Covering). Glass containers are closed with metal caps.

The final stage is sterilization, that is, heat treatment of cans at any temperature in order to kill microorganisms.

The data in Table 1 show that the organoleptic indicators of the manufactured beverage on the day of bottling and during the storage period correspond to the standard values.

Drink the color and aroma of ik is due to the presence of natural biologically active substances in the composition, and no fragrances, dyes or other dyes were used. The results of physico-chemical studies show that the produced drink meets the requirements of regulatory documents and contains a set of nutrients that meet the daily needs of the human body for biologically active substances.

Conclusion: The mass fraction of dry substances in the drink is 14%, which fully satisfies the level of daily consumption of these substances by a person. Taking into account that an adult's need for P-carotene is 4.8 - 6.0 mg per day and the need for vitamin C is on average 50 mg per day, the amount of 100 cm3 of the produced drink or juice meets the daily need for P-carotene by 100% and vitamin C and satisfies the existing demand by 50%.

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