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TECHNOLOGIES FOR THE PRODUCTION OF APPETIZERS WITH FUNCTIONAL PROPERTIES (Review article)

Abstract: The analysis of scientific and industrial activities on the development and production of appetizers, fruit pastes, nut pastes, and honey pastes is carried out. There are mainly appetizers, fruit, nut, and honey pastes from other countries present on the market of Kazakhstan, however, there are no local equivalents. The issue of selecting raw materials and enriching appetizers with local plant raw materials and extracts from them is considered. A review of the literature showed that a lot of research has been conducted in the field of extract production, but most of these studies are aimed at the pharmaceutical and cosmetics industries. Within the framework of the project No. BR24993031, it is planned to select local plant raw materials rich in BAS and convey a search for the gentlest methods of extracting BAS to subsequently use them in the production of thick vegetable pastes.
Keywords: local plant raw materials, appetizer, fruit, nut, honey pastes.

Introduction. When developing new types of functional products based on honey, it is necessary to consider numerous factors and limitations. To address such challenges, it can be worth paying attention to literature reviews using a systematic research methodology.

Currently, the issue of sufficient protein consumption for human replacement is under particular scrutiny across the CIS and overseas. In addition to proper meal consumption as per regulatory standards, protein is one of the vital components consumed by humans. Proteins have structural, hormonal, and protective functions and act as catalysts within the human body. To address the issue of protein deficiency, an alternative to traditional sources such as meat and dairy products is the use of non-traditional sources based on fruits, nuts, oilseed crops, and honey, which help strengthen the body's functional status [1]. The study of the functional properties of processed oilseed products, particularly various types of nuts, indicates that they can be used to produce confectionery pastes, which are valuable protein-rich food products.

The most effective measure in this direction is the enrichment of mass-consumption products with micronutrients. Confectionery products represent a promising and accessible category of such products. It is known that confectionery products are polysaccharide-based and generally high in sucrose with low or almost absent principal functional adjuncts – fibers, vitamins, and micro- and macro-elements – which belong to the disadvantages of the group. Therefore, the abilities to fortify and develop brand-new confectionery products as staple are vast [2, 3].

The research works by the authors [4] presents the results of research on the parameters affecting the process of producing dessert paste based on cedar wood meal and plant raw materials (dried fruits and berries). The production of the dessert paste was carried out using innovative technologies based on microwave energy input.

The study [5] developed a recipe for peanut paste that is balanced in terms of protein, carbohydrate, and fat composition. The researchers calculated the product's energy and nutritional value. Their goal was to improve the manufacturing technology to ensure the paste contained the highest possible amount of natural ingredients essential for proper nutrition, such as sugar, unsaturated fats, and easily digestible protein.

Article [6] provided the recipe and manufacturing technology for vegetable sauces. The authors analyzed the properties of vegetable sauce-paste semi-finished products via sensory testing, physicochemical, microbiological, and structural-mechanical properties. They evaluated the impact of the blending ratio on the rheological properties of the resulting product and examined the quality of the resulting sauce semi-finished products, which possessed fortifying properties and health benefits.

This research works of authors' [7] explores the possibility of using lingonberry (*Vaccinium vitis-idaea*) and cranberry (*Oxycoccus*) press residues in the production of homogenized pastes and marinades with enhanced microbiological stability. As a result of the research, a method for producing semi-finished pastes from frozen lingonberries and cranberry juice was developed. New recipes for homogenized vegetable pastes and marinades incorporating these semi-finished products were formulated using the residues of frozen berries. Based on preliminary studies, the optimal concentration limits of the recipe components were determined. For each component ratio, yield and acidity indicators were analyzed.

According to GOST R 52349-2005, a functional food product is a product intended for frequent use as a component of the diet by the entire healthy population. It maintains and improves health and reduces the

risk of diseases due to the composition of physiologically functional food components. They consist of biologically active and/or physiologically beneficial components which are safe to health, have certain physicochemical characteristics, and whose nature has been determined and confirmed by science. Furthermore, standards of daily consumption in food of these substances have been established. They include some substances such as dietary fiber, vitamins, minerals, polyunsaturated fatty acids, oligosaccharides, bifidobacteria, antioxidants, and others, either alone or as components of biologically active additives [8].

Among the most urgent assignments at the moment are the complete substitution of granulated sugar and molasses in food product recipes and the enrichment of the products with functional ingredients. To achieve that, it is recommended to utilize a natural sweetener – pure honey – and the products of fruit, nut, and oil-bearing crops.

It is known that honey is a valuable food product. Honey contains a complex of enzymes, phytoncides, vitamins, inverted sugars, and microelements [9].

In recent years, paste-like products of original compositions based on natural honey and honey products have been developed, but the issues of scientific substantiation of the recipes and technologies for their production have not yet been fully resolved.

The combination of honey with nuts and/or dried fruits allows for the creation of honey-based products with high biological value and unique organoleptic properties, which is highly desirable from both a consumer and marketing perspective. Expanding the production of such products requires the development and implementation of new technologies to ensure consistent product quality [10].

The production of functional food products is a relevant challenge for specialists in the domestic food industry. Currently, food production technologies are evolving under the growing influence of healthy nutrition principles. From a modern perspective, honey is classified as a health-promoting food, as it can be regularly consumed as part of the diet by all age groups of the healthy population. Its consumption helps reduce the risk of nutrition-related diseases, maintain, and improve overall health due to the presence of physiologically functional food ingredients [11].

The authors [12, 13, 14] have demonstrated the feasibility of preserving the properties of organic raw materials at all stages of the production process for health-promoting food products. They analyzed consumer demand for balanced plant-based foods in daily diets, allowing for a

generalized understanding of human dietary preferences. However, there are still questions about how to develop systematic approaches to measure the efficacy of raw material blending – formulated not just to increase nutritional value but also to streamline the manufacturing process.

Researchers from the United States have developed confectionery compositions in the form of macadamia nut paste, which includes defatted ground macadamia nut flour, cane sugar, honey, water, macadamia nut butter, vanilla, salt, and potassium sorbate (a preservative) [15].

A peanut paste made from nuts roasted to both darker and lighter degrees has also been developed by scientists from the United States. These nut-based spreads have relatively low viscosity while maintaining an intense nutty flavor [16].

Researchers from Switzerland have created a confectionery composition that includes a fruit and/or nut blend with a binding agent, a second layer containing ganache, and a third layer featuring a chocolate composition. This formulation offers a refined taste while maintaining a nutritional profile similar to snack bars associated with a healthy lifestyle [17].

There are known methods for obtaining a paste-like product with the addition of honey and nuts [18], homogenized vegetable pastes with the addition of medicinal plants – the rhizome of the umbrella russula, lingonberry extract, or cranberry extract [19, 20], with the addition of oilseeds - sesame [21], which differ in technology and the composition of functional components.

According to the research plan, a patent search related to this product was conducted across various countries, including China, Korea, Kazakhstan, Russia, Romania, USA, Japan, EPO with a depth of more than 10 years. In the subject of “Development of technology for producing healthy daily-consumption food products enriched with natural antioxidants and biologically active substances”, a considerable amount of patents were discovered in China and Kazakhstan. The patents are predominantly aimed at developing extraction technologies for medicinal plants for use in the pharmaceutical and cosmetic industries. The highest concentration of patents in terms of extract production was discovered in China and Russia. A patent literature search revealed 38 protection documents on this subject. 14 of them were revealed in China, 9 in the Russian Federation, 4 in the Republic of Kazakhstan, 3 in the USA and Korea, 2 in Japan and the European Union, and 1 in Romania.

An overview of the scientific and industrial activities associated with

the production and preparation of appetizers, fruit, nut, and honey pastes revealed that there has been a considerable amount of research in the field of extract production. Most of the studies, however, are predominantly focused on the pharmaceutical and cosmetic fields [22]. There is very little research into their use in the food industry.

An appetizer or paste is a small dish or snack that serves as a stimulating food, enhancing the body's intake of minerals and vitamins. A wide variety of nutritious ingredients are used to prepare appetizers, which are combined based on composition, flavor characteristics, presentation methods, design, and color combinations [23].

From the preliminary analysis of the market of appetizers, fruit, nut, and honey pastes, it is clear that the market of Kazakhstan is mainly replenished with these products due to expensive foreign manufacturers. The implementation of the project will allow the introduction of scientific research into production, which will lead to the replacement of imports. Currently, the market of Kazakhstan is mainly represented by appetizers, fruit, nut, and honey pastes from other countries, such as Russia, Turkey, China, the USA, and Germany, there are no local equivalents. However, due to high logistics costs, these products are becoming expensive and inaccessible to small and medium-sized enterprises, for private use. Also, the analysis of patent information search showed that the developed technologies for obtaining appetizers, fruit, nut, and honey pastes for the food industry are not used.

As part of project No. BR24993031, "Development of technology for preparing healthy food products for the daily diet, enriched with natural antioxidants and biologically active substances", the following activities are planned: selection of local plant raw materials rich in biologically active compounds, grown in the southern region of the country, as well as vegetable components with a high pectin content [24, 25]; search for the most gentle extraction methods for biologically active substances to be used in the production of thick plant-based pastes.

Conclusion. The development of new types of food products and the enrichment of existing ones is one of the most important tasks facing the food industry. Changes in lifestyle and a declining standard of living, associated with lower energy and food consumption, insufficient intake of vitamins and minerals, and the separate consumption of food and biologically active substances, have led to the development of functional food products. It is necessary to improve and expand the range of functional food products, such as appetizers made from fruit, nut, and honey pastes,

while also optimizing the use of scarce raw materials and reducing sugar content, which in turn lowers the energy value of food products. The solution to this problem is the use of local and non-traditional types of plant materials.

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ФУНКЦИОНАЛДЫҚ ҚАСИЕТТЕРІ БАР АППЕТАЙЗЕРЛЕРДІ ӨНДІРУ ТЕХНОЛОГИЯЛАРЫ (Шолу мақала)

Түйіндеме. Аппетайзерлерді, жеміс, жаңғақ және бал пасталарын әзірлеу және өндіру бойынша ғылыми және өндірістік қызметке талдау жасалды. Қазақстан нарығында негізінен басқа елдерден алып келінген аппетайзерлер, жеміс-жидек, жаңғақ және бал пасталары бар, жергілікті аналогтары жоқ. Шикізатты іріктеу және аппетайзерлерді жергілікті өсімдік шикізатымен және олардан алынған сығындылармен байыту мәселесі қаралды. Әдебиеттерге шолу сығындыларды алу бойынша көптеген зерттеулер жүргізілгенін көрсетті, бірақ бұл зерттеулердің көпшілігі фармацевтика және косметика салаларына бағытталған. № BR 24993031 жобасы аясында: БАЗ-ға бай жергілікті өсімдік шикізатын іріктеу және оларды қою өсімдік пасталарын өндіруде қолдану үшін БАЗ-ды экстракциялаудың неғұрлым жұмсақ әдістерін іздеу жоспарлануда.
Түйінді сөздер: жергілікті өсімдік шикізаттары, аппетайзер, жеміс, жаңғақ, бал қосылған пасталар.

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ТЕХНОЛОГИИ ПРОИЗВОДСТВА АППЕТАЙЗЕРОВ С ФУНКЦИОНАЛЬНЫМИ СВОЙСТВАМИ (Обзорная статья)

Аннотация. Произведен анализ научной и производственной деятельности по разработке и производству аппетайзеров, фруктовых, ореховых и медовых паст. На рынке Казахстана в основном присутствуют аппетайзеры, фруктовые, ореховые и медовые пасты из других стран, отсутствуют местные аналоги. Рассмотрен вопрос отбора сырья и обогащения аппетайзеров местным растительным сырьем и экстрактами из них. Обзор литературы показал, что проведено очень много исследований в области получения экстрактов, однако большинство данных исследований направлено на фарминдустрию и косметическую промышленность. В рамках проекта № BR24993031 планируется: отбор местного растительного сырья богатых БАВ и поиск наиболее щадящих методов экстрагирования БАВ для их применения в производстве густых растительных паст.
Ключевые слова: местное растительное сырье, аппетайзеры, фрукты, орехи, медовые пасты.

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