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THE USE OF FOOD ADDITIVES AND INGREDIENTS IN THE PRODUCTION OF CANNED MEAT AND VEGETABLE PRODUCTS

ВИКОРИСТАННЯ ХАРЧОВИХ ДОБАВОК ТА ІНГРЕДІЄНТІВ У ВИРОБНИЦТВІ М'ЯСО-РОСЛИННИХ КОНСЕРВІВ

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Abstract. *The use of fiber in canned meat and vegetable products, especially when using fatty raw materials, improves organoleptic characteristics, i.e. reduces the taste of fat, and also significantly reduces the cost of finished products. Vegetable fibers are used as a functional ingredient to improve the structure, reduce rejects, and significantly reduce the calorie content of the product. The addition of just 2% of dietary fiber significantly increases the water binding rate in the food system. Dietary fiber opens up opportunities to preserve traditional recipes and technologies while maintaining the stable quality of the finished product with reduced calories and not using food additives with the E index. Modern technologies widely use structural polysaccharides of brown seaweed - alginates, which are also representatives of dietary fiber, however, in addition to prebiotic properties, they are able to bind and remove strontium and cesium radionuclides from the body, i.e., have a pronounced radioprotective effect.*

Key words: *dietary fiber, water binding, canned meat and vegetable products, caloric content, body, antioxidants.*

In recent years, the human diet has been characterized by a lack of consumption of coarse-fiber plant foods, the so-called dietary fiber. Dietary fiber affects the metabolism of lipids, carbohydrates, amino acids, proteins, and minerals, regulating human health. They remove harmful substances from the body, including toxic elements, nitrates, nitrites, pesticides, phenols, etc. Dietary fibers are used to add ballast substances to the human diet that improve digestion, enhance the taste of the product, promote the binding of moisture and fat, create a certain structure of the finished product, and improve the consistency [2].

The use of fiber in canned meat and vegetable products, especially when using fatty raw materials, improves organoleptic characteristics, i.e. reduces the taste of fat, and significantly reduces the cost of finished products. Vegetable fibers are used as a functional ingredient to improve the structure, reduce rejects, and significantly reduce the caloric content of the product.

It has also been proven [4] that dietary fiber is a real gastrointestinal tract cleanser. Fiber improves digestion, improves intestinal motility, reduces cholesterol, lowers blood glucose levels, which in turn significantly reduces the risk of atherosclerosis and hypertension, diabetes mellitus and colon cancer. Regular consumption of dietary fiber stabilizes metabolism. For example, the daily intake of dietary fiber for an adult is 25-40 g per day. In case of active lifestyle, physical labor, sports, it is recommended to increase the dose of fiber. The FAO/WHO recommended daily intake of dietary fiber is 25-30 g per day [5].

According to nutritionists' recommendations, fiber intake is achieved by eating 1.5 kg of fruits and vegetables per day. However, since not everyone can do this, it is recommended to use foods that contain dietary fiber and eat more nuts, prunes, and bran. It should also be remembered that abusing foods rich in fiber is dangerous for health, as it can lead to unpleasant consequences (bloating, flatulence) [7].

Based on knowledge in the field of physiological norms of the needs of people of different ages, scientifically based recommendations for the composition and quality of canned meat and vegetable products using a variety of dietary fibers, their content ranging from 45 - 55 %.

Dietary fibers are divided into soluble and insoluble: plant polysaccharides, in particular inulin and pectin; seaweed polysaccharides, namely agarides, carrageenans and alginates; and polysaccharides of microbial origin, such as gums. The main functional properties of dietary fibers are high water-binding and water-holding capacity - from 1:3 to 1:7; reduced moisture migration into the product; thickener; stabilizer; thermal stability, neutral taste and odor.

The main functional feature of soy fiber is its high moisture- and fat-binding capacity. Since fiber fibers have a capillary structure, water is retained not only by their surface but also inside the capillary channels, resulting in evenly distributed moisture and firmly retained in the present three-dimensional framework, improving the structure of the finished product.

The addition of just 2 % dietary fiber significantly increases the water-binding capacity of the food system. As the liquid is transported into the cellulose fiber core via capillaries, the consistency is not adversely affected and thus product stability is ensured. Unlike most other water-absorbing agents, cellulose is insoluble in water and fat, which allows for good water binding while improving consistency. Today, both foreign and domestic manufacturers of dietary fiber are represented in Ukraine.

Functional and technological properties of this type of soy fiber include high moisture absorption and fat emulsifying ability; inertness to any recipe ingredients and thermal stability; enhancing the effect of emulsifiers, proteins, hydrocolloids; strong retention and uniform distribution of moisture and fat throughout the product structure; stabilization of the texture, shape-holding and strength properties of the product; protection against moisture loss during storage; extension of shelf life,

preservation of freshness and microbiological stability of products by reducing the water activity index; enrichment of food with ballast substances.

Table. - Content of fiber, pectin and dietary fiber in products semi-finished products

Product	Fiber, edible part %	edible part Pectin, %	Dietary fiber	
			total, % dry matter	soluble, % dry matter
Wheat bran	43,6	2,9	52,3	3,0
Wheat	2,4	0,2	14,4	4,3
Rye	1,9	0,6	14,9	2,3
Corn	2,1	0,6	11,6	1,5
Oats	10,7	3,0	11,8	1,8
Dry peas	5,7	1,3	23,4	4,9
Soybeans	4,3	0,2	37,6	8,2
Beans	3,9	0,2	34,5	5,8
Buckwheat groats	1,1	1,2	4,7	0,6
Millet	0,7	0,6	4,7	0,4
Rice	0,4	0,1	2,6	0,3
White cabbage	0,7	0,6	39,5	9,3
Potatoes	1,0	0,5	16,5	6,7

AlmaFiber 60 soy fibers bind water and fat well and quickly, retain them, and improve the structure of finished canned meat and vegetable products.

The use of soy protein fiber in the production of meat products does not require additional complex operations for its preparation and does not change the traditional production process. Dietary fiber opens up opportunities to preserve traditional recipes and technologies while maintaining the stable quality of the finished product with reduced calories and not using food additives with the E index.

Soy fiber, a product containing at least 80% edible dietary fiber and 20% crude protein, combines the benefits of soy proteins, which are closest in amino acid composition to muscle proteins, and dietary fiber, a unique new generation ingredient.

Consumption of natural food products derived from plant materials that have therapeutic and prophylactic properties, including radioprotective effects, is promising and relevant today. Despite the rather large number of different substances with radioprotective effects, their use for the production of food products is limited, mostly they are used in the production of food industry products.

Therefore, it was concluded that it is advisable to conduct studies of the use of dietary supplements with radioprotective effects, namely elamine, calendula cryopowder and wheat germ in the production of bakery products that could potentially have radioprotective properties [6,7].

The radioprotective effect of dietary supplements of elamine, calendula cryopowder and wheat germ is explained by the high content of micro- and macronutrients, vitamins, essential amino acids and other biologically active components, and elamine is also due to the high content of alginates, which have been proven to absorb salts of heavy metals and radionuclides. In addition, alginates, as dietary fiber, enhance intestinal motility.

In the production of modern meat products, it is important to reduce fat content and replace saturated fats with mono- and polyunsaturated fatty acids (ω-3 and ω-6). Partial replacement of fat with soluble and insoluble ballast substances is practiced, the use of which has a positive effect on intestinal function and digestion.

Numerous studies have shown the relevance of the use of dietary fiber for the formation of specified structural and mechanical characteristics, organoleptic characteristics, prolongation of shelf life of meat products with a guarantee of their quality (including in the "freeze-thaw" cycle), and the provision of therapeutic and preventive properties [2,].

Modern technologies widely use structural polysaccharides of brown seaweed - alginates, which are also representatives of dietary fiber, however, in addition to prebiotic properties, they are able to bind and remove strontium and cesium radionuclides from the body, i.e., have a pronounced radioprotective effect. [1].

Hydrobionts are relevant natural ingredients for the enrichment of meat products with an organic form of iodine [1, 3]. The therapeutic and prophylactic properties of kelp are known due to its high iodine content, 95% of which is in the form of organic compounds.

One of the most important components in the production of canned food is water, which affects many quality characteristics of meat and meat products during processing and storage. The salt composition of water is important and is regulated by standards. The use of water with an increased concentration of Ca2+, Mg2+, Mn2+, Fe2+ ions in technological processes can negatively affect the organoleptic evaluation (consistency, juiciness, color) and yield of the finished product [5].

Water and aqueous solutions that have undergone special treatment in a metastable state are called activated water (AW). Based on the results of laboratory studies of the process of obtaining activated water, an electroactivation water plant was developed. It can produce two activated solutions: an anolyte (pH 2.0...3.5) and a catholyte (pH 10.0...12.0) [7].

The use of innovative approaches, electrophysical and reagent-free methods of water or its solutions and liquid food systems treatment opens up opportunities for improving and reducing technological processes, improving product quality, and leads to the creation of advanced and competitive technologies that meet the concept of state policy in the field of healthy nutrition [3].

Numerous studies by scientists and producers today are devoted to the use of pulses in canning. Legume dishes are not inferior to cereals in terms of calories, and

even surpass them in terms of protein content (23%). However, it is known that legume proteins contain few amino acids, so combining them with meat raw materials is quite relevant. Legume dishes are rich in mineral salts, vitamins B, PP, and carotene. In terms of its composition, legume protein differs from most other vegetable proteins in its high mesine content.

Legumes contain 26-60% carbohydrates. Chickpea carbohydrates are represented by pectin, starch, mono- and poly-saccharides, in particular oligosaccharides, sucrose galactosides and galactomannose. Proteins of pulses are complete, balanced in terms of essential amino acids and are characterized by a high proportion of lysine and leucine. Chickpea seeds contain 8% fat, which is dominated by linolenic and oleic acids. Chickpea proteins are highly soluble in water (up to 62%) and are similar to animal proteins. Chickpea grain contains up to 30% protein, 5% fat, 48-56% nitrogen-free extractives, up to 5% fiber, and a number of vitamins (vitamin A - 0.19 mg, B - 0.29 mg, B1 - 0.51 mg, B6 - 0.55 mg, C - 3.87 mg, PP - 2.25 mg per 100 g of grain).

It is known that chickpeas help dissolve stones in the gallbladder and urinary bladder, open blockages in the liver and spleen, fuse bones after fractures, strengthen weakened lung function, eliminate colds and bronchial diseases, and help prevent pleurisy, the first stage of tuberculosis.

Insoluble chickpea fibers help cleanse the intestines of toxins, preventing the development of putrefactive processes and the growth of harmful bacteria, and provide easy bowel movements. The beneficial properties of chickpeas as a good source of antioxidants are also manifested in ensuring the health of the cardiovascular system. Its regular consumption reduces the risk of coronary heart disease by 15%, improves its functioning, and significantly strengthens the walls of blood vessels.

Products that contain a vegetable component in the form of chickpeas have a high moisture retention capacity, which has a positive effect on the product yield and its juiciness. The peculiarity of such technologies is the combination of proteins of plant and animal origin, which alone do not meet the formula for a balanced diet.

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Анотація. *Використання клітковини в м'ясо-рослинних консервах, особливо при використанні жирної сировини, покращує органолептичні показники, тобто зменшує присмак жирності, а також значно знижує собівартість готових виробів. Рослинні волокна використовуються в якості функціонального інгредієнта, що дозволяє поліпшити структуру, знизити брак, значно зменшити калорійність продукту. Додавання всього 2 % харчових волокон значно підвищує показник водозв'язування в харчовій системі. Харчові волокна відкривають можливості зберегти традиційні рецептури, технології при стабільній якості готового продукту зі зниженою калорійністю і не використовувати харчових добавок з індексом «Е». В сучасних технологіях широко використовують структурні полісахариди бурих морських водоростей – альгінати, які також являються представниками харчових волокон, однак, крім пребіотичних властивостей, вони здатні зв'язувати та виводити з організму радіонукліди стронцію і цезію, тобто, мають виражену радіопротекторну дію.*

Ключові слова: *харчові волокна, водозв'язування, м'ясо-рослинні консерви, калорійність,організм, антиоксиданти.*