

to it, consisting of a chemically modified indicator electrode, silver chloride electrodes, comparative and auxiliary electrodes.

Conclusions. The electro-analytical properties of sensors for determining vitamin B6 are usually related to the electrochemical properties of the vitamin itself and the changes that occur on the electrode during interaction with the vitamin. The literature describes the studies in the field of voltammetry aimed at the development of methods for determining vitamins in various objects using modified electrodes. The working electrodes can be modified to improve the analytical signal, detection range, sensitivity and selectivity of the voltammetric method. At the same time, modification of their surface can be carried out both with the help of organic and inorganic substances.

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DEVELOPMENT OF PRODUCTION TECHNOLOGY OF CEREAL BARS OF FUNCTIONAL PURPOSE WITH INCREASED CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES

Nowadays on the way to proper nutrition people encounter such problems as the quick pace of life and lack of time for healthy eating, which leads to replacing a full meal with irregular snacks, buying unhealthy fast food, various sweets etc. This, in turn, leads to various disorders of the digestive system. An effective mechanism of nutritional correction is enrichment of food products with biologically

active substances. Such products are cereal bars, which are a rich source of dietary fiber, vitamins and minerals, have a high nutritional value and are a source of proteins and carbohydrates [2].

The aim of this work was to develop and justify the recipe and technology of a functional cereal bar with an increased content of biologically active substances due to the enrichment of its composition with natural raw materials having functional properties.

The novelty of the work consists in the use of amaranth as the main raw material of the grain crop. Amaranth is a source of vitamins of groups B, C, E, PP, as well as of trace elements Ca, P, Mg, Fe, Se, Cu, Zn, K, Na. Amaranth contains about 14% of protein, which is several times higher than in most cereals. The seeds do not contain gluten, histamine, cholesterol. Instead, they contain alpha-linolenic acid (an omega-3 fatty acid) and linoleic acid (an omega-6 fatty acid). Amaranth contains lecithin, which is an important substance for the nervous and brain functions of the body, as well as amino acids, mainly lysine, methionine, and cysteine. Amaranth can be used as an additional source of pectin, which lowers the level of cholesterol in blood.

The use of amaranth seeds accelerates recovery in case of the lack of vitamins, hypertensive diseases, disruption of the central nervous system, skin diseases, obesity and disturbance of metabolism and endocrine system [1].

Our task was to develop a technology of functional cereal bars with an increased content of biologically active substances and to conduct assessment of organoleptic indicators, using analytical methods of research, as well as methods of mathematical data processing.

An analysis of the chemical composition and nutritional value of the raw materials of existing cereal bars, which are most often used in their production, was performed. The needs of the adolescent body in biologically active substances were analyzed. A review of information on the needs and shortages of basic vitamins and microelements, which can be partially compensated by the developed cereal bar with a functional purpose, was done.

A recipe model of a cereal bar with an optimal composition from the point of view of taste qualities, dietary properties, beneficial effect on the body, as well as the preparation method, was proposed. It should be noted that no baking technique was used in the manufacture of a cereal bar, the beneficial properties of all components were maximally preserved.

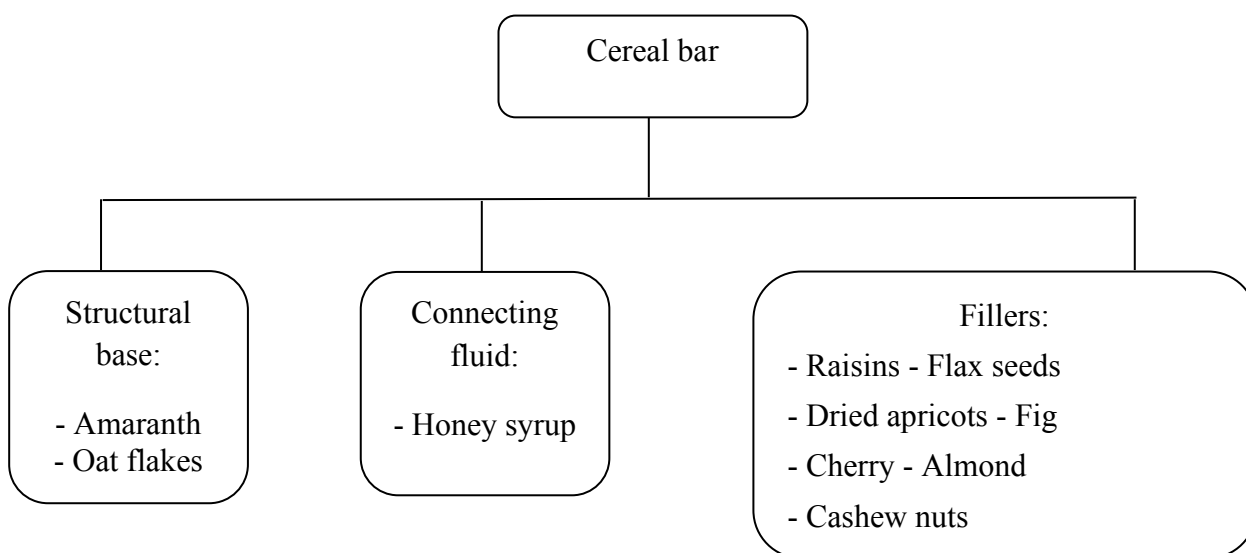


Fig. 1 – The structure of the bar

Table 1

Recipe for a functional cereal bar

Ingredient	X	Component content per 100 gr					Energy value, kcal
		Mass, g	Fats, g	Proteins, g		Water, g	
Amaranth	X ₁	300	7	13.6	58.6	11	1011.45
Oat flakes	X ₂	150	6.2	12.3	61.8	12	505.13
Flax seeds	X ₃	100	42.2	18.3	1.6	7	459.00
Cashew nuts	X ₄	100	48.5	18.5	22.5	5	594.88
Almond	X ₅	100	53.7	18.6	13	4	606.45
Raisins	X ₆	50	0.5	2.3	71.2	18	140.35
Dried apricots	X ₇	50	0.3	5.2	51	20	107.38
Fig	X ₈	50	0.8	3.1	57.9	16	118.36
Cherry	X ₉	50	0.2	0.8	10.6	84	22.38
Honey	X ₁₀	95	0	0.8	80.3	0	289.11
Water		90	0	0	0	100	0.00
Lemon juice		5	0.2	0.6	3.9	90	0.94
Rice paper	X ₁₁	10	0	5.8	77	0	31.20
In total, g		1150	159.6	99.9	509.4	367	3886
						100g	335
						40g	135

Optimization of vitamins and minerals in the composition of recipe was carried out – the content of vitamins and minerals in 40 g of the product is 229 mg, the compliance with the norm – 7.9%.

Flavour testing of the manufactured product was conducted using the method of organoleptic evaluation.

The study of organoleptic indicators of the developed products confirmed the high quality of bars with original taste properties, which can be recommended for industrial production and a wide range of consumers.

As a result of the work, a recipe for a cereal bar with a balanced composition of the main nutrients, a sufficient amount of trace elements and vitamins was developed. The proposed bar, when consumed up to three times a day, is able to provide up to 24% of the daily vitamin and mineral needs of adolescents under 17 years of age, and can be recommended as a functional food or healthy snack.

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COMPARATIVE CHARACTERISTICS OF ETHYL 4-NITROBENZOATE SYNTHESIS METHODS

Benzoic acid esters are widely used in various industries, such as perfumes, flavors, solvents, and plasticizers; in acrylic films, latex coatings, and polysulfide sealants [3]. Ethyl 4-nitrobenzoate is a semi-product in the chemical and pharmaceutical industry for the production of local anesthetics – novocaine (procaine, 2-ethylaminoethyl ester of 4-aminobenzoic acid) and anesthesine (benzocaine, ethyl ester of 4-aminobenzoic acid), which are also contained in pain relievers.