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Contemporary Research On the Production of Preventive Nutrition.

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ABSTRACT

In our country, nutritional status and food patterns are among the main factors determining the level of national development and life expectancy of citizens. One of the promising directions when solving this problem is consumption of foodstuffs, contributing to the improvement in immunity and maintenance of normal micro-ecological status in the human body, or rather having bio-correlative properties. The use of such type products in daily diet inhibits unwanted processes and allows improving the standard of health. The basic method in creating preventive nutrition foodstuffs is the search for and implementation into production of nonconventional herbal supplements with the technological and physiological functionality. The authors provide an overview of preventive nutrition foodstuffs.

Keywords: nutrition, prevention, confectionery products.

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INTRODUCTION

To date, the nutrition of the population is an important issue affecting the social and public spheres of life.

Nutrients from food provide the human body a plastic material and energy. They determine human health, physical and creative activity, life expectancy, and reproducibility. Across the country, nutritional status and food patterns are among the main factors determining the level of national development and life expectancy of the citizens [1].

The Russian Federation runs the state program aimed at preserving health and longevity by ensuring the needs of the human body for energy and nutrients. This includes approved legislative resolutions ensuring the implementation of the Concept in the field of nutrition, production of foodstuffs and health care [2].

One of the promising directions when solving this problem is consumption of foodstuffs, contributing to the improvement in immunity and maintenance of normal micro-ecological status in the human body, or rather having bio-correlative properties. The use of such type products in daily diet inhibits unwanted processes and allows improving the standard of health.

Changing the lifestyle of the population and decline or, conversely, raising the standard of living, associated with increasing consumption of food, inadequate intake of vitamins and minerals, accompanied by the separate use of foodstuffs and bio-affecting agents, led to the need of creating preventive nutrition foodstuffs [3].

The basic method in creating preventive nutrition foodstuffs is the search for and implementation into production of nonconventional herbal supplements with the technological and physiological functionality [4].

Each herbal supplement is characterized by the individual properties, which have a therapeutic and preventive effect against certain diseases [5].

Functional and preventive nutrition enhances the antitoxic function of individual body organs and systems, such as liver, lungs, skin, kidneys, etc. It helps improving the condition of the horny layer and the the function of sebaceous and sweat glands, reduces the permeability of the skin, mucous membranes of upper respiratory and gastrointestinal tracts.

Besides, it helps to decrease the activity of intestinal putrefactive microflora and increase the activity of the normal microflora, normalize intestinal peristalsis, reduce the absorption of zootoxins and other xenobiotics from the gastrointestinal tract. Functional nutrition has a beneficial effect on the autoregulatory response of the body, especially on the nervous and endocrine regulation of the immune system, metabolism, and also contributes to increasing the overall resistance of the organism and its adaptation reserves [6].

MAIN PART

When considering the problem of creation of preventive nutrition foodstuffs, it is advisable to focus on mass-consumption products.

The most promising products recommended for enrichment are flour confectionery goods, which are the leading segment in the market of the Russian Federation. These goods are characterized by the imbalance of chemical composition and low nutritional value. They differ, on the one hand, by the lowered content of proteins, dietary fiber (DF), a very low content of micronutrients, and, on the other hand, by a high content of fats and carbohydrates providing a high calorie content of the product.

Present-day progressive direction in candy manufacturing development is the creation of confectionery products with reduced energy value, enriched in proteins, various vitamins and many other elements through the use of various types of non-conventional food raw materials. The development of new types of dietary and preventive products will allow correcting carbohydrate, fat and protein metabolism. All this contributes to the development and implementation of technologies and creation of new types of confectionery products using unconventional raw materials, as well as the acceleration of scientific and

technical progress in the industry, improvement of technological processes, increasing efficiency, improving product nutritional value, and the rational use of food resources.

Flour and confectionery products are very popular and significantly superior to many other products in terms of their energy value. Also such products are a source of easily digestible carbohydrates. Therefore, the development of functional nutrition products is very important. When producing functional confectionery products, producers are trying to cover various types of products such as gingerbread, cookies, wafers, marmalade and others. Thus, for example, investigations are carried out to find the possibility of adding potato fiber into biscuit semi-finished products. Because the biscuit semi-finished products are an integral part of many kinds of flour confectionery goods, they are in great demand. Supplement of potato fiber into biscuit causes binding of moisture. In this regard, the dough becomes less viscous that has a positive effect on the physical and chemical characteristics of the product, leading to the increase of their storage time.

Due to the almost complete lack of bio-effecting agents (BEA) because of the use of the raw materials poor in the vitamin-mineral composition, chemical composition of confectionery products needs significant correction, namely, increase in the content of bio-effecting agents, food fiber, vitamins and minerals while reduction of the products energy value [7].

Methods of improving nutritional value of flour confectionery products are characterized by great variety. Among them the most rational is the introduction to the formulation of unconventional natural products of plant origin with a high content of proteins, essential amino acids, rich in vitamin and mineral complex as well as dietary fiber that can improve the product quality and its nutritional value [8].

One of the main directions in improvement of the flour confectionery product formulation during the last ten years is the research focused on partial replacement of fancy white wheat flour by the flour with a high content of dietary fiber [9].

One of the increasingly important innovative ingredient in both the food industry and the formation of a healthy lifestyle becomes dietary fiber (DF), which is the edible part of plants or similar carbohydrates resistant to digestion and adsorption in the human small bowel, while completely or partially fermented in the large intestine.

The main challenge facing technologists, who create new food products with dietary fiber, is maintaining the balance between meeting the needs of the human body in dietary fiber as functional ingredient and preserving the conventional quality of enriched product [10, 11].

The scientific rationale for the use of dietary fiber in the functional nutrition products technology is based on a comprehensive assessment of their effectiveness, involving the analysis of chemical structure and properties of dietary fiber. This assessment lays the basis for carrying out forecast on their possible impact on the rheological properties of various food systems, as well as the potential physiological effects caused by the consumption of a food product with the dietary fiber.

Dietary fiber has beneficial effects on the human body. Dietary fiber:

- contribute to the treatment and prevention of obesity, diabetes and cardiovascular disease;
- improve blood circulation and prevent thrombus formation;
- stimulate growth and enhance the biological activity of useful microflora of intestines;
- lower cholesterol, lipids, and blood glucose;
- increase the content of globulins, hemoglobin and erythrocytes in blood;
- contribute to the absorption of iron and have antibacterial and antimutagenic properties;
- contribute to the binding and excretion of toxins and bile acids;
- promote evacuation of bowels, facilitating the passage of food and renewal of the intestinal epithelium [12].

Flour confectionery goods are often supplemented by insoluble dietary fiber (DF) containing cellulose, hemicellulose, etc., which are used to reduce the caloric value and glycemic index, as well as to enrich the

product. In the confectionery emulsions, dough and other semi-finished products, the DF preparations, especially soluble ones, exhibit certain technological effects [13].

The sorption capacity of dietary fiber is one of its most important properties. Due to this property, wheat fiber can bind on its surface not only water molecules, monosaccharides, amino acids, cholesterol, fatty acids, macro- and micronutrients, vitamins, but larger coarse food substrates (proteins), digestive enzymes, bile acids, pharmaceutical drugs, xenobiotics, bacterial enterotoxins, carcinogens, etc. In addition, insoluble dietary fiber can bind bacteria, viruses and other large particles.

The advantage of using the secondary products of plant raw materials processing as dietary fiber sources is that along with the enrichment with dietary fiber, the nutritional value of the product is supplemented also by a certain quantity of minerals and vitamins. This can be considered as compensation for the loss of minerals and vitamins, which can be bonded in the intestines with insoluble dietary fiber and removed from the body [14]. Thus, developed new types of confectionery are produced with the use of flour from barley malt [15], oat flour [16], false grain cereals (millet, buckwheat, rice) [17], wheat [18] and oats [19] bran. Besides, the production of sugar wafers [20] and cupcakes [21] based on use of buckwheat flour and wheat bran is known as well [16, 21].

The products for topinambur processing are also used to give confectionery products health-promoting and preventive properties [22]. Thus, there is a well-known development of nougat [23], candy, wafers [24], and gummy gingerbread products using a powder from topinambur tubers, as well as muffins, enriched with a topinambur concentrate [21], jelly marmalade produced using a mixture of powders from the leaves of alfalfa and topinambur as vegetable filler [25].

The authors are well aware of the known method for preparation of school feeding confectionery products with the use of oat flour and plant supplement, containing powders of topinambur tubers and subtropical fruit cultures (powders from persimmon fruits and/or from feijoa fruits) [26].

Investigations are carried out to study the possibility of using microcrystalline cellulose in the production of jellied confectionery products, amaranth flour - in the production of aerated flour confectionery products for therapeutic purpose [27], as well as in the production of gluten-free flour confectionery products [28]. The use of sugar beet fiber in the production of sugar wafers [20] has also been reported, etc.

CONCLUSION

Undoubtedly, the future belongs to highly purified preparations. Though up to date, the superiority belongs to secondary products from plant raw materials. Today, they are most widely used in the confectionery industry.

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