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Improvement of the Assortment of Diet Bakery Products

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Introduction

The role of nutrition in ensuring healthy life activity of the population of the Russian Federation is of great importance. Maintenance of the body's working capacity in crisis conditions is determined by the regular intake of a certain level of various nutrients. This is due to the growing popularity of dietary bakery products. The therapeutic and preventive effect of using dietary bakery products is provided by introducing into the formulation the necessary additional components or by eliminating undesirable ones as well as by changing the technology of their preparation. Introduction to the formulation of bakery products of ingredients that impart therapeutic and prophylactic properties can effectively solve the problem of prevention and treatment of various diseases associated with the deficit of certain substances. According to GOST 25832 - 89 the products of bakery dietary are divided into seven groups depending on the purpose: salt-free bakery products for those suffering from hypertension, cardiovascular diseases and kidney diseases. Bakery products with low acidity for people suffering from diseases of the gastrointestinal tract bakery products with reduced carbohydrate content are produced for patients with diabetes mellitus, who received a burn injury, with obesity, acute rheumatism. Bakery products with a low protein content for those suffering from kidney failure and other diseases associated with protein metabolism disorders bakery products with high content of dietary fiber - with intestinal atony bakery products with the addition of lecithin or oatmeal are recommended for those suffering from atherosclerosis, obesity, diseases of the digestive tract and nervous system bakery products with high iodine content are necessary for those suffering from thyroid diseases and living in areas with iodine deficiency. A wide range of dietary bakery products is produced according to specifications. Development of technologies of dietary bakery products includes two directions: technology of bakery products with food ingredients in dosages from 3% to 30% to the total weight of flour - with the use of bran, various grain products (barley, oat, corn, amaranth, buckwheat, millet and corn), soybean, pea flour. Technologies with micro-ingredients vitamins, mineral and biologically active additives [1].

Analysis of the assortment policy of enterprises of the bakery industry indicates that practically all enterprises produce dietary bakery products. The share of output of products for preventive and therapeutic nutrition is insignificant and does not exceed 2% of total output. In Figure 1 shows the structure of the production of dietary bread varieties by product groups. The share of production of dietary bakery products in various economic regions of Russia is characterized by great unevenness. A significant portion of the production of dietary bakery products falls in the Central Federal District and is 23%. Figure 2 the modern direction of the development of the assortment of dietary bakery products is the development of functional bakery products using non-traditional raw materials as a functional ingredient. Functional ingredients can be single-component and multi component [2]. As a rule, natural biologically active additives of plant origin are classified as multi component. Currently seven basic kinds of functional ingredients are effectively used: dietary fiber- soluble and insoluble; Vitamins-A, group B, D, etc. Mineral substances (including calcium, iron, iodine, etc) Polyunsaturated fats (vegetable oils, fish oil, ω-3 fatty acids) Antioxidants β-carotene, ascorbic acid, α-tocopherol, Prebiotics-fructooligosaccharides, inulin, lactose, dairy Acid and others Probiotics including bifid bacteria, lactobacilli yeast and even higher fungi. The scientific principles of creating dietary (specialized, functional, enriched) bakery products are the following: When selecting food functional ingredients or natural sources of biologically active substances the main criteria developed by WHO should be followed [3].

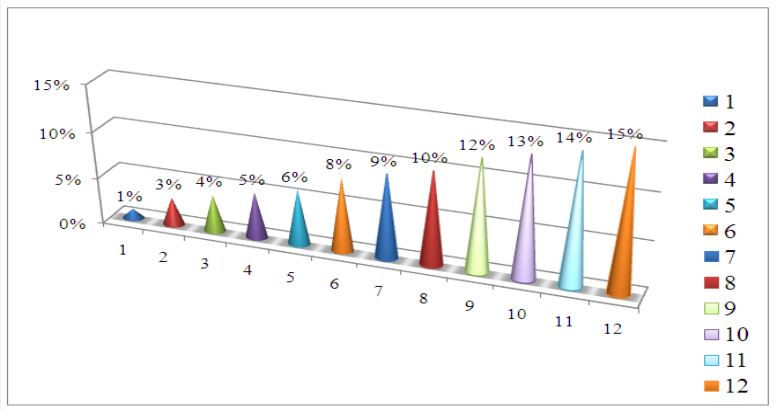

Figure 1: Structure of production of dietary bakery products.
a.Salt free.
b.With low acidity.
c.With a reduced content of carbohydrates.
d.With a reduced content of protein.
e.With increased content of dietary fiber.
f.With the addition of lecithin or oatmeal.
g.With increased iodine content.
h.With soy products.
i.From dispersed grain.
j.With biologically active additives.
k.Fortified.
l.With sweeteners

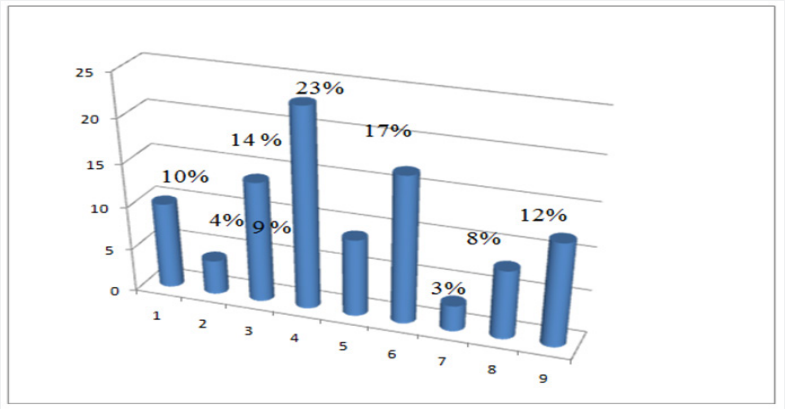

Figure 2: rupture of production of dietary bakery products by federal districts of the Russian Federation.
a)Siberian.
b)South.
c)Privolzhsky.
d)Central.
e)Moscow.
f)North-Western.
g)St. Petersburg.
h) Far East.
i)The Urals.

To develop new types of products, one should use those functional ingredients the deficiency of which actually takes place, is quite widespread and dangerous for health. The addition of micro-ingredients should, first of all, be in the mass-consumption products available for all groups of children and adults and regularly used in everyday nutrition. The microinjected content of the product guaranteed by the manufacturer should be sufficient to meet 10 to 50% of the daily physiological demand in these micronutrients at the usual level of consumption of a dietary (specialized, functional, enriched) product. The introduction of micro-ingredients should not worsen the consumer properties of products: reduce the content and assimilability of other food

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substances significantly change the taste aroma and freshness of products and shorten the period of their storage. The technology of production of bakery products should ensure the maximum safety of the introduced food ingredients, taking into account the possibility of their interaction with the components of the product. The total amount of nutrients in the product should be indicated on the label both in absolute quantities and in percentage of physiological daily requirements. Perfection of the structure of the assortment of dietary products is possible on the basis of the use of prescription components - alternative sources of biologically active substances - sources of vitamins, macro- and microelements. Considerable prospects in this direction are associated with the use of seaweed, as well as dry powders of freshwater microalgae. An effective way to increase the nutritional value of dietary products can be the use for their enrichment of wild fruits, berries and products of their processing of particular interest is the extract of green tea. Their use will not only increase the nutritional value of products, intensify the technological processes of production, but also significantly expand the raw material base for the banking industry.

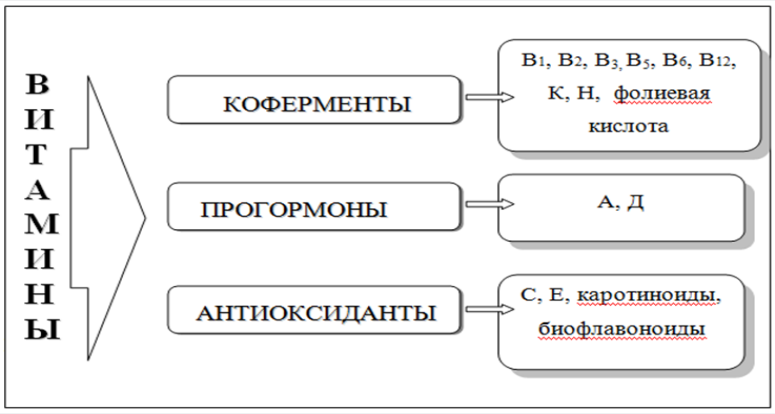

Figure 3: Functional classification of vitamins. Vitamins play an important role in the metabolism; regulate the processes of assimilation and use of proteins, fats and carbohydrates, the functions of all organs and systems, the growth and development of a living organism.

"Norms of physiological needs for energy and food substances for various groups of the population of the Russian Federation" (MP 2.3.1. 2432-08) the levels of consumption of essential nutrients have been determined and adequate levels of consumption of minor and biologically active food substances have been established. The developed norms are the basis for justifying the ranges of the amount of the recipe components introduced. By their functional role and mechanism of action, they can be divided into three groups (Figure 3). Currently more than 200 polyphones are known that have P-vitamin activity and have received a common name-bioflavonoid. In the human body they play the role of activators and inhibitors of many important reactions. According to the research of the Institute of Nutrition of the Russian Academy of Medical Sciences, the recommended level of consumption of flavonoids for men and women over the age of 18 is 250 (including 100 catchiness) mg/day. Physiological functions of phenol substances include P-vitamin activity i.e. Ability to maintain in a normal state or restore the disturbed permeability of capillaries. The most P-vitamin activity is possessed by catchiness and proanthocyanidins. Part of these substances being synergists of ascorbic acid contributes to its economic expenditure. This effect of phenol compounds is explained by the formation of chelates with metals, which protects ascorbic acid from oxidation. The capillary-strengthening effect of phenolic substances underlies many pharmacological, preventive and curative properties of these compounds: wound healing, antitumor, anti-inflammatory and antiviral. The constant intake into the human body from plant food, phenolic compounds have a significant effect on all parts of the digestive tract, which is enhanced in combination with pectin's. Condensed catchiness exerts an astringent effect on the mucous membranes of various parts of the digestive tract, promote healing Wounds [4].

Flavonoids stimulate the secretion of bile; normalize the process of synthesis of bile acids and colloidal properties of bile in liver pathology. It has been established that flavones, catchiness and proanthocyanidins possess an anti sclerotic effect, lower the level of cholesterol in the blood. Phenolic substances have a significant effect on the cardiovascular system and blood composition. With increased stress on the cardiovascular system (stress, physical work) flavonoids increase its stability, increase blood circulation, thereby providing the heart muscle with oxygen. It is also important to note the antioxidant effect of phenolic compounds. The antioxidant activity of phenolic compounds is explained by their two characteristics. First they bind ions of heavy metals (forming stable complexes with them) which are catalysts of oxidative processes. Secondly, phenolic compounds interact with highly active free radicals that occur during auto oxidation for example lipid components. In this case, the reaction proceeds with the formation of low-active radicals. Thus, phenolic compounds are able to quench chain free-radical processes. The antioxidant ability of phenolic compounds is based on their radio protective and antitumor

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effect: the inhibition of free radical reactions that occur during the development of radiation sickness and the degeneration of normal cells into malignant ones. This property was used by N.M. Emmanuel in developing the theoretical foundations and practical applications of phenolic compounds in chemotherapy of tumors. There is evidence that an increase in the degree of condensation of flavones leads to an increase in the anticancer effect. It is known that phenolic substances also have anti-inflammatory properties, which are based on the ability of these substances to reduce the vascular-tissue barrier. In recent years, for some phenolic compounds ((+) catching (-) epicatechin, Gallic acid, as well as oligomeric hydrolysable phenolic substances) antiviral activity is shown and in particular against human immunodeficiency virus (HIV). Such activity is believed to be due on the one hand to phenolic compounds inhibiting the absorption of the virus into the cell on the other hand to suppress the activity of HIV transcriptase [5].

The dependence between the consumption of flavonoids by a population of a number of countries and the mortality from cardiovascular diseases is established. Development of dietary bakery products is today one of the directions of innovative development of food technologies. Which are inextricably linked with the search for new additives that can enrich the products with essential nutrients and minor substances of various chemical natures? The quantitative justification of the dosage of the functional ingredient (D% to the weight of flour) in the bakery product formulation can be calculated by the formula:

$$D = \frac{N \cdot K \cdot B_{хл}}{10^6 \cdot M \cdot G} \cdot \left(1 + \frac{L}{100}\right)$$

Where N-is the daily norm of consumption of essential food substance, (mcg / day); 1μg= 10-6g.

K-Coefficient of covering the daily norm of consumption of essential food substance with 100 g of baked goods %.

M-The average daily rate of consumption of a functional bakery product g.

G-The amount of essential food substance in the functional ingredient (prescription component) %.

L-Coefficient of loss of essential food substance in the process %.

Bx-yield of a functional bakery product %.

Expansion of the assortment of bakery products for preventive purposes is possible due to the additional introduction of non-traditional vegetable products into the recipe, which will allow not only to create new generation products aimed at preserving and improving the health of the population, to regulate the physic chemical and structural-mechanical properties of semi-finished products, but also to involve In the food supply, additional raw materials. As an additional raw material for bakery it is promising to use plant extracts and algae, which by chemical composition are a complex of biologically active compounds-vitamins, macro and microelements, dietary fiber, incl. Pectin substances and other physiologically functional ingredients.

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