

WHEAT BREAD FUNCTIONAL PURPOSE FOR PREVENTION OF CARDIOVASCULAR DISEASES

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Abstract

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The article considers the problem of improving the nutritional value of wheat bread by making functional additives. The content of essential trace elements magnesium is increased in several times and also increases the content of vitamins, essential amino acids and antioxidant activity. The aim of this work is to create a new assortment of bread products on the basis of functional additives medicinal purposes for all layers of the population for prevention of cardiovascular diseases, structural-mechanical properties, porosity. With the introduction of the functional additive increases the content of magnesium in the bread from 0.014 mg/kg to 430.05 mg/kg.

Key words: wheat bread, cardiovascular disease, berries, additive, prevention

Abridgments: CVD - cardiovascular disease, WHO - world health organization, ND – normative document

Introduction

Modern achievements of medical and biological Sciences, the decoding of the human genome, research in the field of nutrigenomics, metabolomics and proteomics confirm the importance of food as a source of nutrients and biologically active components in the formation and ensuring human health. These data underline and strengthen our understanding of nutrition as an essential component of human health (Pogozheva, 2012).

Healthy nutrition and food safety are the main factors determining the level of public health, quality of life, longevity, labour and social activity (Sharmanov, 2011).

The diet of the population has a significant influence on the formation of the most important risk factors. They include the increase of the production, marketing and consumption of tobacco, foods high in fat and / or sugars and low presence of trace elements, vitamins in combination with reduced physi-

cal activity (Sharmanov, 2010). One of the main tasks of the welfare of the people is its high-quality food, optimally balanced content of several nutrients, physiological and energetic value (Usembaeva and Zhakaeva, 2004).

Cardiovascular diseases (CVD) are the main cause of death worldwide: for no other reason, each year more people die, how many from CVD. According to estimates, in 2008 from CVD died 17.3 million, representing 30% of all deaths in the world (Sharmanov, 2011; WHO, 2010; WHO, 2011; Mathers and Loncar, 2006).

The results of epidemiological studies indicate that morbidity and mortality from cardiovascular diseases started to decline in the countries of Western, Northern and Southern Europe, North America, Australia, Japan, while in Eastern Europe it continues upward trend. Held standardization of indicators of mortality from cardiovascular disease (CVD) and coronary heart disease showed that mortality from cardiovascular pathology in Kazakhstan occupies one of leading

places in the world, compared to those who for other countries. (WHO, 2010).

Undoubtedly, an important role in ensuring a healthy diet has fruits and berries, regular consumption of which reduces the risk of many diseases. Including cancer and cardiovascular, due to the presence in its composition healthy natural ingredients and physiologically functional ingredients (vitamins, carotenoids, antioxidants, fatty acids, organic acids, dietary fibers, minerals) (Alekseenko, 2012). In folk medicine are marked therapeutic properties of flax seed and included in the composition of the oil. The use of flax seed will enrich the diet valuable components, first of all proteins and vitamins a, E, F (Steblinin and Minevich, 2003).

Berries and fruits are seasonal product, so for the enrichment of bread used in the form of products of processing. The advantages of this product in a sanitary cleanliness, longer shelf life.

Recommending to the use of a particular product, you should consider its antioxidant activity. This is an extremely important indicator, which indicates the presence of substances that neutralize the excess of free radicals and interrupting the chain of oxidative reactions that damage cells and tissues of our body. The excess of free radicals formed in the result of improper nutrition, bad ecology, stresses and smoking. The decrease in antioxidant activity leads to lowered immunity and the development of many pathological processes, early ageing. Additionally, the lack of antioxidants can cause cancer (Lemehova et al., 2010).

The most promising for the correction of the antioxidant status of human organism products of plant origin, which are rich in polyphenols, vitamins, carotenoids, and others, due to their wide distribution, availability, valuable properties, sparing effects (side effects develop less and not as pronounced not cause the syndrome) and comparatively low toxicity (Fedina et al., 2010).

Methods and Materials

In the study are used common and special methods of assessment of the properties of raw materials, semi-finished and finished products.

The analysis of amino acids was determined at a temperature of 30.0°C and the wavelength of 254, phosphate buffer with beta cyclodextrin and the calculation was made by the method of absolute calibration.

Antioxidant activity of bread defined amperometric method, which is based on measuring the electric current in the cell, resulting in the oxidation of analyzed substances on a surface of the working electrode feeding him a certain capacity. The signal is recorded as a differential output curves.

With the help of special software calculates areas or peak heights (differential curves) are analyzed and the standard substance. Used for the analysis of the average value of a series of three to five consistently performed measurements. As standard substances used: quercetin.

Results

Research contributes to sustainable enrichment mass product - wheat bread, minerals and other nutrients necessary for the normal functioning of cardiovascular system. Chemical composition of sea buckthorn, pumpkin seeds, flax flour surpass other raw materials on the content of magnesium, which was developed concentrating additive for the production of wheat bread, aimed for prevention of cardiovascular diseases. Magnesium helps lower blood viscosity, improves the state of the vascular wall, reducing its energy and, thereby, regulates blood pressure. This microelement prevents formation of stones in the urinary and biliary tract, improves the quality of work of muscles in the intestines and bile ducts, eliminating constipation and cramps. An adequate level of magnesium protects from insomnia, dizziness and depression, high performance and the activity of thinking, reduces anxiety and irritability. Important magnesium and prevention of abortion and miscarriage were held baking with use of dressing supplements for the prevention of cardiovascular diseases at 5, 7, 10 and 15 kg per 100 kg of flour. In terms of quality semi-finished and finished products, the introduction of 10% enrichment supplement is optimal. The introduction of 10% enrichment supplements increases the water absorption capacity of flour, increases the amount of bread, the intensification of the process, improve structural-mechanical, physical and chemical properties of semi-finished and finished products (Figure 1). Dosage increase more than 10% reduces structural-mechanical, rheological parameters of semi-finished and organoleptic characteristics of the

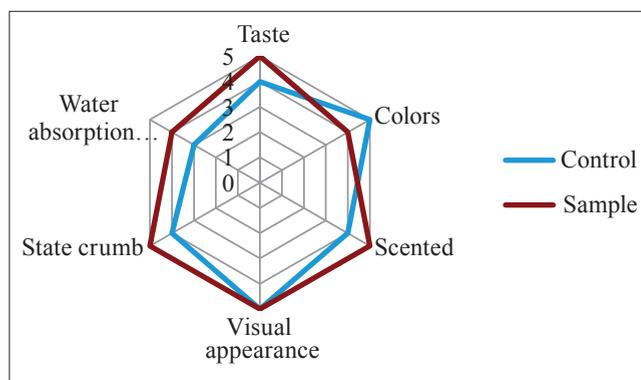


Fig 1. The results of the sensory analysis of cereal products

finished product. The research of the process of maturation of semi dependence from quantity of the applied concentrating additives, 5 kg accelerates the ripening process for 10-15 min, 7 kg of 20-25 min, 10 kg on 30-35 min, 15 kg for 45-50 min. Therefore, the number of yeast that is introduced into the dough, decreased by 5-7%.

We expected improvements in all organoleptic indicators in addition to the color of bread. Making concentrating additives gives the crust and the crust of bread in a darker color with dark shades (Figure 1).

By results of researches of the basic trace mineral ions of calcium and magnesium in the finished bread making con-

centrating supplements increases in 30,000 times in comparison with bread from wheat flour control (Table 1).

The use of such wheat bread with dressing additive provide functional product for prevention of cardiovascular diseases. Making concentrating Supplement berries, increases the content of mass fraction of essential amino acids (Table 2).

It is established that wheat bread making concentrating supplements arginine 100%, lysine 25%, phenylalanine 14.8%, histidine 18.2%, leysin and isoleucine 18.9%, methionine 27.3%, valine by 52.4%, proline 17%, threonine 21.9%, serine by 12.2%, glycine at 55.6%, vitamin B1, 98.5% more in comparison with the control (Figures 2 and 3).

Table 1
The content of mass fraction of ions of calcium and magnesium

Name of products	The norm according to the Normative Document, %	Actual results mass fraction of ions of calcium and magnesium products, mg/kg	ND test methods
Bread control	Not standardized	0.014	«Ion-selective electrode Ek»
Bread trial	Not standardized	430.05	«Ion-selective electrode Ek»

Table 2
The content of essential amino acids in the finished bread

N	Time	Component	Height	Space	Concentration, mg/l	Bread experienced X, %	Bread control X, %
1	6.325	Arginine	0.353	6.129	4.9	0.16	0.08
2	8.855	Lysine	0.721	22.06	7.6	0.25	0.2
3	9.218	Tyrosine	0.417	12.76	8.5	0.28	10
4	9.373	Phenylalanine	0.903	28.02	19	0.62	0.54
5	9.693	Histidine	0.151	6.23	4	0.13	0.11
6	10.1	Leucine+isoleucine	1.307	69.77	33	1.07	0.9
7	10.352	Methionine	0.221	7.989	4.1	0.14	0.11
8	10.492	Valine	0.764	23.46	9.8	0.32	0.21
9	10.76	Proline	3.034	128.2	49	1.58	1.35
10	10.92	Threonine	0.644	27.17	12	0.39	0.32
11	11.375	Serine	1.157	47.05	17	0.55	0.49
12	11.525	Alanine	0.899	32.32	10	0.33	0.36
13	12.342	Glycine	1.19	54.63	13	0.42	0.27

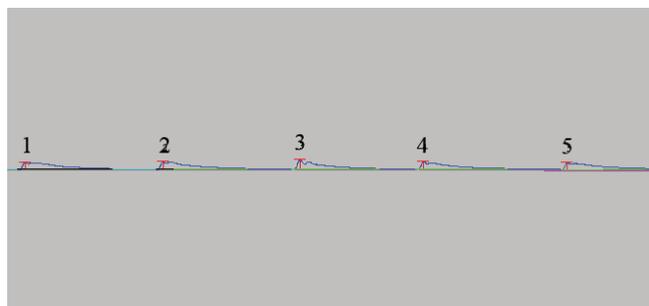


Fig. 2. The peaks of the antioxidant activity of bread trial

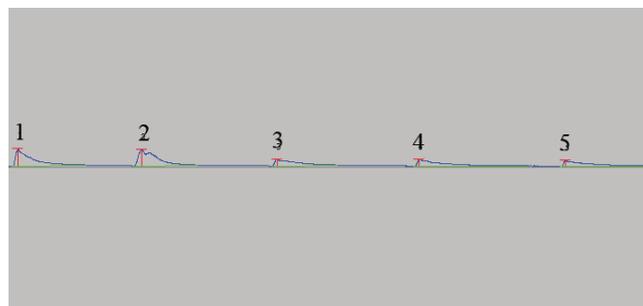


Fig. 3. The peaks of the antioxidant activity of bread control

Discussion

Making bread from wheat flour enrichment supplements that contain only natural ingredients is a product for prevention of cardiovascular diseases. Enables cost approach to production from the point of view of reducing the consumption of yeast and reduce the duration of the process of production of wheat bread functional purpose.

Conclusion

The experimental data wheat bread with dressing additive is recommended as a functional product, daily food for the prevention of cardiovascular diseases for all segments of the population or by individual physiological needs.

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