

Bakery Products of Functional Purpose with Vegetable Supplements

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Abstract — To improve the nutritional value of bread can be used a variety of fruits, vegetables, grains and their products. Their application is perspective, since they are rich in mono- and disaccharides, especially fructose, vitamins, minerals, dietary fiber, including pectin and other ingredients.

Authors set a task of creation of the bakery products enriched with biologically active supplements, representing vitamin mineral polysaccharide a complex received from secondary resources of processing of vegetable raw materials.

In the Kazakh Research Institute developed technology of bakery rye-wheat flour with vegetable supplements. It is proved that the introduction of supplements consisting of secondary plants (wheat germ, pumpkin and carrot cake), not only makes the product more useful, but also has a number of technological effects - improves dimensional stability, porosity, baking loss, loss of moisture and output. Along with this increased consumer quality bakery products - improving their appearance and flavor, and slowing of obduration. The optimum dosage was selected 5.0-7.0% by weight of flour.

Keywords— vitamin-mineral-polysaccharide complex, bakery functionality

I. INTRODUCTION

BREAD, as you know, is one of the most important food and source of vegetable protein for the human body [1].

Low protein content in bakery products from wheat flour requires the introduction of a variety of biological agents. Therefore, to improve the nutritional value of bread can be used by a variety of fruits, vegetables, grains and their products. Their use is promising, since they are rich in mono- and disaccharides, especially fructose, vitamins, minerals, dietary fiber, including pectin and other ingredients.[2,3,4]

Thus, the development of new formulations of bakery products functionality-rich vegetable supplements is a key issue.

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The authors of the task to create bread enriched with dietary supplements, is a vitamin-mineral-polysaccharide complex derived from secondary resources, processing of vegetable raw materials.

II. DEVELOPMENT OF VEGETABLE SUPPLEMENTS

The composition of dietary fiber plant materials include carbohydrate compounds (cellulose, hemicellulose, pectin) and non-carbohydrate components - lignin, etc. The amount of each component in a variety of different plants, and changes during the life of the plant. Dietary fiber, such as bran contains about 6% of the pulp (fiber), 24% hemicellulose and 4% lignin. Beets, black currants and apples are a good source of pectin. Carriers are fiber bread from wheat flour, vegetables, fruits and berries. Understanding the value of fibrous substances in human nutrition has led to the recommendations included in the bread wheat bran, as well as use in food rye bread containing 5 times more fiber than white.

To obtain a fermented vegetable supplements, pre-fermented vegetable products (fermented carrots, pumpkin fermented and fermented wheat germ) were mixed in the ratio (%) 30:30:40. Thus were fermented vegetable supplements containing plant protein, vitamins, minerals and fatty acids.

The chemical composition and energy content of vitamin and mineral composition of plant additives are presented in tab. I, II.

TABLE I
CHEMICAL COMPOSITION OF SUPPLEMENTS, G/100G

Indicators	Vegetable supplements
Protein	10,64
Fat	3,16
carbohydrates	16,72
moisture	68,70
ash	0,78
Energy value, kcall	138

TABLE II
THE CONTENT OF VITAMINS AND MINERALS SUPPLEMENTS

Name	Vegetable supplements
A, mcg	2,7
E, mg	1,16
β-carotene, mcg	6909
C, mg	5,24
B ₁ , mg	0,88
B ₂ , mg	0,09
PP, mg	1,48
Mineral composition, 100 g	
Mg, mg	68
P, mg	172
Fe, mcg	2538
Mn, mcg	1501
Zn, mcg	1349

Analyzing the data in tab. I and II, we can say that the fermented vegetable supplement contains more vitamins and minerals. Through the use of wheat germ, an increase as the content of vitamins - E, PP, B1, and the presence of vitamin A, this is not in vegetables.

Thus, the developed fermented vegetable protein supplement is vitamin-mineral-polysaccharide complex, as shown in tab. I, due to the use of wheat germ protein.

As is known, the proteins of wheat germ for the content of lysine, tryptophan, threonine, phenylalanine + tyrosine equal to egg proteins, amino-acid score on a scale of FAO / WHO over 100%. Thus, the amino acid composition of the complementarity of the developed additives and mix of rye-wheat flour will provide high biological value of the new bakery functionality.

New bakery functionality of rye-wheat flour with herbal supplements prepared according to recipes developed (Tab. III).

TABLE III
BREAD RECIPE

Raw materials	Raw materials consumption, kg
Wheat flour 1 quality	40
Rye flour 1 quality	60
csugar	10
margarine	5
pressed yeast	2,6
salt	1
Egg, pieces.	4
supplements	5
Water	by calculation

Bakery products prepared as follows. The straight dough procedure. Warm water mixed with yeast, then add herbal supplements, sugar, rye and wheat flour and softened margarine. Knead the dough. The dough is fermented about 2.5-3.0 hours. Divide dough ready to roll round on 57 g, placed on a sheet of oiled, proofing was carried out for 30 minutes before baking products smeared with egg and bake at 220-230 ° C for 20-25 minutes.

III. CONCLUSION

The investigations proved that the introduction of supplements consisting of secondary plants (wheat germ, pumpkin and carrot cake), not only makes the product more useful, but also has a number of technological effects - improves dimensional stability, porosity, baking loss, loss of moisture and output. Along with this increased consumer quality bakery products - improving their appearance and flavor, and slowing of obduration. The optimum dosage was selected 5.0-7.0% by weight of flour.

For rye-wheat bread found that when making vegetable supplements, an increase in specific volume by 5.0%, output by 7.1% to 0.4-1.5% porosity; baking loss decrease of 17.7%, decrease of loss of moisture of 33.8% compared to the control. The results indicate that the supplement of 5.0-7.0% of the additive improves the structural, mechanical and organoleptic quality of the dough and baked goods.

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