ACADEMIA ONE
PEER REVIEWED JOURNALS

Open Herald: Periodical of Methodical Research
Volume 2, Issue 4, April, 2024
ISSN (E): 2810-6385
Website: https://academiaone.org/index.php/6

Ways Of Using Grain in Bread Technology

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Abstract. Whole grain wheat bread is not only tasty, but also a healthy product. This paper examines the results of two experimental studies on the use of sprouted grain seeds and crushed wheat grain in bread technology. Grain bread is baked from sprouted and specially crushed wheat grain, which retains almost all the components of the grain. This gives grounds to talk about the exceptional nutritional and biological value of bread.
Keywords: sprouted grains of wheat, barley, triticale, carrot cake, bread quality.

Introduction

Modern wheat grinding is based on gradual grinding of the grain and mechanical separation of three main parts - endosperm, germ and shells, which differ sharply in their physical properties and chemical composition. As is known, when separating the shell, aleurone layer and grain germ from the endosperm, most of the vitamins and minerals are removed, which reduces the nutritional value of flour and bread [1;2;3].

The combination of natural substances ensures a beneficial effect of grain bread on almost all vital systems of the human body, and primarily on the endocrine system. Thus, the presence of a sufficient amount of fiber and fiber in grain bread improves the digestion process and the excretory function of the intestines, which helps remove toxins, heavy metal salts, and radionucleotides from the body. Dietary fiber is beneficial for those who are overweight because fiber has a positive effect on metabolism. Dietary fiber also has a beneficial effect on the intestinal microflora, which is especially important for older people. Whole grain bread reduces stone formation processes. Consumption of grain bread improves the hematopoietic functions of the body and stabilizes blood pressure [4;5;6;7].

Materials And Methods

Sprouted grains of wheat, triticale and barley were used for research. Pre-hulled barley was used, i.e. in our studies we used a semi-finished product obtained in the production of barley groats - pensac. After 24 hours of germination, the grains were crushed using a disperser to obtain a homogeneous dough mass. The control bread was baked according to the following standardized recipe: grain – 100 kg, pressed baker's yeast – 4 kg, salt – 1.7 kg, granulated sugar – 0.7 kg, sourdough – 0.5 kg. Research options are shown in the table.

According to the results of our research, it was established that replacing wheat grain with barley in an amount of 15% accelerates dough ripening and proofing compared to options with triticale grains in an amount of 5% and 15%, as well as control [8;9;10].

Finished products using barley and triticale were more intensely colored than the control ones, which is explained by the presence of more sugars. The taste and aroma of finished products using triticale were less pronounced compared to products using barley. It should be noted that the products of the control variant were significantly inferior in taste and aroma to products with the addition of barley and triticale [11;12].

The tasting score was highest for bread with the addition of barley grains in an amount of 15%. Quality indicators of finished products are given in the table.

Results And Discussion

Quality indicators of finished products

№	*Option*	*Humidity, %*	*Acidity, °N*	*Porosity, %*

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1	2	3	4	5
1	Wheat grain bread	47,6	1,3	60,2
2	Replacing 5% of wheat grain with barley	47,4	2,1	58,8
3	Replacing 15% of wheat grain with barley	47,2	2,2	56,8
4	Replacing 5% wheat grain with triticale	47,3	1,6	58,9
5	Replacement of 15% wheat grain with triticale	47,0	2,0	57,0

The results of experimental studies show that when using triticale and barley seeds, the determined indicators differ significantly from the control variant. The table shows that the highest humidity is observed in the control products. Obviously, this is due to the fact that the addition of barley grains and triticale reduces the moisture content of the bread, especially triticale, since unhulled grain is used and the moisture is concentrated more in the shells than in the central part.

The control products also have the lowest acidity. This is probably due to the fact that wheat grain mass requires a longer time for ripening and proofing of the dough compared to other options, and the addition of triticale and barley speeds up the ripening of the dough and proofing. The porosity of the control products is the highest. A common factor influencing the reduction in porosity is the low gluten content in triticale and barley grains. At the same time, it is necessary to note a significant reduction in the crumbiness of the bread crumb in variants using triticale and barley seeds in an amount of 15%.

We also found that the use of barley and triticale reduces baking of products by 0.2–0.5%, and shrinkage by 0.2–0.4%.

Finished products using carrot cake and sprouted barley were more intensely colored than the control 1st option. The more intense color of the 2nd and 3rd options is explained by the presence of a larger amount of sugars contained in carrot cake and sprouted barley grain, which caramelize at high temperatures and form dark-colored melanoids with amino acids.

Conclusion

Thus, in order to expand the range of products and improve their quality in the production of wheat flourless grain bread, it is possible to use sprouted barley and triticale grains in an amount of up to 15% by weight of wheat grain. The addition of carrot cake and sprouted barley does not impair the physicochemical characteristics of the finished products. At the same time, the appearance, color intensity, taste and aroma are significantly improved and the biological value of the dietary product is increased.

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