



**DEVELOPMENT OF METHODS FOR OBTAINING BAA, WHICH
IMPROVES THE QUALITY OF BAKERY PRODUCTS, BASED ON THE
GRAINS COLLECTED**

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ABSTRACT

Grains harvested, grains containing all the original Bran and endosperm, are 100% germinated, but their nutritional values do not decrease unless they become grass.

The use of germinated grain activates metabolism, resulting in the synthesis of secondary metabolites such as various enzymes, vitamins and phytochemicals, degradation to increase digestion of macronutrient compounds such as proteins and carbohydrates, and is often used as a way to improve the nutritional value of grain.

KEYWORDS

Bread baking, multicomponent enhancer, germination, quality of grain freshness.

Introduction

The continuous pursuit of improving the quality and nutritional profile of bakery products has led to the exploration of various bioactive additives (BAAs) derived from natural sources. Grains, as a fundamental component of human diets, offer a rich reservoir of bioactive compounds that can be harnessed to enhance the functional properties of bakery products. The development of methods to obtain such BAAs from grains is essential to advancing food science, particularly in the creation of value-added bakery goods that meet modern consumer demands for health and wellness.

Grains are not only a primary source of carbohydrates but also contain a wide range of bioactive compounds, including dietary fibers, proteins, vitamins, minerals, and phytochemicals. These components contribute to various health benefits, such as improved digestion, enhanced immune

function, and reduced risk of chronic diseases. However, traditional bakery products often undergo processing techniques that can diminish the bioavailability and functionality of these nutrients.

The development of innovative methods to extract and concentrate these bioactive compounds from grains can lead to the production of BAAs that significantly improve the quality of bakery products. By integrating these BAAs into bakery formulations, it is possible to enhance the nutritional value, sensory properties, and shelf life of the final products. Moreover, these methods must be optimized to ensure that the bioactive compounds retain their efficacy during the baking process, which often involves exposure to high temperatures.

This research focuses on the development of such methods, with a particular emphasis on leveraging regionally available grains. The goal is to create BAAs that not only improve the health benefits of bakery products but also align with sustainability practices by utilizing locally sourced ingredients. Through this approach, the study aims to contribute to the broader field of functional food development, offering insights into how grain-derived BAAs can be effectively used to produce bakery products that cater to both nutritional needs and consumer preferences. This production provides the basis for the use of grains that are harvested as a source of biologically valuable components in the preparation of Functional Foods, which is one of the modern trends in food technology. In this study, a mixture of sprouted grains containing grains of wheat, oats, barley and corn that were floured in equal amounts was used as an unconventional raw material[3].

This mixture of germinated grains contains vitamins (A, YE, B1, B2, B3, B5, B6, B9, n, choline, RR), trace elements (boron, molybdenum, selenium, chromium, iron, vanadium, manganese, zinc, iodine, copper, fluorine), minerals (potassium, calcium, silicon, magnesium, phosphorus), essential amino acids (valine, isoleucine, leucine, lysine, methionine, threonine, tryptophan, phenylalanine) and enzymes (lipase, proteases, phosphatases, α - and β -amylases), have been found to be rich[4].

According to the results of test baking in our preliminary studies, it was recommended to add a mixture of grains, which were ground to a higher grade of flour weight in an amount of 15% to improve the nutritional and biological value of bread. It has been found that adding a mixture of flour-infused grains to wheat flour reduces bread size and its porosity. The use of BAA in the production of bakery products makes it possible to eliminate the negative impact of unconventional raw materials on the quality of dough and bread, as well as activate the technological process, prolong the novelty life of Bakery Products.

To increase the quality of prolonging the freshness of products made with the addition of a mixture of whole grains, it is recommended to use multicomponent bread enhancers containing minerals (wheat flour, soy flour, starch), oxidants, reducing agents, enzymes, emulsifiers, ground wheat flour, ground wheat extract, improved starches, calcium sulfate, calcium carbonate, calcium propionate, calcium phosphate, ammonium chloride, carbohydrates (sucrose, glucose), lecithin, soy flour, dry milk, vegetable protein) and hydrogenated vegetable oils. The purpose of the study is to develop a multicomponent cooking improvement tool that increases the quality of the product and prolongs their novelty life, by using a mixture of wheat, oats, corn and barley grain in wheat flour. To improve multicomponent cooking, bfq-quality components belonging to food additives, generally recognized as safe, were used.

Development of multicomponent baking enhancing additives to preserve the hissiem properties of bread made from wheat flour and prolong its freshness with the addition of a flour mixture.

ATERIALS AND METHODS

The development of the improving composition of multicomponent baking was carried out using the effect of individual food additives on the quality of bread. The flour from the ground wheat was assessed for its effect on the porosity of the bread, the change in fracture deformation, the formation of the upper layer and the accumulation of chissium and dextrins in the bread.

The study used a sprouted mixture of wheat, oats, barley and corn grains produced in the Department of" food safety and functional products technology".

The dough is made from high-grade wheat flour, the dough samples are prepared according to the recipe, in gram: high-grade wheat flour, 100gr; pressed yeast, 3GR; salt, 1.5 gr; ground flour mixture of wheat, oats, barley and corn grains, 15gr. The dough is kneaded in a two-speed mixer mixing machine (Russia), dressing a uniform mixture with a moisture content of 44.0%. The fermentation period was carried out in a 20-minute tin. Dough processing was carried out manually, the inspection was carried out at a temperature of 40 ± 2 °C and at a relative humidity of $82 \pm 2\%$ until it was ready. The bread was baked in an artel oven (Uzbekistan) in a baking chamber moistened at a temperature of 210-220 °C for 28 minutes. All experiments were carried out in at least three copies.

Results and their discussion

BAA is enriched in whey powder, wheat protein powder, tapinambur inulin, carboxymethylcellulose, lactic acid. In bread-making technology, wheat flour, which was floured into the flour mixture, was introduced in 15% quantities, and this mixture was found to be acceptable in 1.8% quantities as an additive that improved multicomponent baking displays.

The addition of BAA provides the organoleptic properties and specific volume of bread enriched with a mixture of flour, which is no different from control. The introduction of a multicomponent baking enhancer increases the overall, plastic and elastic deformations of breadcrumbs, reducing fracture markers and layer thickness under the crust. The deformation of breadcrumbs enriched with a mixture of ground grain and a developed multicomponent baking enhancer was twice that of control (wheat bread) after 72 hours of storage. The addition of a multicomponent baking enhancer to bread containing a 15% uncooked grain mixture to flour weight increased the accumulation of low molecular weight dextrins by 77.6% compared to control.

1-Table. Multicomponent bread baking enhancer BFC

Components	Quantity, kg per 100 kg
Serum enriched with Mn and Mg	20,8
Tapinambur extract	18,4
Dried wheat gluten	16,5
Dried apple puree	20,3
Thickening KMS	10,2
Wheat mortar	9,5
Soy extract powder	0,5
Kefer	3,8
Total	100

CONCLUSION

The research focused on the development and application of a multicomponent baking enhancer (BAA) demonstrated significant improvements in the quality and shelf life of wheat bread enriched with a mixture of germinated grains. The incorporation of this enhancer into bread-making processes yielded multiple benefits, addressing critical factors such as texture, volume, moisture retention, and the overall sensory attributes of the final product.

One of the primary findings of this study was the positive impact of the multicomponent baking enhancer on the structural properties of bread. The introduction of a 15% germinated grain mixture into the wheat flour, complemented by the BAA, resulted in a marked increase in the plastic and elastic deformation of breadcrumbs. This improvement is crucial, as it directly correlates with the bread's ability to maintain its softness and resilience over time, reducing the brittleness often associated with extended storage. Notably, the deformation of breadcrumbs enriched with the BAA was twice that of the control wheat bread after 72 hours of storage, highlighting the enhancer's effectiveness in preserving bread quality.

The addition of the BAA also had a significant influence on the organoleptic properties of the bread. Despite the inclusion of a complex mixture of ingredients, the bread's specific volume and sensory characteristics remained consistent with that of the control, indicating that the enhancer did not adversely affect the bread's traditional qualities. This finding is particularly important for consumer acceptance, as it ensures that the nutritional enhancements do not come at the expense of the bread's familiar taste and texture.

The application of such enhancers in the bakery industry has the potential to meet consumer demands for higher-quality, more nutritious, and longer-lasting bread products, ultimately leading to broader adoption in commercial baking practices. The use of a developed multicomponent baking improvement tool has a positive effect on the quality of wheat bread enriched with a mixture of germinated grains and prolongs the freshness of bread to 72 hours without packaging.

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