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The effect of changes in the chemical composition of the flour mixture on the characteristics of wheat bread

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Abstract

Bread is traditionally one of the main food products of the population of our country. It has a high nutritional value. However, due to the insufficient balance of the chemical composition of wheat flour, its biological value is relatively low. It is proposed to increase the biological value of bread made from wheat flour by enriching it with barley flour. The change in the chemical composition of the original flour mixture was carried out by replacing part of the wheat flour (from 10% to 20%) from barley. As a result of research, an increase in the yield of bread was found with a simultaneous increase in its acidity with the introduction of barley flour. At the same time, there is a slight decrease in the porosity of the bread. However, all investigated physical and chemical indicators of bread corresponded to the norm. The noted changes are associated with the transformation of the protein-carbohydrate complex of flour. A part of the prolamine and glutenin fractions of flour proteins is replaced by β-glucans and arabinoxylans. The weakening of the protein framework as a result of this substitution leads to a decrease in the porosity of the resulting product and its volume due to the loss of a part of CO_2 formed during fermentation. An increase in the proportion of barley flour with a flour mixture leads to a slight change in the organoleptic properties of bread. At the same time, chemical analysis showed that partial replacement of wheat flour with barley flour leads to an increase in the content of B vitamins. In addition, the fiber content increases. The growth of these components in bread gives it additional functional properties. There is a drop in the energy value of bread due to a decrease in the content of fats and carbohydrates. The biological value of the product increases due to the increase in the content of almost all amino acids. The optimal concentration for replacing wheat flour with barley is 10%.

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