



## THE IMPORTANCE OF BREAD PRODUCTS PRODUCED THROUGH THE PROCESSING OF RYE CROP AND GRAIN

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<b>Received:</b> 14 <sup>th</sup> December 2023	This article provides a brief definition of the importance of bakery products obtained by processing rye crops and their usefulness in various diseases.
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Rye, black wheat (*S.sereale*) belongs to the group of annual and perennial plants belonging to the cereal family. Rye cultivation originated 1-2 thousand years ago. Rye is native to the foothills of the Caucasus, Asia Minor and Central Asia [1].

Rye is an important nutritious crop, and its grain is used in the production of bread flour. Rye bread is considered a valuable food product, it has high calories and great taste. According to these indicators, rye bread ranks second only to wheat bread.

For this reason, in many countries, rye bread is called the second bread after wheat. Rye has high winter resistance and requires little maintenance compared to wheat. In world agriculture, Russia and Belarus are the leaders in rye cultivation, as well as in Poland and Germany, rye cultivation is well established, and consumption of rye bread is widespread.

In Germany, one of the world's largest producers of rye grain, rye grain is used for bioenergy (57%), bread (17%), feed (13%), and export and other purposes. In Estonia, 50% of the rye grain produced is used for food purposes.

In the world's leading countries that grow rye, special attention is paid to rye due to its ecological adaptability, soil fertility, low demand for herbicides, pesticides and fertilizers, resistance to winter and drought, the ability to grow in saline, heavy clay, swampy soils, and its agrotechnical importance in crop rotation.

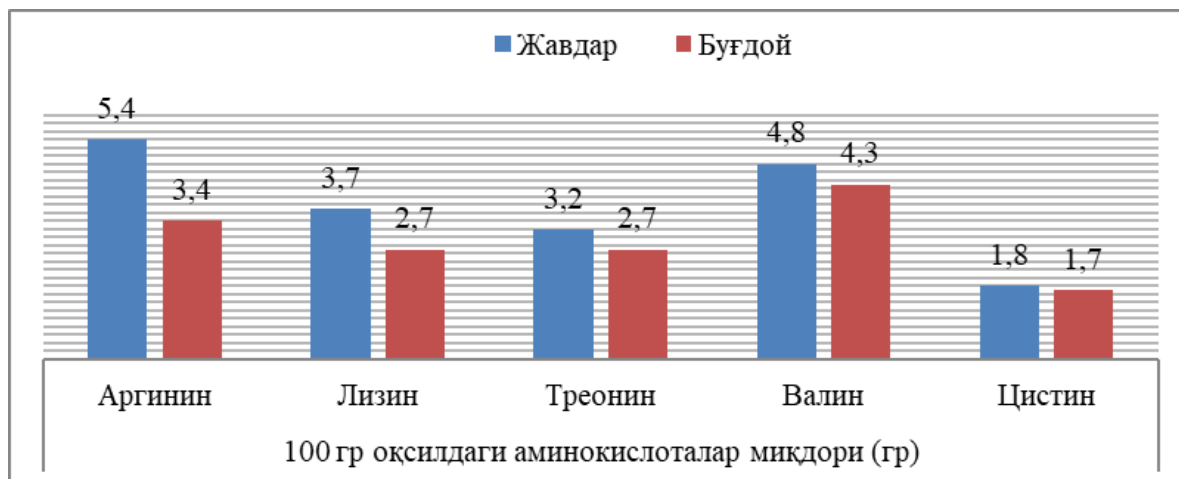
Rye plays an important role in satisfying the population's need for bread and bakery products. Rye grain contains vitamins A, V1, V2, E, PP. Products made from it are nutritious and have a unique taste. Lysine in rye flour is 1.5 times higher than in wheat flour, and tyrosine and threonine are several times higher. In addition to bread and bakery products, grain is used as a raw material for obtaining alcohol and preparing starch. Rye seeds contain a lot of protein, oil, sugar, and vitamins, so they are widely used in the preparation of medicines and in the food industry [2].

Rye is also a valuable second crop after wheat in many countries. According to scientists, eating rye bread is important in preventing heart disease. Our doctors recommend that patients with diabetes should eat bread made from rye flour. Rye flour contains unsaturated fatty acids (oleic, linolenic, myristic) necessary for heart function, and these acids have the property of reducing cholesterol in the human body.

Rye is an important nutritional crop, and its grain is used in the production of bakery flour. Rye bread is an expensive food product with high calories and great taste. According to these indicators, rye bread ranks second only to wheat bread [3].

Although rye grain contains slightly less protein than wheat, the amino acids in the protein are biologically richer and more complete. Rye protein is rich in amino acids such as lysine, arginine, threonine, valine and cystine, which are irreplaceable for the human body. Also, with the amount of vitamins B1 and E, rye is slightly superior to wheat (Figure 1) [4].

For example, if 100 g of rye grain contains 5.4 g of arginine amino acid, this amino acid is 3.4 g in wheat grain, which is 2 g less compared to rye. Also, amino acids such as lysine, threonine, valine and cystine contained in rye grain are 3.7; 3.2; if it is 4.8 and 1.8 g., in wheat grain these amino acids are 1.0; 0.5; 0.5 and 0.1 g. was noted in the conducted research (Fig. 1)



**1 – picture. Comparative composition of the content of non-exchangeable amino acids in rye and wheat grain (according to V.A. Sysuev, L.I. Kedrova and others).**

According to the World Health Organization, the problem of overweight and obesity will increase worldwide in the next few decades. By 2030, about 45 percent of the world's population may be obese. According to data, the number of obese people in the world has tripled since 1975. Also, obesity is the main cause of diseases such as metabolic syndrome, diabetes, ischemic heart disease [5].

In order to prevent the accumulation of excess weight in the human body and various diseases, we must pay serious attention to a healthy diet. In this case, we need to eat parkhezbop, that is, low-calorie and healthy food products.

According to the recommendations given by our doctors, before starting any diet, bread is usually the first food product to be given up.

Bread is definitely the product that every person eats the most every day. In the daily diet, adding parhezbp bread by mixing a little rye flour with wheat flour in the consumption of bread products will help prevent many diseases.

For example, rye bread contains whole grains that reduce the risk of heart disease. According to several studies, a 28-gram serving of whole grains can reduce the risk of heart disease by 22%. This is because they help lower cholesterol and maintain blood pressure [6].



**2 – picture. Parkhezbop (black bread) bread made from rye.**

Today, people's demand for parkhezbop bread, i.e. bread made from rye flour, is increasing, as if the reason for this is that the population realizes the importance of a healthy diet. In fact, the rye bread that occupies the shelves of our stores is somewhat more expensive than wheat bread. The main reason for this is that this product comes as an import from abroad, and in return, the cost of bread increases significantly. Even now, rye is rarely grown in our country, or even when it is grown, it is grown for the purpose of making fodder, hay and silage. This will lead to an increase in the import potential of rye products in our country from abroad. Taking this into account, it is no exaggeration to say that improving the cultivation of rye and providing the population with healthy food products in exchange for making bread and bakery products with high quality and high productivity is one of the most urgent issues in our country today.

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