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PROSPECTS FOR THE USE OF WHOLE GRAIN SORGHUM FLOUR (SORGHUM BICOLOR) FOR PRODUCTION OF GLUTEN-FREE PRODUCTS

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Abstract. The research results and comparative chemical components of whole grain sorghum and wheat flour are presented. It is investigated that the use of whole grain sorghum flour for the production of gluten-free products is affordable.

Key words: celiac disease, grain sorghum, flour, processing, products.

Introduction. The most common grain processing product is flour. In today's conditions, the flour industry meets the needs of production and the population in terms of output, but does not meet the range. The main types of flour produced are wheat and rye, while barley, oat, buckwheat, rice, pea flour are of secondary importance. This situation can be explained by the low content or complete absence of gluten in the flour, the presence of natural pigments [1-3].

Today, grain sorghum is very popular and the cultivation of this crop worldwide is confirmed by the total sown area of about 51 million hectares with a clear trend of progressive growth, and among 85 countries that grow grain sorghum, for almost 38% of producer countries it is leading grain crop not only fodder but also food use [4, 5]. Sorghum is the fifth largest crop in the world after wheat, rice, corn and barley. Currently, sorghum is used in three main areas: food industry, feed production and bioenergy. Therefore, the interest in this culture is huge. One new direction is the use of whole grain sorghum flour as a non-traditional raw material in gluten-free products.

Imbalanced human nutrition, poor quality and questionable chemical additives lead to metabolic disorders, which leads to more serious consequences, including diseases such as celiac disease. Celiac disease - (gluten enteropathy) - is an autoimmune disease that affects the small intestine of genetically predisposed individuals due to the consumption of toxic cereal protein - gluten, found in wheat, rye, barley and oats [6-8].

For another ten years, this disease was considered rare, today more than 27% of patients in Ukraine. For a complete diet, people still need to eat gluten-free products, most of which are foreign manufacturers. Abroad, celiac patients, as well as people who follow a healthy diet, produce a wide range of gluten-free products that replace bread, flour, cereals, cookies, pasta and more. Therefore, it is important to study the cultures of their chemical composition and flour from them, which can be used for gluten-free production in Ukraine [9-11].

This raw material, which does not contain gluten, includes sorghum grain. Abroad, there is experience in using the products of its processing for the production

of gluten-free products. In Ukraine, sorghum is currently not used in baking for the production of dietary products, in particular for patients with disorders of protein metabolism. Insufficient data on the chemical composition of Ukrainian sorghum and its technological properties is one of the reasons that prevent its introduction in the production of dietary bakery products [12-14].

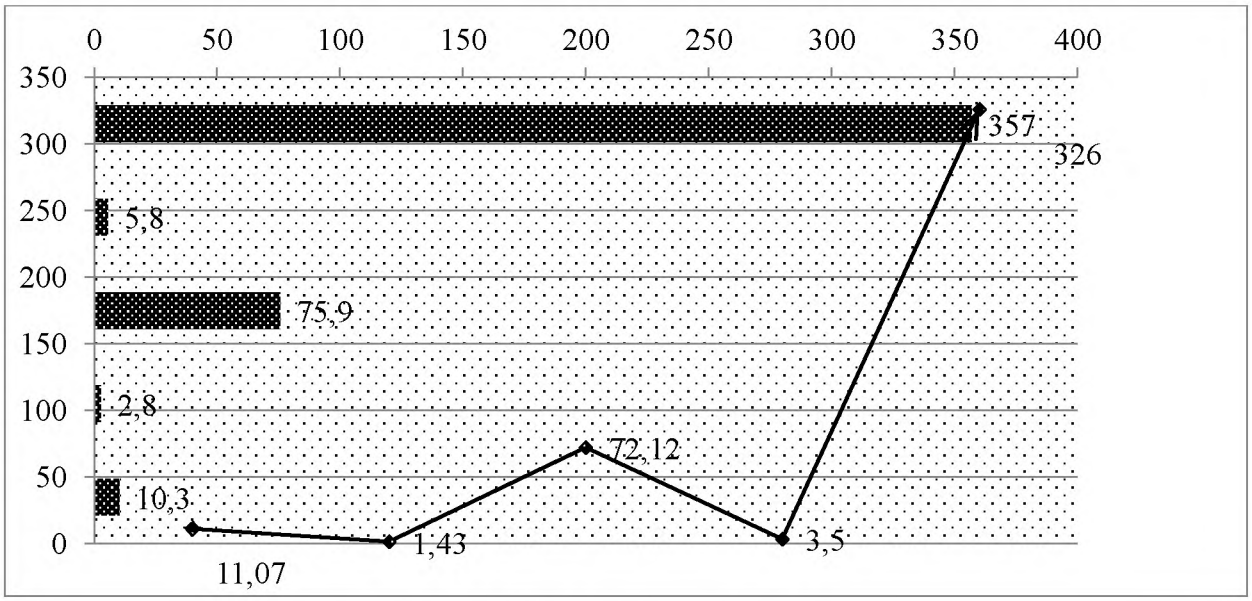
First of all, the constructive enrichment of gluten-free products should correspond to the optimal combination of microelements and biologically active substances in digestible forms and technologically justified combinations that contribute to the formation of the necessary consumer properties.

Foreign researchers use sorghum flour and mixtures with rice, corn and potato starch instead of wheat flour to make gluten-free spaghetti. Spaghetti made with a mixture of sorghum, rice and potato starch in a ratio of 40: 20: 40 was found to have the highest consumer properties [15,16].

The purpose of the research is to conduct a comparative evaluation of sorghum flour with wheat to obtain an objective assessment of its use in the production of gluten-free products.

Research methodology. In our studies, we used grain sorghum hybrids of Ukrainian (Lan 59), French (Targga) and American (Prime) selection and wheat hybrids Khiuberi and Khiuliuks. From them obtained wholemeal flour and determined the various chemical components according to generally accepted methods and techniques.

Research results. As can be seen from the data, the caloric content of sorghum flour compared to wheat, which we chose for control, indicates that the highest values were protein, fat by 1.37 g, carbohydrates - 3.78 g and dietary fiber. The caloric content of sorghum flour averaged 31 kcal for hybrids compared to the average value of wheat hybrids (Fig. 1).



■ - Sorghum, → – wheat

a)- Proteins, g, b) - Fats g, c) - carbohydrates g, d) - dietary fiber g, e) - caloric content KKal

Fig.1. Comparative characteristics of the nutritional value of wheat and sorghum flour

Conclusions. On average, every three hundred people in the world suffer from celiac disease. To fully develop physically and improve their quality of life, people with this disease must consume gluten-free foods at all times. Various crops, including grain sorghum, are considered safe for use in celiac disease.

The absence of gluten in sorghum flour allows its use in the production of gluten-free products.

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