Physico-Chemical and Nutritional Characteristics of Soriz Flour (Sorghum Oryzoidum)

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Abstract- The assortment of gluten-free flours in the Republic of Moldova is very small, and the properties of these flours are not sufficiently studied. Sorghum (Sorghum Oryzoidum) is a relatively new cereal, the industrial production of which has recently begun, and the use of sorghum and derivatives, especially flour, are current. The purpose of this study is to determine the chemical composition and nutritional value of sorghum flour. This would have a direct impact on human well-being, contribute to the development of novel foods and reduce food insecurity in the Republic of Moldova, including people with gluten-related disorders. Physico-chemical methods were used to determine the chemical composition and nutritional aspects of the flour. The obtained results showed that the chemical composition of soriz flour is complex and similar to cereal flours, with a predominance of carbohydrates, followed by proteins, lipids etc. Protein fractions of flour are predominant of prolamins and glutenins, but are not generators of gluten. Soriz flour proteins are unbalanced in most essential amino acids relative to the reference protein, especially lysine. Therefore, it is justified to combine it with other foods such as eggs, meat, fish, milk, whose proteins are balanced in essential amino acids. Soriz flour is a good source of potassium and magnesium, but it is poor in such elements as phosphorus, calcium, iron and sodium. The content of tannins and phytates is close to the values mentioned in the literature for other categories of cereal flours. Soriz could be used in both common and gluten-free diets, helping to diversify the range of cereals, but also to increase food security.

Keywords: chemical composition; nutritional value; sorghum flour (sorghum oryzoidum).

I. Introduction

Cereals and cereal products are the basic element in ensuring the food security of the population, providing the major share of energy and nutrients in the daily diet (Kulamarva et al., 2009), (Sarwar, 2013). The importance of cereals and cereal derivatives is also supported by the fact that global food security depends to a large extent on cereal production, which amounts to approximately 2762 million tonnes per year (FAO, n.d.). Regarding the importance of cereals and the challenges in food consumption patterns, it should be emphasized that the analysis of energy and nutrient sources is crucial to ensure their adequate nutritional quality (Laskowski et al., 2019). Diversified nutrition is one of the principles of rational nutrition, with direct benefits for human well-being and lifestyle.

Sorghum is one of the main basic food crops, traditional in many developing countries, being the fifth most important cereal crop in the world after rice, wheat, corn and barley. It is the main grain food for over 750 million people living in the semi-arid tropical regions of Africa, Asia and Latin America. Sorghum is also an interesting ingredient in gluten-free product formulations (Schober et al., 2005). Gluten-related disorders are on the rise, wreaking havoc on both children and adults. For people diagnosed with malabsorption, celiac disease, allergy or sensitivity to gluten, the consumption of products containing gluten, more precisely containing toxic prolamins, is strictly forbidden, because even in very small quantities, they can cause serious health disorders, and in extremely severe cases they can lead to cancer or even death(Renzetti et al., 2008), (Marengo et al., 2015).

Soriz is a hybrid of sorghum that is characterized by glassy endosperm, similar to rice. It was obtained at the Institute for Scientific Research for Maize and Sorghum in the Republic of Moldova, by crossing Sudan grass (S. sudanense) and bicolor sorghum (S. bicolor)(Galaiev et al., 2011). It is a relatively new cereal crop for the Republic of Moldova. The advantages of cultivating soriz are manifested in the production process, which does not require major investments: the plant is not demanding to soil conditions, fertilizers and has tolerance to diseases and pests (Rodica Siminiuc and Țurcanu, 2020). Previous research on the chemical composition of whole soriz grains shows a starch content - 74.12% ... 82.0% dm, protein - about 13.0% dm, sugars - 0.24% - 0.37% dm , lipids - 0.1% ... 0.5% dm, ash - 0.36% - 2.0% dm In the whole soriz bean, the dominant protein fractions belong to prolamins (56.0% of the total protein), followed by glutelin (22.4%), globulins (7.3) and albumin (6.7) (Siminiuc Rodica et al., 2012).

The controversial information on the origin of sorghum in the category of gluten-generating cereals, as well as the provisions of European legislation

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