

AMARANTH FLOUR FROM LOCAL ORIGIN AND GLUTEN-FREE DIET TRENDS

Akramova Ra'no Ramizitdinovna
Prof. PhD Tashkent Chemical- Technological Institute
rano-akr-1976@mail.ru

Pozilzhonova Nodirabegim Nematjon kizi
Master's Degree, Fergana Polytechnic Institute
2128poziljonova@gmail.com

Abstract

The article provides for the development of a gluten-free diet with the help of amaranth flour of local origin. The problems of availability and cost of gluten-free products are the main ones on the bread market today.

Keywords: gluten-free analog products, amaranth flour, wheat flour, rye flour.

Introduction

A gluten-free diet is a diet that requires caution because it excludes most of the commonly consumed carbohydrate foods. This diet usually consists of a combination of natural gluten-free products (for example, potatoes, rice, unprocessed meat, fruits and vegetables), and produced gluten-free analog products based on wheat, such as bread, cereals and pasta. It can be very difficult to adhere to a gluten-free diet, because it requires knowledge, skills and special eating behavior, including in social situations. Compliance with a gluten-free diet ranges from 36% to 96%, depending on the research method used to determine dietary compliance, and is associated with various demographic, psychosocial and clinical factors.

Gluten flour entering the body of a person with gluten intolerance leads to damage to the intestinal villi and subsequently increases the risk of anemia, osteoporosis and malignant neoplasms. [26] Celiac disease: the role of the epithelial barrier. Absorption of gliadin by the intestinal mucosa According to a Gallup Poll conducted in the United States of America in 2015, 21% of the population tried to use gluten-free products in their diet. The decrease in gluten in people's diets may be due to increased awareness of gluten intolerance and the recent surge in the prevalence of celiac disease (C) and non-cellular gluten sensitivity (NCHG). This trend is especially clearly growing in those areas of the world that are currently undergoing "Westernization" in dietetics, which is directly related to the demand for functional products developed by us for therapeutic and preventive purposes. [23]

The secondary absence of prolyl and glutamyl endopeptidase in the human gastrointestinal tract leads to the inability of people to fully digest gliadins to the level of a dipeptide or tripeptide.

Thus, oligopeptides and polypeptides the size of α -gliadin isomer-33 remain in the cavities of intestinal cells and are found even in the colon. The question arises: how peptides, such as α -gliadin isomer-19, inducing the innate major histocompatibility reaction or immunodominant 16 isomer-33, are produced by intestinal epithelial cells. Two decades ago, after a strongly altered structure of celiac disease was shown by electrochemical microscopy during freezing, its paracellular pathway became obvious. However, many researchers have disputed this hypothesis, doubting that macromolecules up to 2-4 kilodaltons in size will pass the epithelial barrier, which changes with respect to its dense compounds. Evidence for the transcellular pathway is provided in more recent studies. The most important discovery of Heyman's laboratory was the discovery of soluble immunoglobulin A, a pathway of dependent uptake of gliadin peptides. Although celiac disease, the transferrin receptor, is usually expressed in basic units in intestinal epithelial cells, it is also detected on the cell membrane of the intestinal epithelium.

The best study using transacicular energy transfer of intramuscular fluorescence binding gliadin peptides has created a complex of soluble immunoglobulin A with the highest isomer of the celiac molecule-71. Inhibition experiments using an array of immunoglobulin in rows of intestinal epithelial cells were used in studies of apically internalized gliadin, including the superior endosome and basolateral secretion. The mechanism of ectopic expression of the isomer of the celiac-71 molecule on the apical membrane is unclear. However, it should be borne in mind that the trade in the isomer of the celiac-71 molecule is considered an organized priority.

Another unsolved problem is finding a specific pulse that can cause gliadin jumps. In this regard, it is worth hypothesizing that the orientation of the epithelium may be a key factor, because stable depolarization impulses have a detrimental effect. A specific microbiota and a polarity regulator are sufficient to enhance transcytosis of macromolecules, this mechanism is an excellent hypothesis to explain outbreaks of celiac disease activity.

Compared with traditional cereal crops, amaranth has a very high yield and endurance, and the composition of amaranth flour compares favorably with the composition of wheat or rye. To identify the advantages of amaranth flour in comparison with rye and wheat, we analyze their chemical compositions, determine the need to use this raw material and provide a justification for the influence of the percentage content on the quality of the baking mixture.

Amaranth contains a full complex of vitamin B, which nourishes the nervous system, vitamins C, E, A. Such a component as squalene contributes to the production of "good" cholesterol and participates in metabolism, having the properties of a

biologically active substance. Phytosterols found in grains are also indispensable for the body, as they are the building material for cell membranes. Phospholipids play a significant role, saturating the body with phosphoric acid and providing plasticity of cell membranes. The components of the grain contribute to the production of melatonin, which is necessary for the proper functioning of the nervous system [14]. Thus, amaranth flour can be used as an additional source of nutrients that increases the biological value of the product. In terms of the amount of proteins, fats, carbohydrates, some amino acids and vitamins, amaranth grains are superior to wheat and rye, which can be seen in Table 1, constructed using the reference book [21].

The main advantages of amaranth flour:

- Protein content is 69.5% higher than in rye and wheat, and their biological value and utility coefficient are 67.85% and 76.45% higher, respectively %;
- The lysine score in the protein of amaranth flour of the highest grade is 107.54%, whereas in wheat and rye protein only 57% and 62%;
- The mass fraction of digestible carbohydrates, including starch, is slightly lower compared to wheat (70%) and rye (67%) and is equal to 66.1%, and fiber, on the contrary, is 3 times higher (3.1%);
- The possibility of using products based on amaranth flour by people suffering from celiac disease or allergy to wheat proteins
- Porosity of bakery products increases by 5%
- Naturally increases the shelf life by 48 hours

The main advantages of amaranth flour.

Таблица 1

Feature	Amaranth flour	Wheat flour of the highest grade	Rye flaked flour
Protein content ,%	11,5	9,8	7,1
Lysine score, %	103,36	57	62
Mass fraction of starch,%	64,1	70	67
Mass fraction of fiber, %	3,1	1,2	0,8

We conducted a number of experiments on the study of amaranth flour of the highest grade (TU 9293-00477872064-2011) in order to understand how optimal it is to introduce amaranth flour into the product, and not its grains, comparing the quantitative content of amino acids. The determination of the mass fraction of moisture was carried out according to GOST 13496.3, protein - according to GOST 10846, fat - according to GOST 27670, starch - according to GOST 10845, water-soluble carbohydrates - according to GOST R 51636, fiber - according to GOST R 52839, ash - according to GOST 27494; sodium, potassium, calcium and magnesium - in accordance with HDPE F 14.1:2:4.167-2000, phosphorus - according to GOST 26657, iron - according to GOST 26928; the content of vitamin E - according to MVI No. 8-19/2 dated 02.01.1984, vitamins B1 and B2 - according to the manual [20],

amino acids - in accordance with M 04-38-2009; the energy value was determined by calculation.

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