PROBLEMS AND SOLUTIONS OF SCIENTIFIC AND INNOVATIVE RESEARCH
Volume 02, Issue 04, 2025

Analysis of the composition of available sources of cereal raw materials when organizing special consumption rations.

Sanayev E. SH. (PhD), dots.
Tashkent Institute of Chemical Technology

Annotation. Barley grain is grown in all regions of the republic. Barley stems and grains are mainly used for fodder purposes for livestock. It should be noted that today, due to unfavorable climatic conditions, the yield of food crops grown on rainfed lands is decreasing or declining, which requires the effective use of available raw materials. For this purpose, obtaining instant cereals from barley was considered a solution to this problem.

Keywords: barley, early-ripening groats, ultra-high-frequency drying, steam pressure treatment, threonine.

For the use of barley grain for food purposes, the autumn varieties "Noyob" and "Istak," registered in the state register of this grain, were studied. As a result, the functional composition of grains, which is important for the human body, was analyzed, and it was substantiated that the variety "Istak" is the most suitable variety for drought resistance compared to the variety "Noyob," and for obtaining early-ripening groats, the physicochemical, technological, and biochemical properties of this grain variety were analyzed.

Table 1.

Chemical composition and nutritional value of barley grains of the "Noyob" and "Istak" varieties (100 g).

Substances	Nutrient value	
	Istak	Noyob
Proteins. gr	10,3	9,2
Fats. gr	2,4	2,0
Carbohydrates.	56,4	51,2
Water. gr	14,0	14,0
Nutritional fibers. 14.5 g	14,5	15,1
Nutritional value. Kcal	288	271

According to the analysis of Table 1, the "Istak" variety of barley grain, which has a high advantage in terms of nutritional value, was selected as the optimal variety for the object of research, and its nutritional composition was substantiated.

Table 2

Vitamin content of barley grain of the "Istak" variety and the degree of satisfaction of a person's daily needs (100 g).

Vitamins	Chemical name	value in 100 grams	Amount of satisfaction of daily consumption needs, %
A	Retinol equivalent	0 mkg	0
B1	Thiamine	0,33 mg	22
B2	Riboflavin	0,13 mg	7
C	Ascorbic acid	0 mg	0
E	Tocopherol	1,7 mg	17
B3 (PP)	Niacin	**6,5 mg**	**33**
B4	Choline	110 mg	22
B5	Pantothenic acid	0,7 mg	14
B6	Pyridoxine	0,47 mg	24
B9	Folic acid	40 mkg	10
H	Biotin	11 mkg	22

The results of the analysis presented in Table 2 were analyzed using high-performance liquid chromatography of the State Center for Veterinary Medicine Registration. According to the analysis results, 100 grams of barley grain can meet 33% of a person's daily requirement for Vitamin B3 (RR), i.e., niacin. Vitamin B3 (PP) - Niacin is an essential water-soluble vitamin for the body, supporting energy metabolism, the nervous and digestive systems, skin health, and blood circulation. In its enzymatic form, it participates in many biochemical reactions. Niacin has antioxidant properties and also activates liver detoxification processes. Its deficiency can lead to the development of pellagra (dermatitis, diarrhea, dementia). Also, the "Istak" variety of barley grain contains minerals necessary for daily human consumption, the results of the analysis of these data are presented in Table 3.

Table 3

Mineral composition of barley grain of the "Istak" variety and the degree of satisfaction of daily human needs (100 g).

Mineral substances	Quantity per 100 grams	% of daily requirement
Potassium	453 mg	18
Calcium	93 mg	9
Magnesium	150 mg	**38**

Phosphorus	353 mg	35
Sodium	32 mg	2
Iron	7.4 mg	**53**
Iodine	9 µg	6
Zinc	2.71 mg	23
Selenium	22.1 µg	40
Copper	470 µg	47
Sulfur	88 mg	9
Fluorine	106 µg	3
Chromium	10.6 µg	21
Silicon	600 mg	**2000**
Manganese	1.48 mg	74

The analysis results presented in Table 3 were determined by modern chromatographic and spectrometric methods of the State Center for Veterinary Medicine Registration, such as AAS, ICP-OES, and ICP-MS. Both qualitative and quantitative analyses of minerals were carried out using these methods. According to the analysis results, 100 grams of barley grain contains 600 mg of the mineral "Silicium," which participates in the daily diet of a person, the synthesis of collagen and elastin, and ensures the strength and flexibility of the skin, bones, tendons, and vascular walls. "Silicium" also contributes to the absorption of calcium and magnesium, activates bone mineralization. This reduces the risk of osteoporosis. By strengthening the walls of arteries, it slows down the development of atherosclerosis.

This is also important in the prevention of heart diseases. "Silicon" contributes to skin shine, hair strength, and nail resistance. Therefore, it is often used in cosmetic products and biologically active additives. Silicon participates in the removal of heavy metals and toxins from the body. At the same time, he participates in the fight against free radicals.

Used literature

1. **FAO/WHO.** (2004). Human vitamin and mineral requirements: Report of a joint FAO/WHO expert consultation. FAO Food and Nutrition Series.

2. **Bakhmat, M. I., & Vodolazhko, M. O.** (2017). Barley: Chemical Composition and Processing Features. Ukrainian Journal of Food Science, 5(2), 185–194.

3. **Morris, C. E., & Sands, D. C.** (2006). The role of barley in sustainable agriculture. Agricultural Systems, 89(2-3), 329–350.

4. **National Institutes of Health (NIH).** (2021). Niacin — Fact Sheet for Health Professionals. https://ods.od.nih.gov/factsheets/Niacin-HealthProfessional/

5. **McKevith, B.** (2004). Nutritional aspects of cereals. British Nutrition Foundation, Nutrition Bulletin, 29(2), 111–142.

6. **Liu, R. H.** (2013). Health-promoting components of cereals: Whole grains and beyond. Cereal Foods World, 58(2), 56–61.

7. **Seaborn, C. D., & Nielsen, F. H.** (2002). Silicon in bone health. Journal of Nutrition, Health and Aging, 6(3), 155–162.

8. **Jugdaohsingh, R.** (2007). Silicon and bone health. The Journal of Nutrition, Health & Aging, 11(2), 99–110.

9. **Popova, A., et al.** (2020). Development of instant cereals based on barley and oats. E3S Web of Conferences 210, 02025.

10. **Mironov, V. A., & Lykov, A. G.** (2015). Modern methods of food composition analysis: Chromatography and spectrometry. Moscow: KolosS. HPLC, ICP-OES, AAS