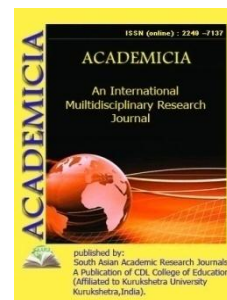




ACADEMICIA
An International
Multidisciplinary
Research Journal
 (Double Blind Refereed & Peer Reviewed Journal)



DOI: 10.5958/2249-7137.2021.01349.5

COMPARATIVE CHARACTERISTICS OF THE MINERAL COMPOSITION OF DIFFERENT VARIETIES OF WHEAT FLOUR

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ABSTRACT

The article provides data on the content of macro- and microelements in flour produced by the joint-stock companies "Zhambai-don" and "Aktash-don" of the Samarkand region of the Republic of Uzbekistan, as well as flour from Kazakhstan. Comparative characteristics of the studied varieties of wheat flour in terms of mineral composition are given. The results established that in terms of the content of macro- and microelements, flour from Kazakhstan is inferior to the same varieties produced by the joint-stock companies "Zhambai-don" and "Aktash-don" of the Samarkand region of the Republic of Uzbekistan. Hence, it can be concluded that the weather and climatic conditions of Uzbekistan are most favorable for the accumulation of mineral elements by grain crops.

KEYWORDS: *Grains, Flour, Mineral Substances, Macroelement, Microelement.*

INTRODUCTION

It should be noted that in the structure of nutrition of the population of the Republic of Uzbekistan an important place is occupied by processed products of grain crops, especially bread, cereals and pasta. Therefore, in the "Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030" (2) approved by the Decree of the President of the Republic of Uzbekistan dated October 23, 2019, No. UP-5853 (1), it is noted that one of the main goals is to introduce a system of state intervention procurement in production of grain

crops and the abolition of state regulation of prices for agri-food products, as well as the introduction of a mechanism for the purchase of grain crops based on a quota at market prices.

It can be clearly seen that, the quality of baked bread depends to a large extent on the quality of flour. Therefore, in order to obtain high-quality bread, special requirements are imposed that the flour must have good baking properties. On the other hand, the nutritional and biological value of wheat bread is made up of the biological value of wheat flour.

Therefore, the study of the chemical composition of flour and especially its macro- and microelement composition is of great practical importance, since bread is the main food product of the population of the Republic of Uzbekistan. However, to date, there are very few studies to identify the mineral composition of flour, as well as the influence of soil and climatic conditions on the nutritional and biological value of grain. On the other hand, in the Republic, a wide range of flour is sold to the population, produced in the flour mills of Kazakhstan.

In this regard, we have set the task of a comparative study of the macro- and microelemental composition of the flour of local production and imported from Kazakhstan.

Objects and methods of research. For a comparative study of the mineral composition, we used wheat flour of the 1st and 2nd grades obtained at the enterprises of the joint-stock companies "Aktash-don", the 1st grade of wheat flour at the enterprises "Zhambai-don" of the Samarkand region of the Republic of Uzbekistan and the 1st grade of flour from the Republic of Kazakhstan.

The content of macro- and microelements was determined by the atomic absorption method on a Saturn spectrophotometer in the laboratory of the Institute of Bioorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan. A sample of the test flour with a mass of 3 g was weighed in an Secura 224-1ORU analytical balance with an accuracy of 0.003 g and incinerated in an electric crucible muffle furnace of the SNOL brand in the temperature range 350-5000C, followed by dissolving the ash with 0.1 N hydrochloric acid.

As a light source, we used LEIK spectral lamps with a bare cathode and VSV-2 high-frequency electrodeless lamps powered by a PLBL-2 source. Absorption was measured with a KSP-4 recording potentiometer. The flame of combustion of an acetylene-air mixture was used as an atomizer.

Research results and their discussion. Mineral substances play a huge role in human life, since all physiological processes in the body occur with the participation of these elements. Table 1 shows the results of the study of macro- and microelements of the studied samples of wheat flour. The data in Table 1 show that the macro- and microelement composition of wheat flour is diverse. In all studied varieties of wheat flour, the main macronutrients were phosphorus, potassium, calcium, magnesium, silicon.

A comparative study of the mineral elements of wheat flour shows that the soil-climatic and natural-climatic conditions, apparently, do not significantly affect the accumulation of such mineral elements as silicon, sulfur, magnesium and zinc in wheat grains. This statement is based on an insignificant difference in the quantitative content of these elements in the studied varieties of wheat flour.

1-TABLE COMPARATIVE CHARACTERISTICS OF THE MINERAL COMPOSITION OF DIFFERENT VARIETIES OF WHEAT FLOUR

№	Mineral elements, mg per 100g	Types of flour			
		Flour of the Republic Kazakhstan	1st grade flour JSC enterprises "Zhambai-don"	1st grade flour JSC enterprises "Aktash-don"	2nd grade flour JSC enterprises "Aktash-don"
1	K (potassium)	152,09	290,61	261,14	181,46
2	P (phosphorus)	448,74	546,47	472,43	315,21
3	Ca (calcium)	111,61	155,30	110,76	108,37
4	Na (sodium)	94,73	138,04	80,02	65,66
5	Mg (magnesium)	54,62	80,61	67,19	53,09
6	Si (silicon)	31,37	50,99	38,18	31,95
7	S (sulfur)	22,61	26,83	25,84	24,67
8	Fe (iron)	4,20	5,68	6,76	8,25
9	Al (aluminium)	3,16	6,81	11,75	4,46
10	B (borum)	0,28	0,73	0,60	0,58
11	Ti (titanium)	0,129	0,08	0,03	0,027
12	Ba (barium)	0,239	0,818	0,642	0,604
13	Zn (zinc)	0,343	0,404	0,376	0,312
14	Sr (strontium)	0,1788	0,333	0,249	0,224
15	Cr (chromium)	0,178	0,367	0,228	0,236
16	Cu (copper)	0,097	0,156	0,126	0,130
17	Mo (molebdenium)	0,024	0,030	0,410	0,052
18	Zr (zirconium)	0,017	0,060	0,059	0,039
19	Sn (tin)	0,071	0,121	0,129	0,061
20	Ni (nickel)	0,045	0,049	0,042	0,071
21	Mn (manganese)	0,275	0,241	0,326	0,273
22	Se (selenium)	0,022	0,025	0,059	0,029
23	Li (lithium)	0,009	0,012	0,010	0,009
24	W (tungsten)	0,001	0,001	0,001	0,04
25	Co (cobalt)	0,002	0,003	0,002	0,002

Flour 1-grade produced in the joint-stock company "Zhambai-don", in comparison with other varieties, has a high content of phosphorus, potassium, calcium and sodium. Comparative study of our data on the content of potassium and phosphorus, with the data of the "Table of the chemical composition of food" (3) show that they do not differ significantly. Also, in terms of sulfur content, the studied varieties of wheat flour almost do not differ from each other. The sulfur content in the studied varieties of wheat flour ranged from 23 to 27 mg per 100 g of the product.

The studied varieties of wheat flour, with the exception of flour produced by Zhambai-don Joint Stock Company, contained almost the same amount of silicon. We received the same

insignificant indicators for the content of the microelement cobalt. The cobalt content in all studied varieties was 0.002 mg per 100 g.

Studies have shown that wheat flour can serve as an additional source of a number of trace elements such as selenium, molybdenum, lithium, tungsten and zirconium. It is known that selenium is a very necessary trace element in our body. Selenium is involved in the metabolism of fats, proteins and carbohydrates. Selenium also has a very close relationship with substances such as ascorbic acid, tocopherol (vitamin E) and biotin (vitamin H). It has been proven that selenium is involved in the synthesis of sex hormones. According to our research, the selenium content in the studied varieties of wheat flour is -2.2 - 5.9 $\mu\text{g} / 100\text{g}$.

According to our data, the content of molybdenum in the studied varieties of wheat flour ranged from 24 to 52 $\mu\text{g} / 100\text{g}$. Studies have found that molybdenum is part of an important enzyme xanthine oxidase, which accelerates nitrogen metabolism in the body. We found that wheat flour from Kazakhstan in terms of molybdenum content is inferior to the studied local varieties of wheat flour produced by joint-stock companies "Zhambai-don" and "Aktash-don" of the Samarkand region of the Republic of Uzbekistan.

CONCLUSION

It can be concluded that wheat flour is one of the important sources of macronutrient intake with food, primarily phosphorus, potassium, sodium, magnesium, sulfur, silicon and a number of trace elements such as iron, boron, selenium, lithium, cobalt, chromium, zinc, etc. dr.

In all studied varieties of wheat flour, phosphorus, potassium, sodium, calcium, and magnesium turned out to be predominant. Phosphorus accounts for about half of all mineral elements, and about 1/3 of potassium. In this, our data completely coincides with the data of D. Kazakov and V.L. Kretovich (4).

In general, it can be concluded that the ash content and the qualitative composition of flour vary greatly depending on the type, variety and soil and climatic conditions of grain growing. In this regard, bread products baked from wheat flour can serve as an additional source of a number of macro - and microelements for the human body.

LITERATURE

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