

STUDY OF THE QUALITY OF WHEAT GRAIN BY ELEMENTAL COMPOSITION

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ANNOTATION

The quality of grain products not only depends on the amount of gluten and protein, but also on the many trace elements contained in the grain. Modern safe food technology for grain products should include control of elemental composition, especially heavy and toxic elements such as cadmium, mercury, lead, arsenic and others in wheat and other cereals. Wheat, as a staple food, is important as a carrier of macro- and microelements in our body. Trace elements in wheat grain are included in starch, protein, sugar, fats and fiber. Therefore, the study of grain quality by elemental composition, using modern instrumental methods, is an urgent task for safe food technology.

Among the analytical methods for determining the elemental composition in various complex objects, nuclear-physical methods of elemental analysis have advantages, which are highly sensitive, selective and instrumental. For microelement analysis, from a practical point of view, the method of instrumental neutron activation analysis (INAA) is convenient.

The report presents the results of the authors' study to determine the elemental composition of wheat grown in the natural and climatic conditions of Uzbekistan using instrumental neutron activation analysis. Laboratory analyzes were carried out on the basis of the Laboratory of Ecology and Biotechnology of the Institute of Nuclear Physics of the Academy of Sciences of the Republic of Uzbekistan.

The content of elements in the selected samples of wheat was determined by the relative method, by comparing the activity of the radionuclide of the element being determined with the activity of the same element in the standard. The gamma-ray spectrum from the residual activity of the samples was measured using a semiconductor Ge(Li) detector with an energy resolution of 2 keV along the ⁶⁰Co (1333 keV) line in combination with a DSA-1000 multichannel analyzer and a personal computer with the Genie-2000 software package for collecting and processing of gamma spectra.

Some essential elements, i.e. vital and necessary elements for the healthy functioning of the human body: K, Se, Mg, Zn, Mn, Fe, Cr, Cu and others, which, as studies have shown, predetermine the quality indicators of grain crops (wheat, rice, beans, corn, etc.). From the point of view of biological value, the following elements are important: Mg, I, Na, K, Se, Zn, Br, Fe, etc.

The concentrations of heavy elements: Cd, Hg, As, Pb, U, Th in wheat grains were also studied. These studies were carried out to assess the impact of phosphate fertilizers applied to agricultural land, containing a certain concentration of uranium and thorium. As our results showed, the concentrations of heavy elements in the studied wheat samples are at a level below the MPC accepted for these elements in food products.

REFERENCES

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