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ANALYTICAL ASSESSMENT OF THE AMOUNT OF MINERALS IN AGRICULTURAL PRODUCTS

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Abstract

At present, solving the problem of food security is an important priority of public policy and research in any country.

In this article, the amount of substances that make up the mineral content of agricultural crops grown as food is determined by the soil in the experimental areas of irrigated lands where they are grown and the surface water used for their irrigation, i.e. rivers and streams, and analytical control. The results of scientific research to assess the impact of groundwater on the quality and quantity of products at the site are presented.

In the scientific article, the amount of macronutrients in the mineral content of products grown in experimental fields was estimated on the basis of chemical, electrochemical and optical analysis methods of analysis.

Keywords: Agricultural products, irrigation facilities, surface water, groundwater, analytical assessment.

It is no secret that today the protection of nature, the universe, especially irrigated lands, is a very important issue for mankind. No matter where you look in the world today, we are witnessing the solution of a very difficult problem, such as overcoming the ecological and reclamation situation, which poses a great threat to human life. The issue of sustainable development of agriculture in our country, meeting the demand of the population for environmentally friendly food products depends on the level of correct and rational use of land and water resources, including irrigated lands [1].

Excessive application of nitrogen fertilizers accelerates the decomposition of humus in the soil, which reduces the reclamation of the soil. Causes an increase in nitrates in the soil, groundwater, in the composition of the product. This has harmful effects on the human body. Phosphorus fertilizers contain large amounts of heavy metals, radioactive elements, fluorine and other substances. Increased levels of nitrates, heavy metals, radioactive elements and fluoride in the product can seriously damage the health of humans and animals who consume this product. They are carcinogenic and accumulate in the body, causing various levels of tumors [2].

The fertile topsoil is limited. More than 93.9% of human food is obtained from these soils. In our country, attention is paid to the protection of the environment, the study of the causes of desertification, the elimination of negative processes that occur as a result. This, in turn, will create the basis for the preservation, protection and rational use of unique natural resources - land, water, air, etc., which will ensure food security of our country, production of environmentally friendly products, further improving the welfare of our people. [3].

Soil nutrient regime is mainly determined by the amount of mobile nutrients and their dynamics. As the proportion of chicken manure in the compost increased, so did the nitrogen content. Therefore, compost made from 70% chicken manure had a stronger effect on the amount of ammonium nitrogen in the soil than composts containing 60% and 50% chicken manure. Compared to semi-rotten cattle manure, composts increased the amount of ammonium nitrogen in the soil. As a result of application of organic fertilizers in combination with mineral fertilizers, it was found that the amount of nitrogen in the form of ammonium in the soil increases again [4].

It is known that natural soil and water pollution does not have a negative impact on humans, animals and plants, because through precipitation, various compounds and substances in the air are returned to the soil. Because the greatest accumulation of harmful substances in the air accumulates in the soil, and plants absorb them, at least in part, that is, with air-fires-water basins, rivers-irrigation water-soil rotational motion occurs. This means that more than a hundred substances and chemical compounds that fall into the soil over the years through irrigation are eventually falling into the soil and degrading it.

In particular, it is necessary to know the relationship of soil and vegetation to the poison. Toxic substances are determined on the basis of several factors: soil-vegetation relationship, i.e. migration. The main issue is the speed of action of the toxicant and the plant's response to it. The process of migration of toxins in the soil depends entirely on the type of soil, vegetation cover of the upper part of the soil and the amount of humus, the granulometric composition of the water regime, the temperature factor, etc. For example, Pb moves faster in soil than Cd, because a complex solution of Pb binds to humic acids 150 times more than the Cd complex. Pb and Hg are located in the surface layer of the soil (10 cm). Cd moves up to 30 cm and only 3-8% of Cu and Zn, Hg and Pb can sink to a depth of 30-40 cm. The PDK of heavy metals is still unknown to the soil, because the soil solution has a more heterogeneous system (homogeneous in water and air).

The reason for the inaccurate assessment of the ecological condition of lands is that they have different attitudes to phytotoxins. We can see this from the data found by various scientists for the topsoil. Many years of field experiments have shown that when 3-4 times the amount of P fertilizer (superphosphate) is obtained, an increase in the amount of N is observed due to a sharp decrease in the experimental substance F [5].

The study provides information on the order of separation of minerals in natural and processed foods into macro and micronutrients, and the possibility of their analysis using atomic absorption spectroscopy, flame photometry, electrochemical and titrimetric (chemical) methods. The accuracy of the analysis results was proved on the basis of processing using mathematical statistical methods.

In addition to surface water, the soil is also exposed to various substances and anthropogenic acids that are released into the atmosphere. Rainfall on the surface, say, sulfuric acid or nitric acid, affects the soil composition (leads to oxidation), affects its structure, the state of the aggregate, etc., and destroys the soil microflora. Analysis of soils near highways revealed the presence of heavy metals, lead, cadmium, zinc, nickel and other organic carcinogens. The effect of the above-mentioned ingredients is also reflected in the composition of food products made from animal-derived raw materials grown in any environmentally difficult conditions [6].

For many years, the Department of Analytical Chemistry has been working on the control of harmful ingredients that, in addition to various minerals in the composition of groundwater and surface natural drinking water, spoil or change the quality of these waters.

Analysis of drinking water samples consisted of quantitative assessment of the chemical composition of well water obtained from the territory of Changal village, Bulungur district, Samarkand region. The cations in the well water are calcium, magnesium, iron, sodium, potassium, zinc, anions such as bicarbonates, sulfates, nitrates, iodine, chlorine, as well as indicators of the quality of drinking water. We set ourselves the goal of identification.

The amount of cations such as calcium, magnesium, iron, sodium, potassium, zinc in the well water was determined using chemical analysis methods. In addition, the content of hydrocarbonate and sulfate anions in drinking water was determined using gravimetric methods of chemical analysis.

The content of Na +, K +, NO3-, J- and Cl- in the well water was tested using electrochemical analysis methods using ionometric analysis with high selectivity. Ion-selective electrodes sensitive to the ions are used as indicator electrodes. The results of the analysis show that the amount of cations and anions detected in the well water is at or below the permissible level for these waters. The relative standard deviation value in the analysis results does not exceed 1.03-2.61% [7].

As an analytical sample, surface waters and irrigated lands of Bulungur district of Samarkand region were selected and adjusted to the established standards. One-time inspection samples are taken to check for the presence of individual components. It is advisable to check the surface water at least once a month. Sampling instruments and devices must meet the requirements of special GOST 17.1.5.04.-81. Samples are taken taking into account that the content of various minerals in the tested water, which is considered clean, is the allowable amount. Oxidation in water - reduction, physicochemical, biochemical activity of various microorganisms, sorption, desorption, sedimentation, etc. As a result, various substances can be oxidized or reduced. For example, nitrates can be reduced to nitrites or ammonium ions, sulfates to sulfites, and oxygen can be used to oxidize various organic substances. It should be taken into account that the analytical sample changes over time due to changes in its various organoleptic properties, such as odor, taste, color, turbidity. In some cases, the purpose is to take a water sample in a separate container, the whole sample, e.g. petroleum products, dissolved oxygen, hydrogen sulfide, etc. All samples in the container are used and the water sample is checked as soon as it is taken.

The effect of water on the soil is the dissolution of mineral compounds and, in part, humus, and in some cases the decomposition of complex silicates. The soil then interacts not with water, but with the resulting complex solution, and the complexing of various ions in the soil takes place. In alkaline reactions in the soil, the solubility of humus increases, and in acidic reactions, the solubility of oxides of amphoteric elements increases. Therefore, the timing of soil water absorption preparation should be based on strict standards. The method of preparation of the soil water absorption sample adopted by the crop is to shake the soil in a ratio of 1: 5 with water (containing no CO2) for at least three minutes. The pH of the sample determines its acidity or alkalinity.

The aqueous absorption of soil is mainly due to CO32-, HCO3-, Cl-, SO42-, F-, NO3-, HSiO3-, H2PO4-, HPO42- anions and Ca2 +, Mg2 +, K +, Na +, Fe3 +, Fe2 +, Al3 +, NH4 + cations are detected. Colorless, clear soil absorption samples are used in chemical and electrochemical analyzes [8-9].

Table 1

Carrots contain macronutrients from vegetables grown on irrigated land results of quantification.

n = 3, = 0.95, Δ = 4.30

№	Determined quantities	Under standard laboratory conditions $\bar{X}$, mg/0,1 kg	$\bar{X}$, mg/0,1 kg	Δ	S	Sr, %	$\Delta\bar{X}$
1	K^{+}	200	194	6,0	2,561	1,32	6,351
2	Na^{+}	21,0	19,8	1,2	0,208	1,05	0,515
3	Ca^{2+}	51,2	51,7	0,5	0,563	1,09	1,397
4	Mg^{2+}	38,4	39,1	0,7	0,305	0,78	0,756
5	S	6,06	5,74	0,32	0,099	1,74	0,247
6	P	55,1	54,3	0,8	0,586	1,08	1,454
7	Cl^{-}	63,4	61,5	1,9	0,713	1,16	1,769
8	Zol,%	1,07	1,07	0,0	0,007	0,74	0,019

The differences between the results of quantitative determination of macronutrients from the mineral content of carrot products in the laboratories of the department and the results of quantitative determination in the laboratories of Uzstandard from 0.32 to 6.0 mg / 0.1 kg, electrochemical, chemical, spectrophotometric and flame photometry. Noting that the random error value of the quantification results obtained from the performance of the methods using the methods is from 0.5 to 1.74% and the value of the reliability range from 0.19 to 6.351 we

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see that the amount of trace elements detected meets the permissible concentration standards set for such products.

Table 2

Cucumber macronutrients from vegetables grown on irrigated land results of quantification.

n = 3, = 0.95, Δ = 4.30

№	Determined quantities	Under standard laboratory conditions $\bar{X}$, mg/0,1 kg	$\bar{X}$, mg/0,1 kg	Δ	S	Sr, %	$\Delta\bar{X}$
1	K^{+}	141	139	2,0	1,626	1,17	4,033
2	Na^{+}	8,00	7,84	0,16	0,076	0,98	0,190
3	Ca^{2+}	23,0	23,7	0,7	0,265	1,12	0,658
4	Mg^{2+}	19,1	19,9	0,8	0,213	1,07	0,528
5	S	-	-	-	-	-	-
6	P	42,0	41,3	0,7	0,442	1,07	1,096
7	Cl^{-}	25,1	27,1	2,0	0,298	1,11	0,739
8	Zol,%	0,52	0,54	0,02	0,003	0,63	0,08

The area under cucumbers in the table is probably irrigated by well water, which dries faster than other crop areas within 2-3 days after irrigation and contributes to soil compaction we focused. Not surprisingly, this is a sign that the amount of macro-and micronutrients that come to the soil from irrigated water is naturally low. Sulfur could not be determined from the macronutrients in cucumbers. We even noticed that the amount of sol released was much lower than other products, i.e. 0.54%. Using electrochemical, chemical, spectrophotometric and flame photometry methods, the differences between the results obtained in the laboratories of the Department of Analytical Chemistry and the results of quantitative determination in the laboratories of Uzstandard varied from 0.02 to 2.0 mg / 0.1 kg. Noting that the random error value of the quantification results obtained from the performance ranged from 0.63 to 1.17% and the value of the confidence interval ranged from 0.08 to 4.033, the differences in such quantification results should be included in the analyzes performed for the tested products. We see that it meets the half requirements.

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