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Changes Of Macro And Microelements And Carbohydrates In Soil And Wheat Grain As A Result Of Atmospheric Pollution

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ABSTRACT

Today, as a result of the production activities of the State Unitary Enterprise "Tajik Aluminum Company" (TALCO SUE), the ecological situation in a large area is deteriorating, causing serious damage to the environment and human health. In particular, such a negative environmental situation can be observed in the deterioration of the natural environment of Sariosiyo, Uzun and Denau districts of Surkhandarya region. Based on the research, biochemical parameters of soil and wheat grains, including macro-and micronutrients, and quantitative indicators of carbohydrates were determined as a result of atmospheric pollution.

KEYWORDS

Atmospheric Pollution, Environmental Factors, Soil, Cereals, Wheat, Biochemical Analysis, Carbohydrates And Macro And Micronutrients.

INTRODUCTION

Decrees of the President of the Republic of Uzbekistan No. PF-4947 dated February 7, 2017 "On the Strategy for the Further Development of the Republic of Uzbekistan", PF-5024 dated April 21, 2017 "On improving the system of

public administration in the field of ecology and environmental protection" and Decree of the President of the Republic of Uzbekistan No. F-5394 of October 29, 2018 "On additional organizational measures to reform the agro-

industrial complex" and other regulatory legal acts related to this activity. [1]

In recent years, the development of scientific and technological progress in the world and in our country requires the intensive use of all types of natural resources. As a result, there is a sharp decline in natural resource reserves, environmental imbalances and other problems. [2,3]

The use of imperfect technologies in increasing the use of underground and surface minerals to meet human needs leads to an increase in waste and the burning of oil products, which pollutes the environment day by day. Atmospheric, water and soil pollutants are different. When the amount of this substance in a living organism exceeds the permissible norm, the normal course of physiological processes in the body is disrupted.

Currently, industrial enterprises and factories located in cities emit a large number of poisonous gases from cars, relatively changing the atmosphere and having a significant impact on its pollution. As a result, the course of biophysical, physiological, biochemical processes in the human body, animals and plants changes. [4,5]

ANALYSIS OF THE LITERATURE ON THE TOPIC (LITERATURE REVIEW)

Scientists from leading world research centers, including (Boynazarov BR, Narbaev Z., 2004; Burlakova EV, Konradov AA, Maltseva EL, 2004; Norboev Z., Norboev Sh., 2001; Boynazarov BR, 2006; Azenova A.Kh. , Ibragimov AP, 2002; Mamatkulov K.Kh., Norboev ZN, 2001.) TALCO DUK studied the harmful effects of various fluorine compounds emitted into the

atmosphere on crops, enzymes, vitamins and carbohydrates by plants, animals and humans.

RESEARCH METHODOLOGY

The biochemical composition of seeds was analyzed in the laboratories of the Institute of Bioorganic Chemistry, the Russian Academy of Sciences. The determination of the number of elements in the samples of plants, soils and residual rocks was carried out by the method of neutron activation analysis at the research reactor VVR-SM (Russia, 1959, modernized in 1980) (Laboratory of Activation Analysis, INP RAS). Academy of Sciences of Uzbekistan).

Neutron activation analysis method

Samples were prepared in the following order: samples of plants, soil and residual rocks in the field, each sample was taken in separate plastic bags indicating the time of their collection, a brief description of the place and area. Then the required amount was ground in porcelain dishes under laboratory conditions, dried at a temperature of 600 ° C and passed through a sieve with holes of 2 mm. Plant samples for the determination of short-lived isotopes for neutron activation analysis (NAT) samples by quartering 30-40 mg for soil and residual rock samples, plant samples for the detection of medium- and long-lived isotopes 100 mg, Soil and residual rock samples were taken at 50-70 mg. Then each sample to be measured was placed in numbered plastic bags and sent to the VVR-SM research reactor for neutron activation analysis.

Samples from the research reactor were analyzed in the laboratory. Different standards were used to determine the amount of elements: laboratory samples (obtained by

applying the exact amount of an element on desalted filter paper), reference standards such as MAGATE Sabbage IAEA 359 and Lichen IAEA 336, and a comparison method.

Method for determining the amount of carbohydrates in samples

Equipment and standard substances required to determine the number of carbohydrates in the sample: liquid chromatography Agilent 1200, the instrument with a Degasser G1379A degasser, QuatPump G1311A pump, ALS G1313A motor sampler, Colcom G1316A column thermostat, RID refractometric detector. Speaker SupelcosiLC-NH₂ 5 µm 4.6x250 mm, Supelco, USA. Micropipettes 100 and 1000 µL, VWR, Poland. Pipette volume 5 ml, Biohit, Finland. Analytical balance AND GR-202 (accuracy 0.00001 g), AND, Japan. Deionized water Millipore Simplicity, Millipore, France. Ultrasonic cleaner S 30 H Elmasonic, "Elma", Germany. Nylon filter 0.45 µm 13 mm. Fructose standard, imp. Glucose standard, imp. Sucrose standard, imp. Maltose monohydrate

standard, imp. Acetonitrile for USSX (VEJX) "Sigma-aldrich", USA.

The process of work on a liquid chromatograph - Buffers A-acetonitrile, B-water. The 82/18 volume ratio is implemented in an isocratic manner. In this case, buffers are prepared from one ratio in one vessel, rather than from a separate vessel, and the flow is carried out from one channel, as is done to separate the peaks of Glucose and Fructose. The flow rate is 1 ml/min, the amount sent to the injector is 10 µl. The temperature of the thermostat column is 35 °C.

ANALYSIS AND RESULTS

Soil and wheat samples for laboratory analysis were taken from the fields of farms in the Sariosi, Uzun and Denau districts of the Surkhandarya region. After drying the soils in a special place, the amount of elements in the soil was determined using neutron activation analysis. The analyzes focused on micronutrients, which are mainly cations (activators or inactivators) of enzymes.

The amount of macro- and microelements in wheat and soil samples taken from Denau, Uzun, Sariosy districts near the territory of TALCO DUK. (µg / g)

Table 1

	The soil			Wheat		
	Sariosio	Uzun	Denov	Sariosio	Uzun	Denov
As	9.6	9.8	9.9	<1.0	<1.0	<1.0
Au	<0.001	0.0064	0.0062	0.0022	0.0052	0.0024
Ba	230	160	175	5.9	3.9	2.9
Br	3.3	2.8	3.2	2.3	0.43	0.86
Ca	44600	63500	54000	510	580	3900
Ce	35	29	33	<1.0	<1.0	<1.0

Cl	<100	<100	<100	3150	940	870
Co	7.4	5.5	6.3	0.038	0.028	0.045
Cr	30	28	26	1.2	1.6	1.3
Cs	2.5	2.4	2.6	<0.001	<0.001	0.0082
Eu	0.61	0.52	0.50	<0.001	<0.001	<0.001
Fe	16100	12300	13500	68	58	71
Hf	3.3	3.3	3.4	<0.1	<0.1	<0.1
K	22300	20800	20000	4500	4900	4800
La	42	34	38	0.027	0.020	0.028
Lu	0.31	0.26	0.28	<0.1	<0.1	<0.1
Mn	700	530	570	28	32	35
Mo	2.7	0.84	2.9	1.3	1.7	0.96
Na	11600	11500	9900	34	31	33
Ni	<0.1	<0.1	13	0.77	0.66	0.60
Rb	49	41	45	5.0	2.8	2.8
Sb	0.57	0.41	0.46	0.014	0.014	0.012
Sc	7.9	5.7	6.2	0.0066	0.0051	0.011
Sm	5.8	4.4	4.5	<0.01	<0.01	<0.01
Sr	60	85	89	<1.0	13	4.0
Tb	0.43	0.36	0.41	<0.01	<0.01	<0.01
Th	5.5	4.3	4.8	0.0040	<0.001	<0.001
U	3.6	3.8	2.7	<0.1	<0.1	<0.1
Yb	3.0	2.4	2.7	<0.1	<0.1	<0.1
Zn	45	38	39	47	45	37

Under the influence of TALCO DUK, the amount of 30 chemical elements was determined in the composition of some cereals growing in conditions of increased content of fluorine compounds in the atmosphere. It is noted that the content of some metals is much higher, and the content of some elements is lower.

Determination of carbohydrates in the food, i.e. monosaccharides, is carried out using high-performance liquid chromatography. For this, if the sample contains fatty substances, it is

defatted and a certain amount is extracted from the defatted substance. The sample is extracted with water and kept in an ultrasonic water bath for a specified period to speed up the extraction process. At the end of the extraction process, it is filtered or centrifuged, and the supernatant (liquid part) is quantitatively analyzed by high-performance liquid chromatography (HPLC).

Changes in the content of carbohydrates in wheat grown in Denau, Uzun, Sariosi districts under the influence of emissions from the

State Unitary Enterprise “Tajik Aluminum Company”, mg/g.

Table 2

Carbohydrates	Denov	Uzun	Sariosio
	Concentration mg/ml		
Fructose	2.4	2.81	5.33
Glucose	0.93	3.38	4.74
Sucrose	2.07	1.43	0.74
Maltose	4.77	3.10	3.24
Sum	10.18	10.72	14.06

According to the results of the above table, it can be seen that the total amount of carbohydrates is much lower in Denau, Uzun districts than in Sariosi district. The amount of monosaccharides in grain samples taken from the Denau area was 3.5-5 times lower than in the other two areas, but the amount of disaccharides was high. This indicates a change in the functions of enzymes in ripe grain.

decrease in the content of vitamins and other biologically active substances in agricultural products. Therefore, ongoing studies examining the number of vitamins and proteins in cereals indicate the need to check enzymatic activity. Drawing conclusions based on relevant data and developing ways to eliminate these harmful effects, it is clear that this is an urgent problem.

CONSLUSION/RECOMMENDATIONS

The results of scientific research show that the harmful substances released into the environment by the aluminum smelter, especially fluorine compounds, affect the soil microflora, changes in the composition of elements. As a result, biological processes change due to a decrease in the redox potential of the soil, a decrease in the activity of enzymes, and an increase in the solubility of substances. In these areas, there is a decrease in germination, growth and development of plants, a decrease in productivity and a

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