ANALYSIS OF MACRO AND MICRO ELEMENTS IN THE NITRARIA SCHOBERI PLANT DISTRIBUTED IN THE ARID SOUTHERN REGIONS OF THE ARAL SEA

G. I. Amanova,

[1] Institute of Bioorganic Chemistry, Academy of Sciences of the Republic of Uzbekistan. Tashkent, M.Ulugbek str., 83

F. A. Usmonova,

[2] Tashkent State Technical University named after Islam Karimov. Tashkent, University st., 2a

Z. F. Faxriddinova

[3] National University of Uzbekistan named after Mirzo Ulugbek. Tashkent, University st.

ABSTRACT

Given the high content of salt in the soil around the Aral Sea, not only the ecological groups of promising plant species distributed in the region, but also the amount of chemical elements in them were studied. As a result of the study, for the first time, the amount of 38 chemical elements in the vegetative and generative organs of 24 plant species belonging to different systematic units distributed in the arid southern regions of the Aral Sea was determined.

In recent years, during eco-geo-botanical expeditions in the Southern Aral Sea region, it was observed that the plant populations of Nitraria schoberi L., which are distributed in this area, are adapting to the external environment. Observations have shown that plant growth, development, flowering and fruit production are significantly accelerated.

Scientific sources state that most species of the family Nitrariaceae contain peptides, proteins, alkaloids, aminocystates, vitamins and many other biologically active substances.

The leaves and fruits of the plant Nitraria schoberi contain biologically active substances: alkaloids, plavanol, tannins, catechins, anthocyanins, pectin, polysaccharides and many other chemical antioxidant compounds. Biological preparations based on biologically active substances contained in the plant Nitraria schoberi have a high activity and are of great

importance in the treatment of many diseases. It is also biologically active, prepared from the fruits of the plant for many years supplements are widely used in folk medicine, scientific medicine and the food industry.

The plant Nitraria L. is widespread in the desert regions of Central Asia, Europe, North Africa and Southeastern Australia. The plant Nitraria schoberi grows naturally in the dry southern regions of the Aral Sea and occupies large areas.

Studies have shown that the N.schoberi plant, which grows in the arid southern regions of the Aral Sea, can grow up to 1.5-2 meters in height, and a single plant with a diameter of about 3-4 meters can form branched stems. The leaves of the plant are fleshy, 13-15 mm long (most leaves are 3-4 mm long), around 4 mm wide. The flowers are small Based on the above preliminary ecological analysis, the study of the chemical composition of the plant Nitraria schoberi L., distributed in the South Aral Sea region, the isolation of physiologically active components of different biochemical nature and the study of their biological and physicochemical properties is one of the important scientific issues.

From the sources analyzed above, it is clear that no special research has been conducted on the chemical composition of plant species distributed on the dried bottom of the Aral Sea, the study of biochemical processes taking place in them.

This requires scientific research to determine the chemical composition of plant species common in the region, their biologically active substances and their application in pharmacological practice.

For laboratory analysis, samples were collected from the above-ground vegetative and generative organs of the Nitraria schoberi plant growing in the South Aral Sea region in different seasons of 2016-2018 (Figure1). The collected samples were dried at room temperature.

Samples were prepared in the following order: each sample was taken in separate polyethylene bags, indicating the time of their receipt, a brief description of the location and area. It was then ground in a porcelain dish in the required quantity under laboratory conditions, dried at 600C and passed through a 2 mm sieve. Plant samples were taken from 30–40 mg to determine short-lived isotopes for neutron-activation analysis (NAT) of samples using the quartovia method. Each measured sample was then placed in numbered

plastic bags and sent to the VVR-SM research reactor for neutron-activation analysis. Determination of the amount of elements in plant samples was carried out in the Laboratory of Activation Analysis of the Institute of Nuclear Physics of the Academy of Sciences of the Republic of Uzbekistan using neutron-activation analysis in the research reactor VVR-SM.


а)

б)

с)

figure1. Leaves (a), fruits (b) and seeds (s) of the plant Nitraria schoberi

Samples taken from the research reactor were analyzed under laboratory conditions. Different standards were used to determine the amount of elements: laboratory-standard (obtained by dropping the exact amount of the element on desalinated filter paper), standard samples of comparison such as MAGATE Cabbage IAEA 359 and Lichen IAEA 336, and the comparator method.

As a result of the research, the content of 35 chemical elements in the leaves, fruits and seeds of the plant Nitraria schoberi, distributed in the South Aral Sea region, was determined (Table 1).

Table1. The amount of chemical elements in Nitraria schoberi, mkg / g

Elements	Plant organs		
	leaf	fruit	seeds
Ag	<0.01	<0.01	0,032
As	<0.1	<0.1	<0.1
Au	0,0084	0,0048	0,0029
Ba	6,6	<1.0	<1.0
Br	108	9,6	17
Ca	9770	1860	6170
Ce	0,65	0,13	0,40
Cl	78100	11800	20000
Co	0,47	0,15	0,31
Cr	0,88	<0.1	0,42

Cs	0,071	<0.001	0,021
Cu	6300	580	1040
Eu	0,017	<0.001	0,0086
Fe	510	85	270
Hf	0,069	0,017	0,019
Hg	0,017	<0.01	<0.01
K	22900	13000	13700
La	0,45	0,033	0,22
Lu	<0.001	<0.001	<0.001
Mn	48	13	35
Mo	18	3,6	4,8
Na	75000	13400	20000
Ni	6,5	<1.0	4,5
Rb	1,9	0,69	1,1
Sb	0,024	<0.01	0,02
Sc	0,16	0,022	0,074
Se	0,59	0,076	0,088
Sm	0,054	0,0083	0,029
Sr	210	45	140
Ta	<0.1	<0.1	<0.1
Tb	<1.0	<1.0	<1.0
Th	0,11	0,037	0,076
U	<0.1	<0.1	<0.1
Yb	<0.001	<0.001	<0.001
Zn	20	26	31

Micro- and ultra-micronutrients such as bromine, calcium, chlorine, cobalt, chromium, copper, European, iron, potassium, lanthanum, magnesium, manganese, molybdenum, sodium, zinc can be listed as important bio-elements in plant life processes.

Repeated analyzes have shown that the Nitraria schoberi plant species, which is distributed in the areas emptied of the Aral Sea, has indicative properties. It was first noted that some rare underground metals accumulate in various organs of the Nitraria schoberi plant. The content of macro and micro elements in the leaves, fruits and seeds of the plant Nitraria schoberi was determined. Ca, Cl, K, Na elements have been proven to be high.

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