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STUDY OF THE AMOUNT OF MAKRO AND MIKROELEMENT IN BUCKTHORN AND UTRICA PLANT

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Annotation

In this article, the composition of samples of Sea buckthorn and utrica plants growing in the territory of our Republic in a ratio of 1:1 was studied by the method of inductively coupled plasma optical emission spectroscopy (IBP-OES). It was found that 61 elements were present in all the studied plant samples. According to the research results, macro and microelements were analyzed.

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Buckthorn (Hippophae rhamnoides L) is a shrub up to 10 meters long, with thorns on branches 0.5-7 cm. There are two types of thorns: small (up to 0.5 cm long), always found at the ends of fruit branches. Buckthorn il contains vitamins E, K. Buckthorn ruit juice contains vitamins A, C, B1, B2, B6, E, K. Buckthorn ruits also contain amino acids such as alanine, phenylalanine, glutamine, cysteine, leucine, lysine, arginine, serine , valine and others. In addition, the fruits contain essential oils, micro- and macroelements, and the oils in the fruits contain 8%.[5]

The chemical composition of Buckthorn (Hippophae rhamnoides L) grown in Russia by Trineeva O.V. and other scientists contains 60 chemical elements, about 96% of the elements are macroelements, including phosphorus, potassium, calcium, magnesium, silicon, aluminum, and a high amount of iron elements. proved to be. [8]

Nettle (Utrica L.) is an annual herbaceous plant of the nettle family. The leaves are toothed, divided into parts, opposite. The leaves and stems are covered with spiny hairs. The flowers are very small, unisexual, collected in spike-shaped inflorescences in the leaf axils. The fruit looks like a nut. 40-50 species are distributed in the North, Southern Hemisphere and the tropics. One species is found in Uzbekistan. It grows in shady, moist soils, fields, gardens and other places. Young shoots are eaten.

This plant is used as an excellent remedy for human health. The nettle plant contains tannins, vitamins, pantothenic acid, acetic acid, folic acid, gallic acid, phytoncides, flavonoids, macro- and microelements.

Experimental part:

Determination of the amount of chemical elements in a sample of buckthorn and nettle plants in a 1:1 ratio using optical emission spectrometry with inductively coupled plasma.

Preparation of a working solution sample. A sample of pre-dried, crushed, weighed on a scale with an accuracy of 0.001 g (Navigatortm, OHAUS®) weighing 1 g was ashed by heating to 500 °C in a muffle furnace (Nabertherm, Germany) using the method of dry ashing in a porcelain crucible. Initially, it was heated to 500°C at a rate of 100°C/h and kept at 500°C for 5 hours. 6 ml of concentrated ICP-MS grade HNO_3 and 2 ml of 60% H_2O_2 were added to the resulting ash and heated on a hot plate in a fume hood until the formation of white fumes ceased. The cooled solution was transferred to a 100 ml polypropylene volumetric flask and filled with ultrapure water. This working solution was filtered using a syringe filter and used for analysis.

Preparation of standard solutions. Solutions of 500 µg/L, 100 µg/L and 10 µg/L were prepared by diluting a standard solution of 10 mg/L (Highpuritystandards, USA) of 63 elements in 2% HNO_3 and constructing a calibration curve using ultrapure water.

The analysis was carried out on an iCAP PRO X Duo ICP-OES optical emission spectrometer with inductively coupled plasma manufactured by Thermo Fisher Scientific (USA). The creation of the method and analysis of the analysis results were carried out in the QTegra ISDS program. Analysis parameters are presented in Table 1.

Table 1.

Analysis Method Parameters

Parameter	**Settings**	
Pump tube	For sample Tygon® yellow/white	For drainage Tygon ® white/ white
Pump speed	45 rpm	
Spray chamber	Cyclonic glass	
Nebulizer	Concentric glass	
Nebulizer gas flow	0,6 L·min^{-1}	
Additional gas flow	0,5 L·min^{-1}	
Central tube	2 mm	
Power RF	1150 W	
Repeat	3 times	
Analysis time	Axial	Radial
	15 sec	15 sec

Results. The results of the analysis are shown in the following table.

Table 2.

Results of determination of chemical elements in a sample using the UPS-OES method.

Analite	**Amount in 100 g sample, mkg**	**Analite**	**Amount in 100 g sample,**
Al	1 716 917,75	Nb)	41,23
P	6 711 764,29	Be	2,33
As	65,37	Er	5,38
Sn	1 331,78	Cu)	978,28
Tl	27,92	In	128,66
Se	21,71	Ag	9,32
Mo	337,94	Yb	2,39
Sb)	39,00	La	13,22
Zn)	2 029,04	Ti	1 031,40

Rb	1 864,93	Gd	682,38
Pb)	126,25	Hf	23,86
Ni	2 300,16	Tm	19,29
Bi	58,76	Zr)	5,09
Re	13 261,49	Ho	1,24
Cd	25,18	Tb	58,55
Te)	455,89	Sc	9,94
Co	1 183,40	Sm	765,11
W	9,69	Y	10,48
B	3 779,10	Nd	24,75
Si)	61 473,32	Eu	9,49
Mn	3 349,94	Pr	379,85
Fe	57 905,65	Ca	239 746,23
Lu	10,71	Dy	47,47
U	749,46	Sr	6 985,84
Ge	24,36	Ce	103,29
Ta)	36,39	Ba	3 111,82
Mg	251 517,35	Na	62 179,78
Th	213,45	Li	742,03
Cr)	582,38	K	2 052 598,34
Ga	40,41	Cs	4 447,21
V	44,18		

Table 3

Amount of main macroelements in the sample (mcg)

Name of the element	**Amount in 100 g sample**
Phosphorus P	6 711 764,29
Potassium K	2 052 598,34
Calsium Ca	239 746,23
Sodium Na	62 179,78
Magnesium Mg	251 517,35

The table shows that macroelements were found in large quantities in the studied plant samples. Their amounts are as follows: Phosphorus (P) 6,711,764.29 mcg, Potassium (K) 2,052,598.34 mcg, Calcium (Ca) 239,746.23 mcg, Sodium (Na) 62,179.78 mcg, Magnesium (Mg) 251,517.35 mcg. These data are also presented in chart form in Figure 1.

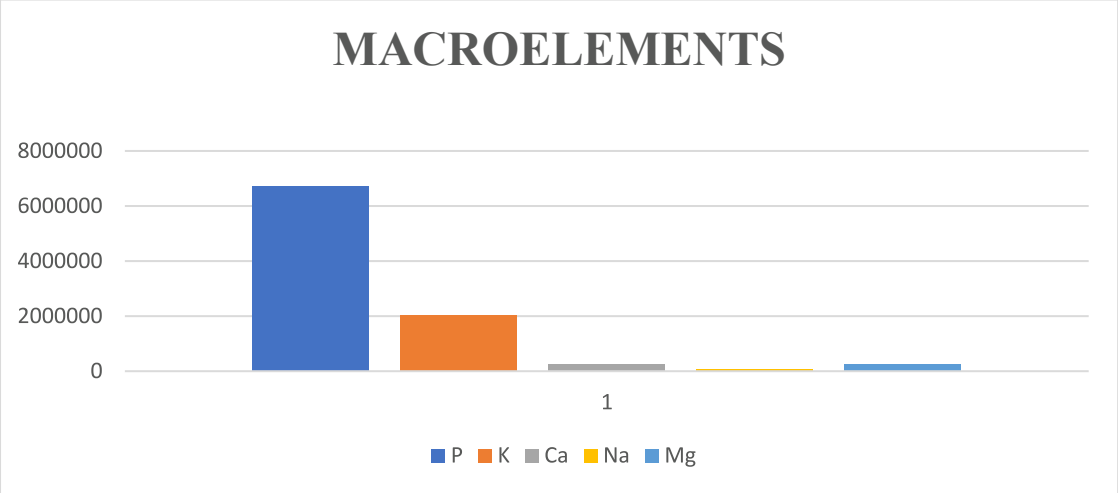


Figure 1. Amount of major macronutrients in plant samples (mkg)

Table 4

Amount of essential microelements in sample (mkg)

Name of the element	Amount per 100 g sample, mkg
Iron Fe	57 905,65
Zinc Zn	2 029,04
Aluminum Al	1 716 917,75
Molibdenum Mo	337,94
Chrome Cr	582,38
Nickel Ni	2 300,16
Marganese Mn	3 349,94
Cobalt Co	455,89
Copper Cu	978,28
Selenium Se	21,71

The table shows that the amount of trace elements in the studied plant samples is as follows: Iron (Fe) 57,905.65 µg, Zinc (Zn) 2,029.04 µg, Aluminum (Al) 1,716,917, 75 µg, Molybdenum (Mo) 337, 94. µg, Chromium (Cr) 582.38 µg, Nickel (Ni) 2,300.16 µg, Manganese (Mn) 3,349.94 µg, Cobalt (Co) 455.89 µg, Copper (Cu) present in the amount of 978.28 µg, Selenium (Se) in the amount of 21.71 µg. This information is also presented diagrammatically in Figure 2.

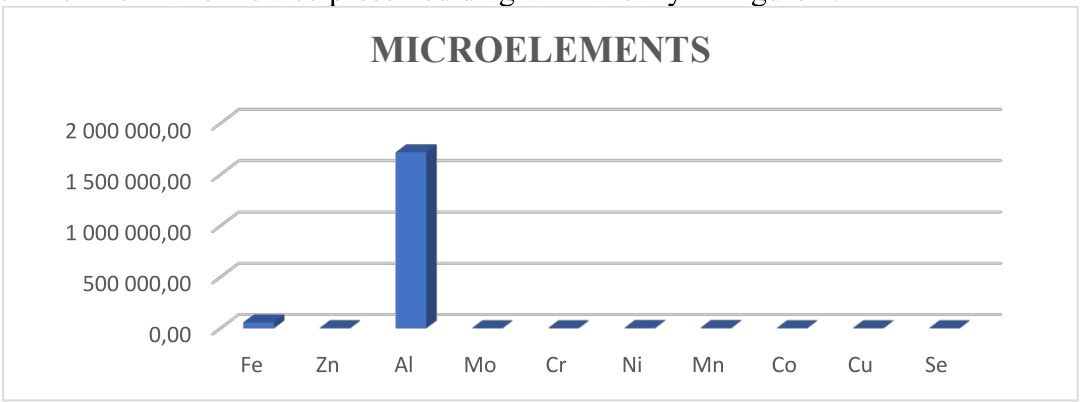


Figure 2. Amount of essential microelements in plant samples (µg)

Conclusion. When studying the antioxidant properties of sea buckthorn and nettle plants in the ratios 1:1, 1:2, 1:3, the 1:1 ratio showed the greatest antioxidant capacity. Therefore, the new product was prepared in an exact 1:1 ratio, and upon examination of the elemental composition of

this prepared product by inductively coupled plasma optical emission spectrometry (ICP-OES), it was found to contain 61 elements in all plant samples studied. Phosphorus, potassium and calcium are the most abundant macronutrients in the sample. Among microelements, iron, aluminum, manganese and zinc have been found to be in greater quantity than other elements. The analysis results show that the amount of toxic elements is very small. According to the results of a scientifically based analysis, the medicinal properties are high due to the large number of macro- and microelements in plants. Based on the results obtained, it is proposed to use these plants to obtain new biologically active food additives intended for the treatment of diseases of the gastrointestinal tract and skin regeneration after burns.

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