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ATOM-ABSORPTIVE SPECTROMETRY FOR DETERMINING OF THE ELEMENTAL CONTENT OF THE GLYCYRRHIZA GLABRA ROOTS

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Introduction: As it was previously proved that nutrients are biologically meaningful substances and elements of human body which are divided into macronutrients and micronutrients. Studies showed that number of essential nutrients, which is necessary for functioning of the human body cells, is about 600.

Derivate of the medicinal plant Glycyrrhiza is in the focus of the medical interest and, for instance, is used as expectorant for treatment of the respiratory tract diseases, and light laxative for treatment of the chronic constipation. Herbal drug which is obtained from Glycyrrhiza roots is named glycyram. Glycyram can be used for asthma, eczema, allergic dermatitis treatment. Other substance - glycerinate can be used for Trichomonas colpitis treatment. Glycyrrhizin and glycyrrhetin acids act as a regulator of water-salt metabolism and have effect similar to the deoxycorticosteron.

Materials and methods. Mass-spectral analysis with ICP MS (Inductively coupled plasma mass-spectrometer) was used for qualitative and quantitative element analysis of substances during determination of the element concentration.

Parameters of the apparatus: power of plasma was 1200Vt, integrating time was 0, 1 second, rotation speed of peristaltic pump was 0, 1 rot/second. The other parameters of the apparatus were determined in the tuning process and they were invariable during periods of making technical service. As a standard, there has been used multi-elemental (27components) standard solution with principal components 1, 0 mg/l.

Samples passed to the mass-spectrometer with a speed 1ml/min by the peristaltic pump into the pulverizer (nebulizer). Particles of dispersed sample were insiminated into the central channel of inductively coupled plasma, where they were evaporated. Ions from plasma fall into the

mass-detector through the cone series, where ions were separated based on the ratio mass to the charge. Mass-detector took signal, which was proportional to particle concentration with the same ratio. Concentration was determined by calibration with multi-element standards. ICP MS analysis permitted to determine elements with the atomic weight 7 to 250, that is Li to U.

Results

The range of the following elements were determined in the derivate from *Glycyrrhiza glabra* (table 1).

Table 1

Results of the mass-spectrometry

Name	Mass	Cons.	Counts(CPS)	Time(sec)
Li	7	23.00mg/kg	76,890.00	0.1
Be	9	0.1800 mg/kg	116.6667	0.1
B	1	56.00 mg/kg	38,400.00	0.1
Na	23	3.700 mg/kg	16,307.150	0.1
Mg	24	4.900 mg/kg	3,718,10	0.1
Al	27	2.100 mg/kg	2,915,867	0.1
Si	29	120.0 mg/kg	136,300.0	0.1
P	31	100.0 mg/kg	103,620.0	0.1
S	34	38.00 mg/kg	57,993.34	0.1
K	39	14.00 mg/kg	24,008,580	0.1
Ca	43	1.600 mg/kg	12,016.67	0.1
Sc	45	1.100 mg/kg	2,240.000	0.1
Ti	47	8.600 mg/kg	1,116.667	0.1
V	51	2.400 mg/kg	3,423.333	0.1
Cr	53	12.00 mg/kg	1,820.000	0.1
Mn	55	21.00 mg/kg	26,213.33	0.1
Fe	57	450.0 mg/kg	16,460.00	0.1
Co	59	3.600 mg/kg	3,616.667	0.1
Ni	60	15.00 mg/kg	3,940.000	0.1
Cu	63	210.0 mg/kg	112,970.0	0.1
Zn	66	35.00 mg/kg	3,576.667	0.1
As	75	2.500 mg/kg	233.3333	0.1
Se	82	5.900 mg/kg	40.00000	0.1
Br	79	21.00 mg/kg	286.6667	0.1
Rb	85	8.000 mg/kg	6,153.333	0.1
Sr	88	35.00 mg/kg	54,700.00	0.1
Y	89	0.1600 mg/kg	176.6667	0.1
Zr	90	0.4200 mg/kg	220.0000	0.1
Nb	93	0.1000 mg/kg	100.0000	0.1
Mo	95	2.800 mg/kg	446.6667	0.1
Rh	103	0.05400 mg/kg	303.3333	0.1

Pd	105	1.400 mg/kg	223.3333	0.1
Ag	107	46.00 mg/kg	16,740.00	0.1
Cd	111	0.6700 mg/kg	36.6666	0.1
In	115	0.05700 mg/kg	10.00000	0.1
Sn	118	1.200 mg/kg	296.6667	0.1
Sb	121	24.00 mg/kg	7,750.000	0.1
I	127	5.300 mg/kg	1,426.667	0.1
Cs	133	0.3200 mg/kg	493.3333	0.1
Ba	137	6.400 mg/kg	730.0000	0.1
W	182	1.800 mg/kg	423.3333	0.1
Ir	193	0.1200 mg/kg	0.0000000	0.1
Pt	195	0.2700 mg/kg	3.333333	0.1
Au	197	0.6500 mg/kg	153.3333	0.1
Hg	202	0.2700 mg/kg	26.66667	0.1
Tl	205	0.1500 mg/kg	63.33334	0.1
Pb	208	10.00 mg/kg	3,306.667	0.1
Bi	209	0.1500 mg/kg	76.66666	0.1
U	238	0.200 mg/kg	1,766.667	0.1

For detection of the metal admixtures, particles were decomposed from objects in the mixture of nitrogen and perchlorous acids (8ml: 2ml) in the microwave oven "Milestone" at four-graded programming of power 250 to 500Vt and at the temperature 180 to 220°C. Obtained solution was cooled, quantitatively carried into the measured flask with 100 ml volume and further there has been used for direct introduction into spray-camera of ICP MS apparatus (Inductively coupled plasma mass-spectrometer) Agilent Technology 7500.

Conclusion. 49 microelements were detected in the derivate from Glycyrrhiza glabra with the use of the mass-spectrometry. Further studies are needed to detect their co-interaction in vivo.

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