

Wild Medicinal Plants in the Ferghana Valley-Springs of Mineral Substances

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Abstract: By neutron activation analysis method defined component composition and quantitative content of 39 macro-and microelements in aboveground parts of medicinal plants of the Ferghana valley. In the bodies of plants found high content of K, Mg, Ca, Fe, Co, Mn and Se related to vital elements. The qualitative composition of the elements of the overground part of the difference the difference is observed only in quantitative content of individual components. The investigated plant species is promising sources of macro-and microelements.

Key words: Medicinal plants mineral substances • Toxic metals

INTRODUCTION

At the present time it is generally recognized that nutrition is one of the main factors determining human health. According to the WHO definition, under health is a state of complete physical, mental and social wellbeing [1]. Proper nutrition provides normal growth and development of a living organism, maintains normal homeostasis, helps to prevent many diseases, prolong life, increases efficiency, provides adaptation to environment.

Currently due to the severe environmental conditions, nervous stresses, other extreme loads and harmful habits, unhealthy diets, physical inactivity public health is characterized by negative tendencies. Increases total morbidity, reduced life expectancy [2].

It is therefore important to prevent diseases, allowing a living body for a long time did not go to a state of illness and move to full recovery, which contributes to a balanced diet. A person need in a day to 2000-2500 kcal of energy [3,4]. However, this energy must be provided with a variety of food containing sufficient quantities of proteins, carbohydrates, fats of vegetable and animal origin, vitamins and minerals [5,6].

Concerning mineral substances, in accordance with the recommendation of dietetic Commission of the National Academy of the USA daily intake of chemical elements from the diet should be at a certain optimal level [7].

Currently, despite the increase in the number of medications produced synthetically, in medical practice have become increasingly popular herbal medicines [8]. Up to 40 % of all drugs in modern medicine, derived from plant material. By its pharmacological activity herbal not inferior to their synthetic analogues, at the same time, thanks to a balanced complex of biologically active substances they have a favorable effect on the human body, practically without any side effects.

It is well known that such plants in the Ferghana valley, as nettle - *Urtica dioica* L., *Capsella bursa-pastoris*, *Arctium tomentosum* Mill., *Plantago major* L., *Equisetum arvense* L., *Taraxacum officinale* Wigg. s.l., *Matricaria recutita*, *Tussilago farfara* L and others, of long been used in folk medicine as medicinal plants, accumulating in their composition, along with biologically active substances and mineral substances [9]. When preparing decoctions used in the treatment of some diseases, part of a mineral substances can pass and goes in an aqueous solution. In this regard, it is interesting to study the qualitative and

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quantitative composition of mineral substances in the above herbs growing in the Ferghana valley as from the point of view of their use and from the point of view of their ecological and chemical safety (the presence or absence of the most hazardous heavy metals) [10].

The purpose of the research: The study of the elemental composition of wild medicinal plants of the Ferghana valley.

MATERIALS AND METHODS

Material for the research was collected in the month of August, 2012 in the territory of Fergana valley in natural places of growth.

The definition of the component composition and quantitative content of macro-and microelements was made by the method of neutron activation analysis. Samples of plants were dried to constant weight in a

drying case at temperature of 600°C. Then the samples were grinded in a porcelain mortar until smooth, then weighed two sample: 40 mg for analysis short lived radionuclides and 90-100 mg for analysis of medium-and long lived radionuclides) in marked bags and Packed in plastic bags. Prepared samples of plants were exposed to neutron activation analysis [11].

RESULTS AND DISCUSSION

Macro-and microelement content in some of the plants grown in the ecologically clean areas of the valley, is given in table.

From the data in the table show that the raw materials practically does not contain heavy metals such as lead, cadmium, arsenic and mercury (their content does not exceed hundredths of a maximum allowable concentration).

Table 1: Macro - and microelement content in some of the medicinal plants of the Ferghana valley mcg/g

element	Daily intake in the human body,mg	The vegetable raw material							
		Urtica dioica L.	Capsella bursa-pastoris	Arctium tomentosum Mill.	Plantago major L.	Equisetum arvense L.	Taraxacum officinale Wigg. s.l.	Matricaria recutita	Tussilago farfara L
1	2	3	4	5	6	7	8	9	10
Ag		0,020	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
As		0,31	0,48	0,27	<0.01	0,76	0,95	0,41	0,13
Au		0,0018	0,0011	0,0019	0,0029	0,0017	0,0028	0,0019	0,0032
Ba		67,2	56,8	38,7	87,8	39,1	151	97,2	23,8
Br		7,3	1,3	104	64	8,4	7,1	13	31
Ca	800–1200	35400	19300	24100	29700	29200	38700	9100	50700
Cd		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1,7	0,65
Ce		0,52	1,4	1,5	0,73	0,37	5,7	8,1	0,59
Cl	3200	6190	5270	2250	4940	7650	7600	540	15600
Co	0,2	0,17	0,64	0,47	0,38	0,24	1,3	1,4	0,48
Cr	0,05–0,2	1,0	2,4	2,2	1,0	0,70	6,6	3,5	0,98
Cs		0,08	0,26	0,46	0,16	0,74	0,78	0,82	0,17
Cu	1,5–3,0	2,9	7,6	15	12	5,9	15	12	6,2
Eu		0,017	0,03	0,027	0,0098	0,0082	0,11	0,082	0,01
Fe	10–15	342	1030	787	380	253	2970	1870	278
Hf		0,054	0,18	0,11	0,041	0,034	0,4	0,24	0,039
Hg		<0.001	<0.001	0,029	0,032	0,0095	<0.001	<0.001	<0.001
K	2000–5500	30600	29800	37300	45400	35900	42600	6370	47600
La		0,34	0,81	1,1	0,42	0,22	3,2	6,5	0,3
Lu		0,0032	0,007	0,0093	0,0027	0,0015	0,025	0,047	<0.001
Mg	300–400	6230	5690	8870	4710	6820	7640	2360	6520
Mn	2,0–5,0	51	64	62	260	20	94,5	82	36
Mo	0,075–0,25	5,2	2,8	2,9	4,1	1,9	2,9	0,98	0,81
Na	1100–3300	240	850	1200	150	175	920	620	480
Nd		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3,3	<0.1
Ni		<1,0	<1,0	7,6	7,0	<1,0	21,3	15,2	<1,0
Rb		7,1	17	33	28	93	22	31	19
Sb		0,39	1,4	0,40	0,20	0,51	1,1	0,13	0,19
Sc		0,12	0,34	0,28	0,13	0,088	1,2	0,54	0,11
Se	0,05	0,20	<0.01	0,12	0,22	0,18	0,3	0,53	1,1
Sm		0,048	0,10	0,11	0,050	0,03	0,46	0,7	0,039
Sr		280	327	465	602	447	416	146	560
Ta		0,012	0,024	0,028	0,0057	0,005	0,077	0,13	0,0081
Tb		0,0055	0,014	0,015	0,0064	0,0052	0,054	0,12	<0.001
Th		0,14	0,35	0,43	0,16	0,098	1,3	2,0	0,13
U		0,042	0,11	0,24	0,085	0,046	0,69	1,1	0,092
W		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Yb		0,018	0,048	0,088	<0.001	0,02	0,23	0,41	0,033
Zn	15	14,6	36,9	27,3	22,0	38,7	51,5	105	26,6

At the same time investigated the plant contain a significant number of essential elements such as sodium, potassium, calcium, manganese, iron, zinc and copper.

Separate experiments established that mineral substances contained in the above plants, partially or fully capable in the aqueous solution with the preparation of decoctions. The degree of extraction of individual elements of the water when cooking decoctions can reach 90-95%, thus enriching broth necessary micro-and macroelements.

CONCLUSIONS

Thus, the above herbs in the Ferghana valley can be used for tea or adding in tea, enriching it with a biologically active mineral substances. The investigated plant species is promising sources of macro-and microelements.

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