УДК: 581.192

УЛТРАМИКРОЭЛЕМЕНТЫ ЖИВИХ ОРГАНИЗМОВ, ФУНКЦИИ И КОЛИЧЕСТВО, ОПРЕДЕЛЕНИЕ.

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Аннотатция. Используя метод масс-спектрометрии с индуктивно связанной аргоновой плазмой Biebersteinia multifida DC. Был ультрамикроэлементный состав растения. Определено, что надземных и подземных органов растений содержит 44 различных элемента с большим разнообразием полезных для живого человеческого организма.

Ключевые слова: Biebersteinia multifida, макроэлементы, микроэлементы, ультрамикроэлементы, калий, кальций, корень, листья, содержание, анализ, метод, химический, аргон, плазма, химия, индуктивный, спектр, метрия, организм, порядок, элемент, дифференция.

ULTRAMICROELEMENTS OF LIVING ORGANISMS, FUNCTIONS AND QUANTITY, DEFINITION.

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Annotation. Using the method of mass spectrometry with inductively coupled argon plasma Biebersteinia multifida DC. There was an ultramicroelement composition of the plant. It is determined that the aboveground and underground

organs of plants contain 44 different elements with a wide variety of useful for the living human body.

Keywords: Biebersteinia multifida, macronutrients, trace elements, ultramicroelements, potassium, calcium, root, leaves, content, analysis, method, chemical, argon, plasma, chemistry, inductive, spectrum, metric, organism, order, element, differentiation.

Introduction. Ultramicroelements are a group of chemical elements that occur in critically small amounts in the human body. Their number is so small that it is impossible to quantify.

The biological function of such compounds has not been clearly established (due to the low concentration), but it is known that they are involved in metabolic processes.

The absence of such elements or their excessive presence leads to serious violations.

Examples of ultramicroelements:

• selenium,

• chrome,

• tungsten,

• cobalt.

Biebersteinia species as a valuable medicinal plant are widely used in folk medicine. Scientists have found that the main chemical categories of Biebersteinia species include flavonoids, alkaloids, phenylpropanoids, terpenoids, essential oils, and fatty acids. They have also proven anti-inflammatory, analgesic, antibacterial, antioxidant, antispasmodic, hypotensive, hypoglycemic and anti-atherosclerotic effects of four types of Biebersteinia. [1;2]

The root of this plant has been used in folk medicine in the western region of Iran to treat diseases of the musculoskeletal system and repair bone fractures. The anti-inflammatory and analgesic activity of Biebersteinia multifida DC root extract has also been reported. [3;5;6;7;8;9].

The purpose of this work is to study the ultramicroelement composition of the Biebersteinia multifida plant by mass spectrometry with inductively coupled argon plasma.

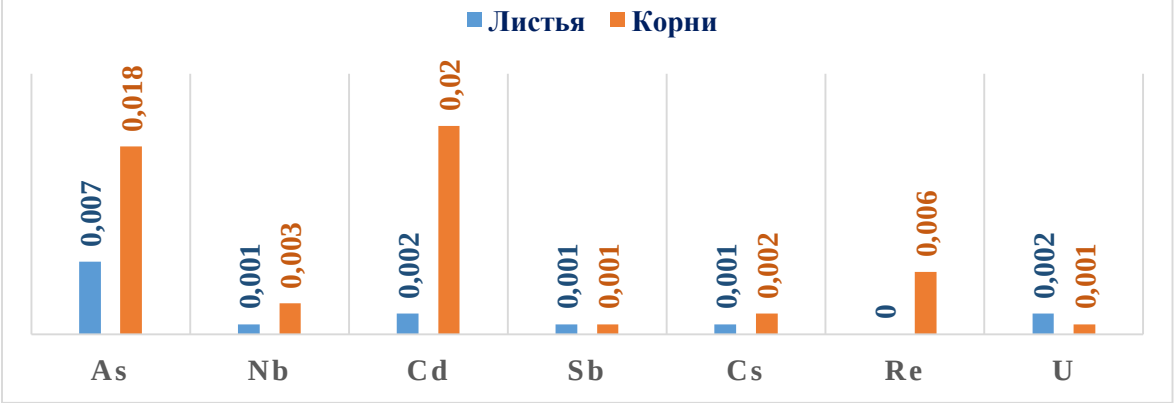
Materials and methods of research. During the flowering period, the vegetative organs of the plant are collected: the aboveground part of the shoot, leaves and the underground part - root crops. The optimal place for drying is shady or semi-shaded conditions. The plants were dried in the shade in the fresh air, the stem and leaves were tied in bundles, hung with flowers down or laid out on shelves covered with dry cotton cloth.

Standard solutions of multi elements were used for quantitative determination. To eliminate the background, a quadrupole universal UCT ™ system was used in the range from 1 to 285 au.

Analysis conditions: Device: NexION-2000. Perkin - Elmer with Syngistix ™ software for ICP-MS (USA); argon gas flow – 15 l/min; peristalline pump speed - 1.2 ml/min; detector – quadrupole mass analyzer; generator power – 1500W. Standard samples of solutions of elements GSO 7759-2000 (Be), GSO 7268-96 (Co), GSO 7252-96 (Pb), GSO 7472-98 (Cd) were used for verification of the device (relative error limits (P=0.95) ± 1.0%).

The results of the study. The results of chemical experiments are shown in Table 1. 44 species of macro-, micro- and ultramicroelements have been identified in the roots and leaves of the Biebersteinia multifida plant.

РИС 1. Ультрамикроэлементы растения *Biebersteinia multifida DC.*



According to the content of ultramicroelements in Biebersteinia multifida, As, Nb, Cd, Sb, Cs, Re, U, etc. are determined. Arsenic 0.018 mg/kg and cadmium 0.02 mg/kg were determined in the roots, and arsenic in the leaves is less - 0.007 mg / kg, cadmium 0.002 mg / kg. The amount of other ultramicroelements is distributed almost evenly throughout all organs of the plant, only rhenium is absent in the leaves (Fig. 1).

Conclusions

1. In terms of the content of ultramicroelements in the roots and leaves of the plant, Biebersteinia multifida is not inferior to previously known, famous medicinal plants such as Lagochilus inebrians, Ferula assa-foetida, Pdncryaf and dru

2. The study of the chemical composition of Biebersteinia multifida once again confirms the experience of using traditional medicine as an anti-inflammatory, analgesic, antibacterial, antioxidant, antispasmodic, hypotensive, hypoglycemic and anti-atherosclerotic agent.

3. After further research, it can replenish the arsenal of medicinal products of scientific medicine.

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