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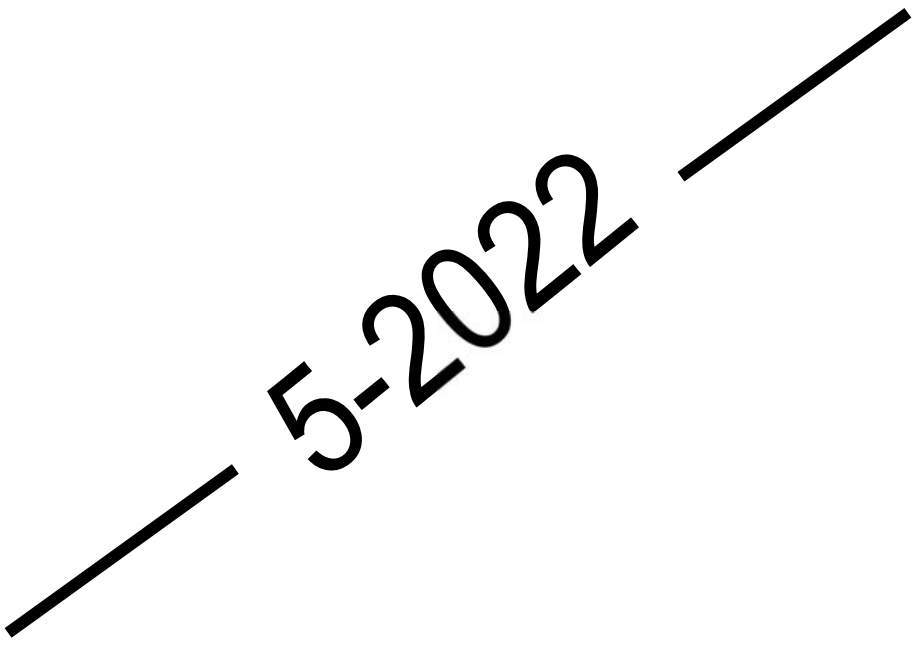

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ACHCHIQ SHUVOQ(ERMON) O‘SIMLIGINI MAKRO VA MIKROELEMENTLARNI TARKIBIDAGI MIQDORINI ANIQLASH

ОПРЕДЕЛЕНИЕ СОСТАВА И КОЛИЧЕСТВА МАКРО- И МИКРОЭЛЕМЕНТОВ РАСТЕНИЯ ПОЛЫНЬ ГОРЬКАЯ

DETERMINATION OF THE COMPOSITION AND QUANTITY OF MACRO- AND MICROELEMENTS OF THE PLANT WORMWOOD

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Annotatsiya.

Maqolada Farg’ona viloyati Yozyovon tumanida o’sadigan achchiq shuvoq (ermon)o’simligi bargi va bandi tarikbidagi makro-va mikroelementlar miqdori induktiv bog’langan plazma mass spektrometriya usuli yordamida o’rganildi.O’simlikning tadqiq qilingan organlarida 22 ta makro-va mikroelementlar aniqlandi. K, Mg, Na, Ca, S, P kabi makroelementlar aniqlandi. Barglarida eng yuqori miqdor kaliyga (7410,072 mg/kg) va eng kichik miqdor fosforga (288,627 mg/kg) tegishli ekanligi aniqlandi. Mikroelementlardan Fe, Li ,Be, B, Al ,Si, Ti, V, Cr, Mn, Co, Ni va Re lar aniqlandi. Barglarida eng yuqori miqdor kremniyga (400,250 mg/kg) ga tegishli bo’lib, temir miqdori 89,577 mg/kg ni tashkil etdi. Zaharli elementlar orasida faqat qo’rg’oshin barglarida juda oz aniqlandi.Element tarkibga asoslangan holda o’simlikning barglaridan turli oziq-ovqat qo’shimchalarida foydalanish mumkinligi ko’rsatib o’tildi.

Аннотация.

В статье приведены исследования методом масс-спектрометрии с индуктивно-связанной плазмой количество макро- и микроэлементов в составе листьев и стеблей растения полыни горькой,произрастающей в Ёзёвонском районе Ферганской области. В исследованных органах растения выявлено 22 макро- и микроэлемента. Выявлены такие макроэлементы, как K, Mg, Na, Ca, S, P. В листьях обнаружено наибольшее количество калия (7410, 072 мг/кг) и наименьшее количество фосфора (288, 627 мг/кг). Среди микроэлементов определены Fe, Li, Be, B, Al, Si, Ti, V, Cr, Mn, Co, Ni и Re.Из токсичных элементов в листьях обнаружен только свинец в ничтожных количествах. зависимости от содержания элементов На основании элементного состава, показано, что листья растения могут быть использованы в различных пищевых добавках.

Abstract.

The article presents a study by inductively coupled plasma mass spectrometry of the amount of macro- and microelements in the composition of the leaves and stems of the wormwood plant, growing in the Yozevon district of the Fergana region. In the studied organs of the plant, 22 macro- and microelements were found. Such macroelements as K, Mg, Na, Ca, S, P have been identified. The leaves contain the highest amount of potassium (7410, 072 mg/kg) and the least amount of phosphorus (288,627 mg/kg). Fe, Li, Be, B, Al, Si, Ti, V, Cr, Mn, Co, Ni, and Re were identified among the trace elements. Of the toxic elements, only trace amounts of lead were found in the leaves. depending on the content of elements Based on the elemental composition, it has been shown that the leaves of the plant can be used in various food supplements.

Kalit so‘zlar: *achchiq shuvoq, makro va mikroelementlar, induktiv bog’langan plazma mass spektrometriya.*

Ключевые слова: *полынь горкая, макро- и микроэлементы, масс-спектрометрия с индуктивно-связанной плазмой.*

Key words*: wormwood, macro- and microelements, inductively coupled plasma mass spectrometer.*

Introduction. Wormwood (Artemisia absinthium L.) belongs to the Asteraceae family, a wild-growing perennial herbaceous plant 50-100 cm high. The stems are straight, slightly ribbed, branched in the upper part, often forming short barren shoots at the base. The lower leaves are long-

petioled, twice or thrice pinnately dissected, medium-short-petiolate, twice pinnately dissected, the upper leaves are almost sessile, pinnate or twice trifoliately divided; segments of all leaves are linear-oblong, bluntly pointed [1]. The flowers are all tubular, yellow; marginal pistillate, median bisexual. Baskets are spherical, 2.5-3.5 mm in diameter, collected on short branches in one-sided brushes, which, in turn, form a narrow paniculate inflorescence. The wrapper of the baskets is tiled, the leaves are broadly membranous. Receptacle convex, hairy. Flowering in June-July. The fruit is a brownish pointed achene about 1 mm long, oblong-wedge-shaped, finely furrowed, with a rounded, slightly convex area at the apex. The fruits ripen in August-September. Propagated by seeds. The plant is resistant to drought and frost [2].

Materials and methods.*Determination of the mineral composition.* The plant was collected in April 2022 in the Yozevon district of the Fergana region. The leaves and stems of the plant were collected and dried in a dark place at room temperature.Determination of the elemental composition of samples of leaves and stems of wormwood was carried out by inductively coupled plasma mass spectrometry on an AT7500 ICP-MS instrument [3].

Preparation of the object for analysis: 4 g of leaves and 6 g of wormwood stems were weighed on an electronic balance and crushed in a mill. After grinding, a plant sample was added to the flask and 30 ml of concentrated nitric acid was added and kept for 30 min until a clear solution was obtained. Then the resulting solution was filtered into a flask with a capacity of 100 ml and distilled water was added up to the mark.

The samples of wormwood leaves and stems prepared above were analyzed in the *Semiguant* semi-quantitative mode on an inductively coupled plasma mass spectrometer.

Instrument parameters: plasma power 1200 W, integration time 0.1 sec. Instrument calibration and quantitative calculations were performed on the basis of the *Agilent Technologist multi-element calibration standard* (44 elements) [4,5].

Discussion of the research results. Table 1 presents the results of quantitative determination of 22 elements in the composition of plants. The elements are arranged in order of increasing relative atomic mass. Analysis of the obtained data on the elements presented in the table and diagrams (Fig. 1 and 2) shows that calcium, magnesium, sodium, calcium, sulfur, phosphorus, and iron are present in the greatest amount [6,7].

All of these elements are found in very small quantities. Among the macronutrients, the elements K, Mg, Na, Ca, S, P have been identified.

Table.

Mineral composition of Artemisia absinthium L, mg/kg

No. (p/ n)	Elements	Content of elements, mg/kg	
		Leaves	Stems
1 (7)	Li	0,377	0,047
2 (9)	Be	0,005	0
3 (11)	B	7,088	0
4 (23)	Na	2553,226	576,729
5 (24)	Mg	2937,753	455,768
6 (27)	Al	265,25	10,140
7 (28)	Si	400,250	121,027
8 (31)	P	288,627	34,336
9 (32)	S	531,587	174,874
10 (39)	K	7410,072	2458,217
11 (42)	Ca	1014,343	187,899

12 (48)	Ti	22,479	0,231
13 (51)	V	0,049	0,005
14 (52)	Cr	0,142	0,045
15 (55)	Mn	5,475	0,594
16 (57)	Fe	89,577	16,162
17 (59)	Co	0,014	0,002
18 (60)	Ni	0,126	0,065
19 (187)	Re	0,001	0
20 (202)	Hg	0	0
21 (208)	Pb	0,006	0
22 (238)	U	0,001	0

*In parentheses - the serial number of the element in the periodic system.

The amount of macronutrients in the leaves of the plant decreases in the following order:K > Mg > Na > Ca > S > P, and in the stems K > Na > Mg > Ca > S > P. It has been established that in the leaves the greatest amount is potassium (7410.072 mg/kg) and the least amount of phosphorus (288.627 mg/kg), and in the stems the greatest amount is potassium (576.729 mg/kg) and the least amount of sulfur (34.336 mg/kg).). Among the trace elements, Fe, Li, Be, B, Al, Si, Ti, V, Cr, Mn, Co, Ni, and Re were identified (Fig. 2). In the leaves of the plant, the amount of macronutrients is 14735.608 mg/kg, and in the stems 3887.823 mg/kg. In the leaves, the amount of trace elements is 790.833 mg/kg, in the stems 148.318 mg/kg. Obviously, the amount of macroelements and microelements in the leaves is much higher than in the stems [8,9]. Based on the above leaves, the plants can be recommended for use in various food supplements.

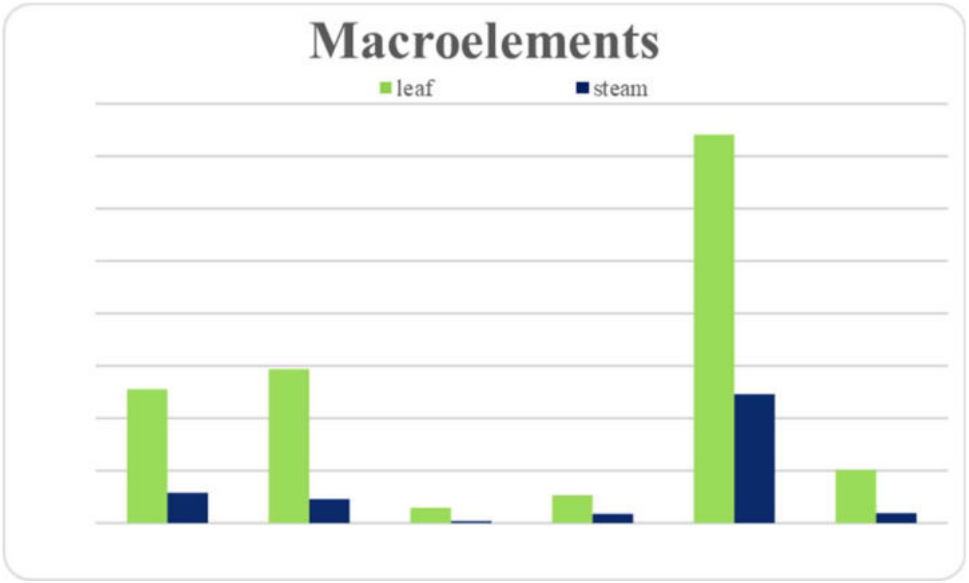

Fig.1. The content of macronutrients in leaves and stems Artemisia absinthium L.

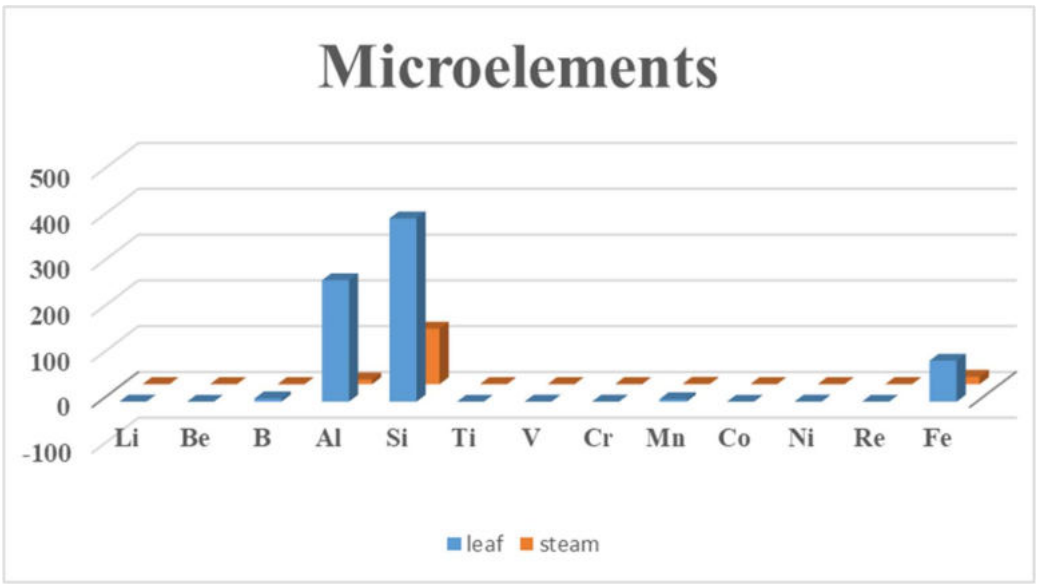

Fig.2. The content of trace elements in leaves and stems Artemisia absinthium L.

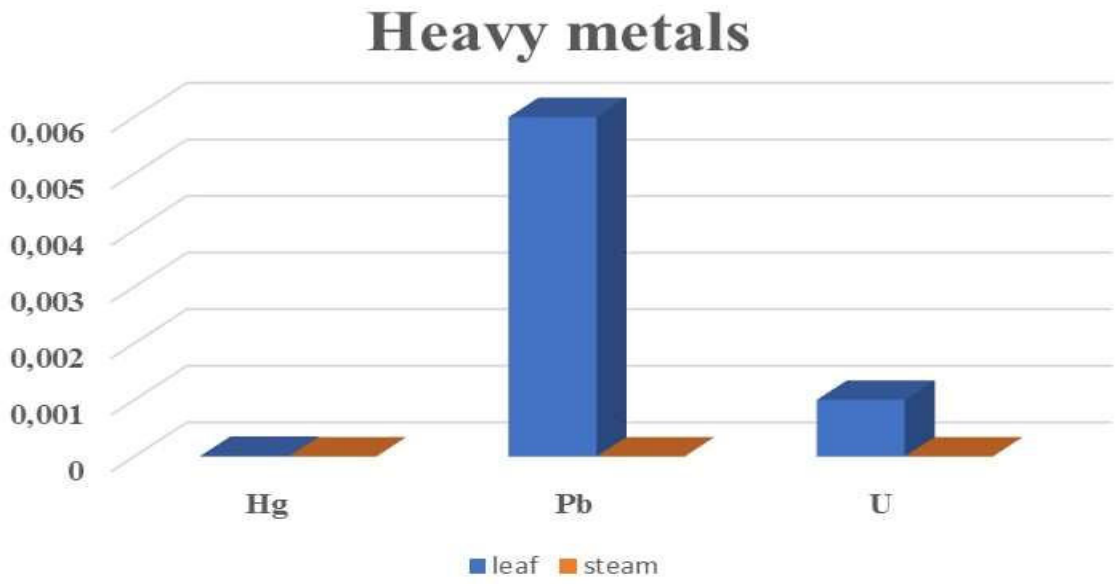

Fig.3. The content of heavy metals in leaves and stems Artemisia absinthium L.

Conclusions. For the first time, the elemental composition of leaves and stems of wormwood has been studied in detail. The mineral composition of the plant was studied by inductively coupled plasma mass spectrometry. The quantitative composition of 22 elements was determined. A natural tendency for the amount of an element to decrease with an increase in its mass is shown. Based on the content of elements in wormwood, its leaves can be recommended for use in various food supplements.

LITERATURE

1. Блинова К. Ф. и др.Ботанико-фармакогностический словарь: Справ. пособие/ Под ред. К. Ф. Блиновой, Г. П. Яковлева — М.: Высш. шк., 1990. — С.226—227.—ISBN 5-06-000085-0.

2. К.Ш.Тожибаев, Н.Ю.Бешко, Х.Ф.Шомуродов, У.Х.Кодиров, О.Т.Тургунов, В.К.Шарипова. Кадастр флоры Узбекистана Кашкадарьинская область. Тошкент-2019.

3. A.A.Ibragimov, T. Sh.Amirova, A.A.Ibrokhimov.Certification and classification of tissues based on their biological properties and chemical composition.*Universum: Chemistry and biology: Sci. Jorn. 2020*. № 10 (76), oktober, p.10-14.

4. Расулова М.О., Назаров О.М., Амирова Т.Ш. Определение содержания макро-и микроэлементов в различных видах кожи методом масс-спектрометрии с индуктивно-связанной плазмой//*Universum: химия и биология: электрон. научн. журн*. 2022. 6(96). URL: https://7universum.com/ru/nature/archive/item/13847.

5. T.Amirova, A.Ibragimov, O.Nazarov. Coloring Natural Silk with Natural Dyes Obtained from Plants.*Annals of the Romanian Society for Cell Biology*, 2021, 7089–7093. Retrieved from https: //www.annalsofrscb. ro/index. Php /journal/ article/view/2225.

6. Назаров, О. М., & Амирова, Т. Ш. (2022). ОПРЕДЕЛЕНИЕ СОДЕРЖАНИЯ МАКРО-И МИКРОЭЛЕМЕНТОВ В РАЗЛИЧНЫХ ВИДАХ КОЖИ МЕТОДОМ МАСС-СПЕКТРОМЕТРИИ С ИНДУКТИВНО-СВЯЗАННОЙ ПЛАЗМОЙ. Главный редактор, 18.

7. Амирова, Т. Ш. (2022, April). ХИМИЧЕСКАЯ ПОДГОТОВКА ТКАНЕЙ ИЗ НАТУРАЛЬНОГО ШЁЛКА. In Conference Zone (pp. 137-138).

8. https://medu.uz/instruksiya/achchi-shuvo-ermon-uti-va-barglari/

9. https://medu.uz/instruksiya/tirno-gul-kalendula-gullari/.