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Research Article

Microelements in Soils and Cenopopulation of Medicinal Plants

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ABSTRACT

The article provides an analysis of the cenopopulation and element composition of the medicinal *Capparis spinosa L.* distributed in calcisols formed on eroded alluvial-proluvial rock-gravel rocks in the south of the Fergana Valley. The predominance of immature plants in the cenopopulation was detected in the Arsif hills, and quantitative indicators of micronutrients in the vegetative and generative organs of *Capparis spinosa L.* were determined. The study of biomorphological characteristics of the plant during the growing season (April-October) was carried out in the identified 10 observational experimental field populations. Soil, plant element analysis was performed by neutron-activation method. In this case, the samples were irradiated in a nuclear reactor with a neutron flux of 5 × 10^{13} neutrons/cm² sec, and their quantities were determined in accordance with the half-life of chemical elements. It has also been compared with research materials conducted by world scientists on the importance and pharmacological properties of botanicals in medicine and the food industry, as well as their botanical characteristics.

Keywords: Medicinal plants, *Capparis spinosa L.*, Calcisols, Microelement, Cenopopulation analysis, Grass, Juvenile, Immature, Virginil stage, Generative, Senile period

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INTRODUCTION

Mankind has been using various herbs for thousands of years to find a cure for its ailments, and people have been particularly well aware of the properties of medicinal plants and have been able to use them effectively. Unfortunately, nowadays, natural medicinal plants have been virtually non-existent. According to the data, only 2.3% of the 6,400 types of medicines consumed in our country are natural medicines. If we look at the countries of the world, the propagation and processing of medicinal plants is widely developed in countries such as China, India, Canada and the United States. China alone produces 700,000 tons of medicinal plants a year, of which 122,000 tons of raw materials worth $ 822 million are exported and $ 50 billion is traded through processing. Despite the high potential of the industry in our country, the existing opportunities are not used enough. In 2019, the country exported 19,000 tons of medicinal plants, finished and semi-finished or raw materials worth $ 48 million. Today, 93 enterprises produce medicines from 89 types of medicinal plants. Only 7% of the volume of natural medicines in total consumption is accounted for by local manufacturers. The results of the analysis show that the protection of natural resources of medicinal plants, their rational use, establishment of plantations, reproduction of competitive species in domestic and foreign markets, introduction of new species of medicinal plants suitable for soil climatic conditions, creation of value chain through primary and deep processing shows that the work being done in this area is lagging behind the requirements of the time.

One of the most pressing issues of today is the development of technology for the cultivation and cultivation of natural flora and medicinal plant species belonging to foreign flora, targeted research to obtain environmentally friendly products, introduced into medical practice. One such naturally occurring medicinal plant species is the *Capparis spinosa L.* plant.

Scientific sources and foreign publications on the origin of *Capparis spinosa L.*, its distribution on the planet (Anwar F, Muhammad G, 2016), botanical and genetic, medicinal properties, macro and micronutrient content (Jiang HE, *et al.*, 2007), cultivation and cultivation agrotechnology (Chedraoui S, *et al.*, 2017), technology of food production and data on cost-effectiveness (Badr S and El-Waseif M, 2017) abound.

Numerous scientific studies have been conducted on the bioecological and medicinal properties of *Capparis spinosa L.*, chemical composition of fruit elements, cultivation techniques, botanical properties (Zokirov KZ, Khudoyberganov R, 1972), development of desert areas, application in biological regeneration, reproduction, development of biotechnology (Eshonkulova NT, 2018).

Although the properties and characteristics of the soils of the Fergana Valley, where these plant areas are widespread, have been studied by G. Yuldashev (Turdaliev T, Yuldashev G, 2015, Yuldashev G, Turdaliev A, 2014), M.Isagaliev (Isagaliev M, *et al.*, 2019, Engineers AM, 2020), A.Turdaliev (Turdalievich TA, Gulyam Y, 2016) and others (Tukhtabaev JS, 2021, Tukhtabaev JS, 2020, Tukhtabaev JS, *et al.*, 2021, Kamoliddin A, Iskandar M, 2020), the soil the biogeochemistry in the medicinal plant system has not been thoroughly studied.

Cenopopulation analysis of the distribution of this plant species in the southern Fergana hills, biogeochemical properties of the plant and its distribution soils, elemental composition of soils and plant organs, medicinal properties and raw material reserves are not sufficient. In addition, the study of biomorphological features of *Capparis spinosa L.*, distribution areas in the calcisols of southern Fergana, the study of the elemental composition of vegetative and generative organs, the location of this species in the vegetation, its cenopopulation analysis.

In the following period, population growth dramatically increased the demand for medicinal plants. As a result, due to the unplanned use of medicinal plants, their natural resources are reduced, and even some species have to be included in the Red Book. Therefore, the cenopopulation analysis, which reveals the soil-climatic conditions of each species and the laws of natural regeneration, is of great scientific and practical im-

portance.

MATERIALS AND METHODS

The object of study is the light calcisols formed on the protected, eroded weakly skeletal alluvial-proluvial rocks of southern Fergana, and the plant *Capparis spinosa L.*, which is widespread in this area.

Cenopopulation analysis of biomorphological properties of plants during ontogeny was studied using the methods of O.V.Smirnova and others (Smirnova OV, *et al.*, 1976), root system P.K.Krasilnikov (Krasilnikov PK, 1983). At the same time, the name of the plant species is based on the work "Determinant the plants of Central Asia" (Kamelin RV, 2015) and the International Electronic Database Names Index (www.ipni.org) (Gilmour R, 2000).

I.N.Beydeman (Beideman IN, 1974) used the methods of studying the seasonal development of the plant, i.e. the formation of grass during the growing season, the formation of true leaves, the growth of twigs and stems, budding, the beginning and end of flowering, the formation and ripening of fruits, the end of the growing season. The study of the duration of the flowering period was conducted in the identified 10 observational experimental populations.

The morphogenetic methods of V.V.Dokuchaev, pedogeochemical approaches of M.A. Glazovskaya and A.I.Perelman were used as the main methods in the study of soil properties of *Capparis spinosa L.* (Turdaliev T, Yuldashev G, 2015). Soil, plant element analysis was performed by neutron-activation method. In this case, the samples are 5×10^{13} neutrons/cm^{2}sec in a nuclear reactor irradiated with a neutron flux, and their quantities are determined in terms of the half-life cycles of the chemical elements.

RESULTS AND DISCUSSION

TIn biogeochemical research, the identification of correlations between the chemical, more precisely the elemental composition of plants and the elemental composition of the soils in which they grow is of great scientific and practical importance in establishing programmed yields in agriculture. In particular, knowledge of the exact amount of macro and micronutrients in the generative and vegetative organs of the plant *Capparis spinosa L.*: Roots, stems, leaves, buds, flowers, fruits also expands the use of this plant species in phytobars, food and pharmaceutical industries.

The study of ontogenetic and phenological properties of plants is one of the most convenient and effective methods to determine changes in different phases of the observed plant species, their resistance to environmental conditions, productivity, as well as the rhythm of life processes in them.

Research work has been carried out in the southern Fergana hills (Arsif, Satkak, Chimgan, Altiariq) since 2017. These hills are located at an altitude of 500-750 m above sea level. These areas are weak and moderately plastered, gravelly, skeletal, perennial precipitation of 180-200 mm. These soils have low and low levels of humus and nutrients. The level of coverage with natural vegetation is 40%-60% depending on the slope exposure. The main part of these plants are ephemeral and ephemeroids.

Capparis spinosa L. Capparaceae (Capparidaceae) is a family of two genus plants with 40 genera and 850 species. Most of the plants belonging to the Capparis family are wild species, which are mainly distributed in arid regions of tropical and subtropical regions (Hansen JM, 1991).

Geographically, *Capparis spinosa L.* is native to the Mediterranean, southern Europe, the Caucasus, Crimea, Azerbaijan, Turkmenistan, Kazakhstan, Uzbekistan, Pakistan, and India. This plant is cultivated in France, Spain, Italy, Algeria, Cyprus, Greece and North America. The name of the plant is associated with the Dashti-Kavir desert in Iran. Because *Capparis spinosa L.* is the most common plant species in these areas (Hammerman AF, 1990 and Valijanovich MO, 2021).

The natural distribution of *Capparis spinosa L.* in Uzbekistan depends on different geographical conditions. In particular, it can be found on rocky hills, sometimes in fields, on roadsides, along ditches, on hills, around railways, on the dry banks of canals, near old walls (Zokirov KZ and Khudoyberganov R, 1972).

During our studies, it was found that this species has entered the desert and semi-desert zone, in the foothills and lower mountain regions, sometimes up to the middle zone of the mountains. The study of the biological and ecological properties of any plant requires, first of all, the study of its condition under natural conditions. The natural adaptation of *Capparis spinosa L.* to soil and air drought allows it to grow in arid areas where water is scarce and in soils with high concentrations of water-soluble salts.

Capparis spinosa L., has been observed by M.S.Saksali et al as a promising plant that can grow in arid and strongly saline soils with nutrient deficiencies as well as in high temperature regions (Sakcali MS, *et al.*, 2008).

The length of the stem of plants distributed in the study areas reached 70-170 cm depending on the growing conditions. The inside of the newly formed young stems is covered with fine short hairs, but the hairs fall off as the branch grows during the growing season. The color of the stem is green, there are twisted spines on the underside of the leaf bundle. The number of side branches was 2-6, depending on the stage of development, and was 10-15 cm long. Poya diameter 7-12 mm. The leaves on the stem of the plant differ in shape, width and length. Usually the leaf shape is round, inverted ovate or elliptical, 3-6 cm long, green, hairless or the lower side is scattered hairs, arranged in series on the main stem and lateral branches through a short leaf band.

The flowers are solitary, slightly zygomorphic, 5-8 cm in size, fragrant, located in the axils of one leaf, the petals are 4, curved, ovoid, green, covered with small short hairs on the outside. The petals are 4, but 2 are up to half, white or light pink, many paternal pollen, varying in length, pollinated, brown (flowers turn red after pollination). The flowers are 4-6 cm long. It blooms in April-May, depending on the amount of precipitation in the study area. The fruit is a multi-seeded berry. The color is green, with long white stripes. The shape is inverted ovate, oblong, walnut or round, many-seeded, elongated. The outside is smooth, the inside is dark red. The fruit resembles the appearance of a watermelon. When the fruit was ripe, the fruit peel turned outwards and opened. Fruits are 3-5 cm long and 1.3-2.7 cm wide.

From ancient times the herb is used in the treatment of toothache, heart and headaches. To do this, tinctures are prepared from various organs of the hive (flower, root, leaf, fruit). The ancient Arabs used *Capparis spinosa L.* root to treat various allergic and rheumatic diseases. Due to its strong anti-inflammatory use and analgesic properties, *Capparis spinosa L.* is one of the most effective medicinal plants, so it has been used as a remedy against various diseases. From this point of view, today in the world pharmaceutical industry the preparation of drugs based on these recommendations is widely practiced. In particular, for the first time in medicine, the Indian company Himalayan Drak developed and tested the drug Liv-52 for the treatment of liver diseases, and now it is used effectively in medicine. The main part of the drug, ie 65%, is made up of *Capparis spinosa L.* products (Movafeghi A, *et al.*, 2008, Isagaliev M, *et al.*, 2019).

Today, the regular addition of *Capparis spinosa L.* to the diet helps to

relieve rheumatic pains. Currently, all parts of the plant are used in modern medicine and folk medicine in the treatment of meteorism, goiter, dentistry (gum and dental diseases), cardiovascular diseases, as well as hypertension, pruritus, jaundice, neurosis, brucellosis (Anwar F and Muhammad G, 2016).

Given the growing demand for raw materials of *Capparis spinosa L.*, the need for in-depth study of its biogeochemistry and agroecology was put on the agenda, given the special attention paid to its export potential. It is important to determine the position of the *Capparis spinosa L.* in the vegetation cover, the status, ontogeny and viability of the populations that determine its natural recovery, and thus its current and future raw material reserves.

Preliminary results of the analysis of *Capparis spinosa L.* cenopopulation in 10 experimental observation sites (100 m^2 each) in Arsif, Satkak, Chimgan, Altiariq hills were as follows *(Table 1, Figure1)*: Grass (p) plants averaged 6.0, 5.0 plants belonging to the juvenile (j) state, 10.8 plants belonging to the immature (im) stage, 5.5 plants belonging to the virginil (v) state, 3.5 plants belonging to the generative (g) period, plants typical of the senile (s) period were 2.3.

In relatively warm climates, the growth of these plant grasses occurs in early April. Observations in our experimental fields revealed that *Capparis spinosa L.* grasses germinate in late April to early May. In grasses, the seeds have 2 leaves, 2-3 cm in height, the roots are 12-14 cm long and branched up to 2 rows. It was observed that 80%-85% of the grasses pass to the juvenile stage in late May and early June.

In the juvenile mode, the seeds continue to grow in the palla leaves. Plants belonging to this stage are 5-7 cm tall, forming 3-4 leaves, the first true leaves are smaller. It was later observed that each chin leaf that grows grows longer than the previous one. The main root reaches 20-22 cm and branches in 2-3 order. The peculiarity of this stage is explained by the drying of the seed palla leaves.

Plants belonging to the immature stage are observed in mid-June, their height is 15-20 cm, the main root is 45-50 cm, branched to 2-3 (4) order. It was observed that 60%-70% of plants belonging to the immature stage go to the virginil stage in late June and early July, and10%-15% go to the virginil stage in early May after the winter dormancy period. The duration of the immature phase lasts from 20-25 days to 10 months.

Seedlings of *Capparis spinosa L.*, plants belonging to the juvenile and immature stages, are resistant to drought, but most of them die due to the crushing of livestock.

Plants belonging to the virginil stage are observed in late June to early July, the length of their main stem reaches 40-80 cm, and it branches up to 2 orders. The root reaches 90-110 cm and branches in 3-4 orders. At this stage is characterized by the formation of thorns on the stems and the thickening of the main root (diameter 4–5 mm). The duration of the virginil state depends in many respects on external environmental factors. It was observed that 15-20 per cent of virginil plants enter the full generative period in the first year and the rest in the second year.

Vegetation of plants belonging to the middle-aged generative stage in the Arsif hills lasted from April to December. The length of the main generative stem is 70-170 cm, branched to 2-3 rows, leaves 4 x 3 cm. In one bush formed an average of 9–14 generative stems. Growing of generative plants was observed in May, flowering in late May, and the formation of fruits began in the second half of June.

The fruiting process of *Capparis spinosa L.* lasted from June to October. One bush, *Capparis spinosa L.*, produced an average of more than 80 fruits (180-210 in the Arsif and Satkak hills) on the Chimgan hills, and 150 on some bushes. An average of 220-235 seeds were observed in each fruit, the absolute weight of 1000 seeds was 7.25 g. Seed length 1-3 mm (Engineers AM, 2020) kidney-shaped, brown (Sher A, 2009). It was found that the length of plant seeds in the study areas was 2.8-3.3 mm. Fruit ripening took place in the second decade of July in the hills of Arsif and Satkak, and in the hills of Chimgan and Altiyarik in late July and early August *(Figure 2)*.

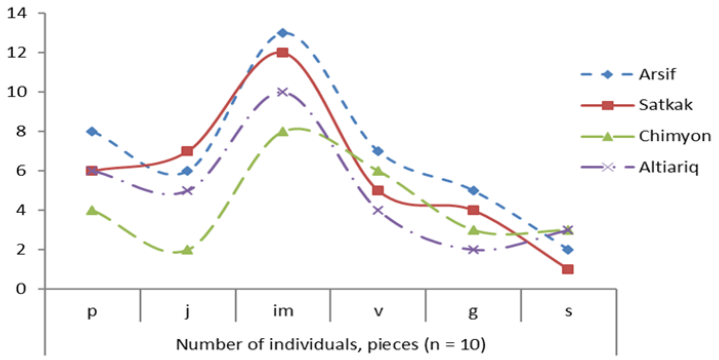

Figure 1: Graph of *Capparis spinosa L.* cenopopulation in elementary landscapes

Table 1: Cenopopulation of *Capparis spinosa L*

Elementary landscape	Number of individuals, pieces (n=10)						Total
	p	j	im	v	g	s	
Arsif	8	6	13	7	5	2	41
Satkak	6	7	12	5	4	1	35
Chimyon	4	2	8	6	3	3	26
Altiariq	6	5	10	4	2	3	30
Average	6,0	5,0	10,8	5,5	3,5	2,3	33,0

Figure 2: The plant *Capparis spinosa L.* growing in the experimental area

In our country, extensive research has been conducted by academician K.Z.Zokirov and professor R.Khudoyberganov (Zokirov KZ, Khudoyberganov R, 1972) on the botanical properties of *Capparis spinosa L.*, the chemical composition of fruits and seeds, nectar separation and cultivation techniques. N.T.Eshonkulova (Eshonkulova NT, 2018) studied the use and cultivation of *Capparis spinosa L.* in the development of the arid climate of the country, the development and implementation of technology for the preparation of food products with a unique chemical composition. However, the properties of the plant and the soil, its biogeochemical properties in relation to the composition of the chemical element have not been studied. In our study, the cenopopulation of the *Capparis spinosa L.* plant, the migration of chemical elements in the plant-soil chain, and the biogeochemical properties were studied.

This plant is valued by many peoples of the world as a potential source of nutrients, vitamins, phenolic compounds, flavonoids, nutrients in its organs, as well as its strong antioxidant properties and ability to grow in arid conditions.

According to the data, 100 g of *Capparis spinosa L.* contains: Phosphorus (679 mg/g), sodium (652 mg/g), calcium (419 mg/g), magnesium (213 mg/g), potassium (157 mg/g), macro and micronutrients such as iron (6.8 mg/g), zinc (5.5 mg/g), manganese (3.30 mg/g) have been reported (4).

The difference of this species from other medicinal plant species is the breadth of its use in folk medicine, modern medicine, pharmaceuticals, food and cosmetics industries. In particular, in cooking, unopened buds of this plant are also used young twigs (Al-Soqeer A, 2011), mainly consumed by their proper selection, salting or marinating (Zhang T and Tan DY, 2009). In the process of marinating the *Capparis spinosa L.* in vinegar, mustard oil is added to it to create a unique taste. Under the influence of marinade, the formation of white spots is observed, which is associated with rutin (vitamin PP) crystals (Tlili N, *et al.*, 2009, Pitkin RM, *et al.*, 2000, Gyaneshwar P, *et al.*, 2002). In European countries, bitter *Capparis spinosa L.* garnishes a variety of salads, pizzas, sauces, meat and fish dishes (Petanidou T, *et al.*, 1996). The dried leaves of *Capparis spinosa L.* are used in the preparation of dry cheese and as a yeast instead of a sedative, wrinkling enzyme (Soyler D and Arlan N, 2000).

Capparis spinosa L. buds contain elements of vitamin K, potassium, calcium and magnesium, which strengthen the bones and prevent the development of osteoporosis. *Capparis spinosa L.* prevents hair loss due to the presence of iron and B vitamins, makes hair grow beautiful and shiny (Rhizopoulou S and Psaras GK, 2003).

The recent discovery of the substance stachidrin in *Capparis spinosa L.* has aroused great interest among scientists. This substance has strong antimetastatic properties and is used in the treatment of prostate cancer. This substance stops the growth and development of cancer cells. This scientific breakthrough is important in the development of anti-cancer drugs. The use of this plant in bowel cleansing and prevention of colon cancer plays an important role (Zhang Y, *et al.*, 2012).

The high content of sodium in the vegetative and generative organs of plant species, especially in saline soils of desert areas, requires caution in some diseases. *Capparis spinosa L.* may be problematic in humans when consumed in the following diseases: Hypotension, constipation, and is not recommended for pregnant women because high sodium levels have been shown to affect the fetus, in individual cases, and in some cases to cause allergies (Eshonkulova NT, 2018).

Although biologically active organic substances in medicinal plants have been systematically studied, biologically active mineral elements have not been adequately studied. As a result of the growing number of drugs made from medicinal plants, the analysis of their elemental composition is one of the most important tasks.

It is known that the amount of chemical elements and substances varies in different soil types (Turdaliev T and Yuldashev G, 2015) *(Table 2)*. Therefore, the chemical element composition of plants depends on the amount of chemical elements in the soil in which the plant grows.

Table 2: Amount of microelements in soils (n=7)

Section number	Depth of cut cm	Element (µg/g)			
		Mn	Zn	Co	Mo
Calcisols					
1 M/O	0-10	370	55.8	4.71	<0.1
	Oct-30	430	37.1	7.35	1,6
	30-56	520	59.8	7.45	0,55
	56-120	420	61.1	8.58	1,1

Old irrigated hydromorphic soils					
7A	0-28	710	85,1	2,7	2,65
	28-36	620	68,10	3,0	2,35
	36-93	530	71,20	2,94	2,50
	93-111	830	91,9	5,4	2,55
	111-140	620	85,0	6,6	5,45
	140-200	650	11,9	9,0	6,45
Newly irrigated hydromorphic soils					
6A	0-18	665	77,0	7,8	2,60
	18-32	610	61,0	7,1	2,55
	32-55	920	98,1	8,0	2,60
	55-80	630	86,0	4,9	4,35
	80-140	630	80,2	5,4	4,20
	140-200	635	120	6,7	6,90

According to the data in *Table 2* above, the amount of chemical elements in soils formed under different conditions varies, due to soil genesis, soil-climatic conditions, use in agriculture, and so on. For example, Mn and Zn were found to be higher in the 32–55 cm layer of newly irrigated hydromorphic (6A-cross-section) soils than in other soil layers, while Mo calcisols were found to be present in the lowest amounts in the 0-10 cm layer.

Strengthening the process of hydromorphism leads to an increase in the amount of Mn, Zn, Mo in the soil and its layers from calcisols to meadow soils. This can also be explained by the fact that the geochemical migration of these elements towards a naturally dependent landscape is accumulated under the influence of agriculture with the use of mineral and organic fertilizers.

The elemental composition of the *Capparis spinosa L.* which is widespread in the calcisols of South Fergana, changes under the influence of soil properties, plant type, natural climatic conditions and other factors. It was observed that the amount of elements in the composition of *Capparis spinosa L.* varies several thousand times depending on the physiological properties of plant organs *(Table 3)*.

The table shows that the amount of micronutrients studied varies in plant organs, or Mn 9-100 μg/g, Mo-0.29-5.2 μg/g, Co-0.086-0.25 μg/g and Zn-5 μg/g. Oscillations in the range of 1–34.1 μg/g were detected. Of the trace elements studied for absorption into plant organs, the highest amount is Mo (52 μg/g in the root bark) and the lowest amount is Co (0.018 μg/g in the stem). Note that the element Mn is absorbed in very high amounts in the plant leaf, Mo in the root bark compared to other organs, and Zn is accumulated in large quantities in the fruit. If we pay attention to the classification of the studied elements in terms of their biological role (Özcan M, 2001), they are among the biogenic, essential elements necessary for life.

According to the methodology, Mo belongs to the group of strong and very strong aggregates by root bark and fruit. According to the range of biological absorption coefficients, the elements Co, Zn, Mn belong to the group of very weak, weak and moderately biodegradable, respectively.

This, in turn, satisfies the need for certain macro and micronutrients by consuming a biologically active supplement made from this medicinal plant as well as the daily norm of food. The study of the correlation between the elemental composition of the plant and the elemental composition of the soil in which it grows expands the scope of its use in folk medicine, phytobars, modern medicine and pharmaceutical industry. This makes a huge contribution to socio-economic development.

The main economic importance of *Capparis spinosa L.* is related to the types of products made from it. In particular, pickled flower buds, known as "capers" or "caper berry", are the main subject of trade in international markets. In recent years, the annual growth rate of production from *Capparis spinosa L.* has increased by 6%. Currently, pumpkin is valued as an important consumer product in the United States and about 60 countries around the world, where the cost of 1 kg of ready-to-eat product is $ 25. From this round, the Chinese earn 3 million a year. They are making a profit in the amount of USD (Rhizopoulou S and Psaras GK, 2003).Today, the Kingdom of Saudi Arabia, Lebanon, Syria, and the Mediterranean countries have proposed *Capparis spinosa L.* as the main crop type to raise the socio-economic level (Saadaoui E, *et al.*, 2011).

However, some cosmetic products derived from the fruit extract of *Capparis spinosa L.* (e.g., Gatuline Derma-Sensitive-$ 74.99; Skin moon-$ 76; Skin save-$ 7.70) are used as anti-aging, skin protection, or anti-inflammatory agents. was commercialized and put up for sale (Yuldashev G and Turdaliev A, 2014).

Table 3: The amount of micronutrients in the organs of *Capparis spinosa L.* (μg/g) and the coefficient of biological absorption, (n=14)

Plant	Plant organ	Microelement (μg/g)				Biological absorption coefficient			
		Mn	Mo	Co	Zn	Mn	Mo	Co	Zn
Capparis spinosa L.	Root skin	32	5,2	0,25	27	0,086	52	0,053	0,48
	Root core	9,0	0,55	0,16	5,1	0,024	5,5	0,034	0,09
	Stem	16	0,29	0,086	14	0,043	2,9	0,018	0,25
	Leaf	100	1,8	0,18	30	0,270	1,8	0,038	0,54
	Bud	26	0,58	0,12	33	0,070	5,8	0,025	0,59
	Flowers	24	0,50	0,13	30	0,065	5,0	0,028	0,54
	Fruit	34	2,1	0,19	34,1	0,092	21	0,040	0,61

In practice, according to the technical regulation TR TS 021/2011 "On the safety of food products" in Russia, the drug IPOSEA in acetic acid is 102.00 rubles, the drug IBERICA is 183 rubles. salty Federici drug is sold in pharmacies at a price of 276 rubles, vinegar wine drug at 370.0 rubles. There are also high-quality certified varieties 107-ISO 9001 and 25-ISO 22000 (Skalny AV, 2004).

In Jizzakh region of the country, 12 enterprises have launched the export of *Capparis spinosa L*. It should be noted that until recent years, this plant has been neglected, whereas *Capparis spinosa L*. is a very valuable raw material in the pharmaceutical, food industry. In 2019, in Jizzakh region, this plant was harvested from existing natural resources and cultivated. 1909 tons of ready-to-eat products were made from its flower buds and fruits. It exported $ 3.2 million worth of goods to Turkey and Spain (Sher H, Alyemeni MN, 2010, Kholikova NB, *et al.*, 2019).

CONCLUSION

According to the observations, the viability, drought tolerance of *Capparis spinosa L*. populations is relatively high, and plants belonging to the immature and virginil stage are 5-10 times more than senile. This shows that it is possible to collect raw materials from the southern Fergana hills on a regular basis. Determining the quantitative supply of nutrients and medicinal substances in *Capparis spinosa L*. and other medicinal plants will further increase the productivity and medicinal properties of medicinal plants.

The series of biological absorption is assimilated in the form of 0,0n→0,n→n→10n, depending on the amount of elements studied. Molybdenum occupies a very strong biological accumulator, while manganese, zinc, and cobalt occupy a medium, weak, and very weak retention line.

By studying the amount of chemical elements in the organs of the plant *Capparis spinosa L*. depending on the composition of the soil, it is possible to assess its sanitary and hygienic characteristics, as well as the level of safety in pharmaceutical use and food preparation. Because this plant has anti-cancer, anti-microbial and anti-viral effects, it requires in-depth study of its chemical composition. *Capparis spinosa L*. can be used as a raw material in the creation of new drugs.

The growing demand for natural and environmentally friendly products made from *Capparis spinosa L*., the global increase in its use in the food industry, modern medicine, the increase in natural products made from it in the pharmaceutical and cosmetic industries, in turn increase the pressure on natural resources of this species. This would jeopardize the natural reserves of *Capparis spinosa L*. in the future. Therefore, research on the study of the plant *Capparis spinosa L*. shows the need to focus on its cultivation and intensive cultivation, conducting cenopopulation analyzes to assess the available natural resources.

REFERENCES

1. Anwar F, Muhammad G. *Capparis spinosa L.*: A plant with high potential for development of functional foods and nutraceutical. Int J Pharmacol. 2016; 12: 3.
2. Jiang HE, Li X, Ferguson DK, Wang YF, Liu CJ, Li CS. The discovery of *Capparis spinosa L.*(Capparidaceae) in the Yanghai Tombs (2800 years bp), NW China, and its medicinal implications. J Ethnopharmacol. 2007; 113(3): 409-420.
3. Chedraoui S, Abi-Rizk A, El-Beyrouthy M, Chalak L, Ouaini N, Rajjou L. *Capparis spinosa L*. in a systematic review: A xerophilous species of multi values and promising potentialities for agrosystems under the threat of global warming. Front Plant Sci. 2017; 8: 1845.
4. Badr S, El-Waseif M. Influence of caper (*Capparis spinosa L.*) seeds powder addition as source of bioactive phytochemicals on quality attributes and shelf life extension of beef burger patties. Middle East J. 2017; 6(4): 1243-1258.
5. Zokirov KZ, Khudoyberganov R. Capers of the prospects for its use. Science. 1972; 120.
6. Eshonkulova NT. Biotechnology for the development of steppe and desert zones and the production of biotechnological products using the plant Thermoxerophyte *Capparis spinosa L*. 2018; 18-25.
7. Turdaliev T, Yuldashev G. Geochemistry of pedolithic soils. Monograph. Science. 2015; 200.
8. Yuldashev G, Turdaliev A. Geochemical features of cyclic elements in desert agrolandscapes. Agrarian Science. 2014; 10-12.
9. Isagaliev M, Obidov M, Matkholiqov R. Morphogenetic and biogeochemical properties of the medicinal *Capparis spinosa L*. Scientific Reports. 2019; 46-49.
10. Engineers AM. Clarification of irrigation technology of cotton varieties with mineralized water in the water shortage conditions. Journal of Critical Reviews. 2020; 7(12).
11. Turdalievich TA, Gulyam Y. Morphological features of pedolytical soils in Central Ferghana. Eur Sci Rev. 2016; 5-6.
12. Tukhtabaev JS, Rakhmonov AN, Uktamov KF, Umurzakova NM, Ilxomovich R. Econometric assessment of labor productivity in ensuring the economic security of industrial enterprises. Int J Mod Agric. 2021; 10(1): 971-980.
13. Tukhtabaev JS. Econometric evaluation of influential factors to increasing labor efficiency in textile enterprises. Advances in Mathematics: Scientific Journal. 2020.
14. Tukhtabaev JS, Samiyeva GT, Tashnazarov SA, Taylakova DB, Chuyanov KU. Econometrical assessment of factors affecting diversification of production in farms ensuring food security. Int J Mod Agric. 2021; 10(1): 981-990.
15. Kamoliddin A, Iskandar M. Geochemical barriers in irrigated soils and the impact of them on plants. Eur J Mol Clin Med. 2020; 7(3): 3082-3089.
16. Smirnova OV, Zaugolnova LB, Ermakova IM. Cenopopulation of plants. Science. 1976; 217.
17. Krasilnikov PK. Methodology for field study of underground parts of plants. Science. 1983; 116-119.
18. Kamelin RV. Key to plants of Central Asia: A critical abstract of flora. Science. 2015; 11.
19. Gilmour R. The international plant names index. Electronic Resources Review. 2000.
20. Beideman IN. Methods of studying the phenology of plants and plant communities. Science.1974.
21. Hansen JM. The palaeoethnobotany of Franchthi cave. Indiana University Press. 1991.
22. Hammerman AF, Kadaev GN, Yatsenko-Khmelevsky AA. Medicinal Plants: "High school". 1990; 305.
23. Valijanovich MO. Biogeochemistry properties of calcisols and *Capparis Spinosa L*. Ann Romanian Soc Cell Biol. 2021:3227-3235.

24. Sakcali MS, Bahadir H, Ozturk M. Ecophysiology of *Capparis spinosa L.*: A plant suitable for combating desertification. Pak J Bot. 2008; 40(4): 1481-1486.
25. Sher A. Antimicrobial activity of natural products from medicinal plants. J Med Sci. 2009.
26. Al-Soqeer A. Antioxidant activity and biological evaluation of hot-water extract of Artemisia monosperma and *Capparis spinosa* against lead contamination. Res J Bot. 2011; 6(1): 11.
27. Zhang T, Tan DY. An examination of the function of male flowers in an andromonoecious shrub *Capparis spinosa*. J Integr Plant Biol. 2009; 51(3): 316-324.
28. Tlili N, Nasri N, Saadaoui E, Khaldi A, Triki S. Carotenoid and tocopherol composition of leaves, buds, and flowers of *Capparis spinosa* grown wild in Tunisia. J Agric Food Chem. 2009; 57(12): 5381-5385.
29. Pitkin RM, Allen L, Bailey LB, Bernfield M. Dietary Reference Intakes for Thiamin, riboflavin, niacin, vitamin B6, folate, vitamin B12, Pantothenic acid, biotin and choline. Nat Acad Press. 2000.
30. Gyaneshwar P, Kumar GN, Parekh LJ, Poole PS. Role of soil microorganisms in improving P nutrition of plants. Plant soil. 2002; 245(1): 83-93.
31. Petanidou T, Van Laere AJ, Smets E. Change in floral nectar components from fresh to senescent flowers of *Capparis spinosa* (Capparidaceae), a nocturnally flowering Mediterranean shrub. Plant Syst Evol. 1996; 199(1): 79-92.
32. Soyler D, Arlan N. The effects of some substance-regulating substances on the sniffing of the feathers of Cape (*Capparis spinosa L.*). Turk J Agric. 2000; 24: 595-600.
33. Rhizopoulou S, Psaras GK. Development and Structure of Drought-tolerant Leaves of the Mediterranean Shrub *Capparis spinosa L*. Ann Bot. 2003; 92(3): 377-383.
34. Zhang Y, Chen Y, Shi L, Li J, Guo Z. Recent progress of double-structural and functional materials with special wettability. J Mater Chem. 2012; 22(3): 799-815.
35. Özcan M. Pickling caper flower buds. J Food Qual. 2001; 24(3): 261-269.
36. Saadaoui E, Guetat A, Tlili N, El-Gazzah M, Khaldi A. Subspecific variability of Tunisian wild populations of *Capparis spinosa L*. J Med Plants Res. 2011; 5(17): 4339-4348.
37. Yuldashev G, Turdaliev A. Geochemical features of cyclic elements in desert agrolandscapes. Agrarian Science. 2014; 10-12.
38. Skalny AV. Chemical elements in human physiology and ecology. ONYX. 2004; 18-20.
39. Sher H, Alyemeni MN. Ethnobotanical and pharmaceutical evaluation of *Capparis spinosa L*, validity of local folk and Unani system of medicine. J Med Plants Res. 2010; 4(17): 1751-1756.
40. Kholikova NB, Abdullaev SV, Muminova M. *Capparis spinosa L.*, plant-based preparations. Proceedings of the IX Republican Conference of Young Chemists on the problems of bioorganic chemistry. 2019; 78-81.