

## Distribution zones, biomorphologic and therapeutic features of species included in *Capparaceae* Juss. Family in the flora of Nakhchivan autonomous republic of Azerbaijan

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### Abstract

The article provides deep information about bio morphological, ecological characteristics and geographical features, areal types and usage perspectives of species included into (*Capparaceae* Juss.) family which widely spread in the flora of Nakhchivan Autonomous Republic. At the same time it deals with mainly spread areas of existing kinds in the world and on the territory of Nakhchivan, time of blossoming and fruit of herbal plants, their chemical content, pharmacological influence and treatment directions. Capper species has been investigated with chemical aspect, carotenoid and chlorophyll pigments, phenolic acids and flavonoids have been studied. UV spectrums and  $R_f$  values of obtained compounds have been revealed.

**Keywords:** echobiomorphological, species, features, flora, spectrum, solvent

### Introduction

The investigation, usage, restoration and protection of natural resources are considered not only important matter in economy development of Azerbaijan Republic but also have great national importance. That is why protection and restoration of natural resources is considered one of the most important conditions. Just for solving this matter the state has created and proved National Strategy and Activity program for saving and durable usage of biological diversities. To investigate modern position of the family and to determine the ecological and anthropological transformations happened with them have both theoretical and practical importance (Rahimova, 2015) [9]. Glancing through the chronological investigation history of the flora of Nakhchivan Autonomous Republic we can see that *Capparaceae* Juss. family had not been investigated enough comprehensively, taking into consideration the actuality of the biological morphology, ecology, natural spread ways, chemical structure, therapeutic directions and usage perspectives of the family we may note that it needs to be studied much more deeply. Aiming these matter investigations had been already started. We consider it is necessary to give information about botanical, ecobiological, therapeutic features, spread ways, chemical content, pharmacological impact, and picking up and of the species included into the family, as well as their usage opportunities both scientifically and in folk medicine (Talibov; Rahimova, 2014) [11].

### Morphology and biology

The species of *Capparaceae* Juss. Family are shrubs or sometimes small trees, sometimes climbing or sprawling plants. *Capparaceae* Juss. Family has more than 350 species. The branches of these family plants are up to 2 m length, sprawling shrubs. According to life form the leaves of these species are curved grass and shrubs. The leaves are egg-round or elliptical, short stalk and located in shifts. Each bowl and petal leaves are 4 and free. The flowers are usually

very small, in some cases are bisexual, regular and irregular. Stalks are long and locate in the armpit as singular. Flower sides are double and free petal. The amount of stamens are 4-6, free, stalks are thin and curved form. Ovaries are one or more hollowed and locate on the long stamen. Fruits are horn-shaped as little-box or sometimes berry. Petals are white, yellow or pale pink, after pollinated become grey color (Rahimova, 2015; Talibov, 2014) [9, 11].

The stamens of representatives of *Cleome* L. genus are straight, with branch; height is 10-50 cm. The leaves are stalk and finger shaped. Glandular, finger shaped leaves grass or shrubs. The flower gathered bunches. Petals are four, white or red color, with hoof, length 2-5 mm. The gynophore is short; box is single hollowed, with more seeds, narrow line salient, length 10-34 mm. All of plants consist of small glandular and compact bloom (Komarova, 1939) [4].

**Family:** *Capparaceae* Juss.

**Genus:** *Capparis* L.

*Capparis herbacea* Willd.

The genres of *Capparis* L. are the largest genus of this family and include 150 species. The branches are sprawling, 50-200 cm. The leaves are egg formed or ellipsoid, tip part is sharp. Fruits are longish with long stalk is 20-45 mm (Komarova, 1939) [4].

The species of *Capparis* L. which include this genus is called field watermelon and field leek. *Capparis herbacea* L. is a perennial species that rounded fleshy leaves and big white pinkish-white flowers. This species grow in the dry slopes and semi desert. Under of leaves are thorny. The leaves are ellipsoid. Stalks of leaf are short and sharp. Petals are white or pale pink, length 30-50 mm. There are a lot of stamens in the flower. Fruits are ellipsoid and long stalk, length 20-45 mm *Capparis herbacea* L. is an important crop in Mediterranean countries, where it also grows spontaneously in diverse ecosystems. It is hot climate plant. *Capparis herbacea* L. (*Capparaceae*) is an aromatic plant growing wild in the dry regions (Petersburg, 2012; Talibov, Rahimova, 2014) [11].

The root of the line, up to 10-12 m long. Stems numerous, prostrate, up to 1.5 m long. Stipules are as yellowish spines, straight or curved. Leaves on short petioles, rounded, obviate or in May-June, fruiting in August-September (Cristina, 2000) [3]. This species also distribute in the territory of Badamli, Kechili, Shahbuz, Kyrna, Julfa, Bilev, Pezmeri, Dirnis, KelekiOrdubad, Kyvrag, Kangarli, Nahadjir, Disa Babek regions of Nakhchivan Autonomous Republic. Also distributed in the middle mountain zones, on dry stony slopes, in wet places, meadows, along rivers. elliptical, with the sharp end (Rahimova, 2015) [9]. Young leaves and the ends of the branches often covered with white pubescence. Flowers 5-8 cm in diameter, single, located in the armpit of leaves, with legs which length exceed the adjacent sheet. Petals up to 4 cm long, pale pink or yellowish. The ovary on the stem length is 3-5 cm. Seeds are brown, dot shaped, diameter is about 3 mm (Matthau's, 2005) [7].

### Distribution zones

General distribution: *Capparis herbacea* Willd. As wild plant this species has been spread in the area of Russia, Turkey, Western and Eastern Mediterranean, Balkans, Iranian areas. Caucasus - all areas (except high mountains and areas with high humidity, Central Asia - the southern and central regions with the exception of sandy deserts, high mountains and lowland areas). As wild plant spread the south of Europe, middle of Asia, Pakistan and India. Also this species spread in the, Absheron, Shamakhi, Sumgayit, Khizi, Nakhchivan regions of Azerbaijan (Komarova, 1939) [4]. This species come across mountainous, foothills, desert and semi desert of Nakhchivan, Khur and Araz plains. Mainly spread plains, foothills, stony and rocky areas. This species create formation with other plants in the desert and semi desert. Blossoms

*C. herbacea* L. also spread on gray soils, clay, gravelly and alkaline soils, on slopes of mountains (the lower mountain belt), on waste grounds and ruins. *C. herbacea* L. is cultivated for production of Capers. Even dry hot and intense sunlight environment is appropriate for caper plants to give the best results and easily survive summertime temperatures higher than 40°C (Matthau's, 2005) [7].

### Use and economic value

The plants had been the source of medicinal agents for thousands of years and an increasing number of modern drugs have been isolated from natural sources based on their use in traditional medicine. The territory of Nakhchivan Autonomous Republic is rich with medical and useful plants. The end of some investigates it is clear that these species are wealth with phenolic and flavonoids. Phenolic are antioxidants in order to give hydrogen and electron. These items made up basic groups of natural antioxidants (Akgül, 1996; Rahimova, 2015) [1,9].

The species of *Capparis herbacea* L. has a lot of medical features. Caper is an important species in our natural environment and economy for high nutrition flowers and buds, high adaptation capability and medicinal efficiency. The buds of flower and fruits has used for different layer chromatography carred out for each fraction.states (the former Ud.SSR)" and "Flora of Azerbaijan". With 0, 5% HCl was chose as solution. 6 fraction had obtained and evaporated.

The determination of compounds of extracts were taken with chemical and physical-chemical methods. Matthaus and Özcan 2002 [8], the UV spectroscopy absorbance of theMedical purposes; take care of hair, cure of wounds and liver diseases. The bud of flower also has special smell and rich with vitamins and minerals. There are plenty of protein and vitamin in flower buds (Cherepanov, 1995) [2]. Capers, unopened flower buds found on the caper bush, are the culinary darlings of many cuisines. The roots of this species down into the soil that is why it used for prevention of erosion and this species is also fire-resistant (Akgül, 1996; Matthau's, 2002) [1, 8]. Different flavonoids had been studied in caper bush and capers: rutin (quercetin 3-rutinoside), quercetin 7-rutinoside, quercetin 3-glucoside-7-rhamnoside, kaempferol-3-rutinoside, kaempferol-3-glucoside, and kaempferol-3-rhamnortinoside. Rutin is a powerful antioxidant bioflavonoid in the body and used as a dietary supplement for capillary fragility. Researched studies suggest that quercetin has anti-bacterial, anti-carcinogenic, analgesic and anti-inflammatory properties (Cristina, 2002) [3].

### Materials and Methods

The research conducted in the summer season 2016. A lot of herbarium specimen had been collected. Materials desk-processed condition used loupes MBS-2 microscope and MCI-2 and 5-MKI in the laboratory. Clarify the types of plants was Grossheim A.A. out "Flora of the Caucasus" Prilipko L.I. "Vegetables relations in Nakhchivan ASSR" Prilipko L.I. "The vegetation Azerbaijan", Cherepanov S.K. "Vascular plants of Russia and adjacent and increasing the last solution and ethanol

Mixture was measured at between 200-700 nm by Hitachi U-2900 UV-VIS. Labconco Clear Drying Chamber with Valves 7443500. Thin layer chromatographic analysis has been carried with DC-fertigfolien ALUGRAM SİL G/UV 254. The qualitative analysis of flavonoids has been studied with Fe (III) chloride and cyaniding tests.

During the visited expedition to the region of Shahbuz areas the plant *Capparisherbacea* L. fruits were collected and brought to the laboratory. The pulp parts of the fruits separated from seeds dried in the shade and kept in the paper bags until use. Samples was powdered in blender and 5 g of fruit sample was taken and firstly was extracted with 50 ml hexane 2 times for separating from lipofilitems and chlorophylls in 25°C, during 4 hours. Then the residue was air dried and extracted with ethanol (50 ml, 4 h) and finally the residue was air dried and extracted with 80% ethanol-water (50 ml, 4 h) at 25°C constant temperature by stirring. The extracts were filtered through What man No1 filter paper. The purification of pure contents from ethanol extract of *Capparis herbacea* L. species has carried out with column chroma-tography.

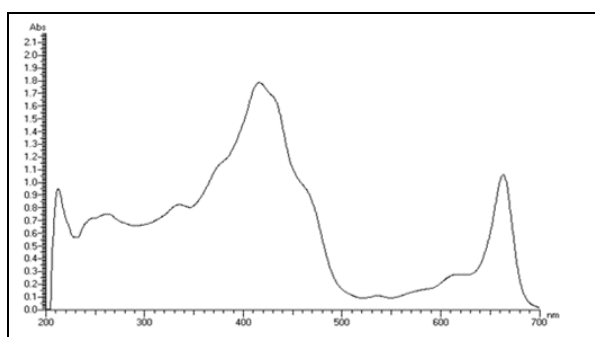
### Results and discussion

The new distribution zones in the world, in Azerbaijan and also in Nakhchivan Autonomous Republic of species including in Capparaceae Juss. Family has been determined. Carotinoids and chlorophyll pigments, also flavonoids have been revealed. It is clear that *Capparis herbacea* L. species has a lot of medicinal features and therapeutic significance it depends on its chemical content. This species is rich with flavonoids, phenolic acids and carotinoids. In the result of

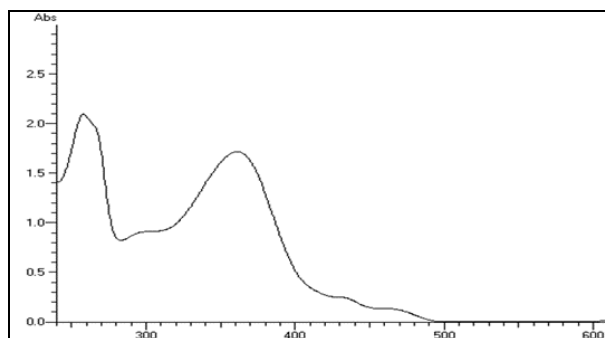
investigation of hexan extract it was revealed that 0.98 Rf value depict carotene, 0.59 illustrate chlorophyll pigments. Rf values of each fraction of column chromatography concerning fenolic acids and flavonoids had been calculated and depict in the table.

**Conclusion**

The conclusions of the analysis of spectrums of extracts of *Capparis herbacea* L. fruits illustrate 656-664 nm wavelengths. It depicts chlorophylls, 432-466 nm show carotenoids. Obtained between 230-360 nm spectrums show phenolic acids and flavonoids.



**Fig 1:** The spectrum of hexan extract of *Capparisherbacea* L. fruits



**Fig 2:** The spectrum of ethanol extract of *Capparisherbacea* L. fruits

**Table 1:** Rf values of obtained chemical compounds

Fractions	Rf value	Compound
I	0,57	Flavonoid-glycoside
	0,81	Flavonoid-glycoside
	0,98	Vanillic acid
II	0,92	Coumaric acid
	0,96	Quercetin
III	0,70	Phenolic acid
	0,96	Quercetin
IV	0,98	Vanillic acid
V	0,42	Flavonoid-glycoside
	0,92	Coumaric acid
VI	0,30	Rutin
	0,57	Flavonoid-glycoside
	0,80	Caffeic acid
	0,96	Quercetin

**Table 2:** Rf values of obtained pigments

Chemicals	Rf value	Color of spots
Carotene	0.98	Orange
Chlorophyll	0.59	Blue-green

250-360 nm illustrate flavonoids in ethanol extract (Forgacs, 2002) [5]. In the result of chromatography of extracts illustrate some compounds belong to flavonoids, carotenoid and chlorophyll (Guliyev, 1999) [6].

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