

PHARMACOGNOSY SIGNSO F AERIAL PARTS MEDICINAL PLANT *ECHINOPS ALBICAULIS* KAR.ET KIR

Kiyekbayeva LN¹, Akhtaeva NZ², Datkhayev UM¹, Omarkhan AB², Litvinenko YA², Tynybekov BM², Berkenov AK^{1*}

¹Department of Pharmacy, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan. ²Department of Organic Chemistry, Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan. Email: berkenov_aidar@mail.ru

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ABSTRACT

Objective: This work is intended to provide you with information about pharmacognosy, herbs and medicinal plants *Echinops* L., structured from the main issues, such as macro-morphological features of organs leaves, to the deeper and more challenging questions, pharmacognosy as the analysis of active ingredients and other substances or compounds use and healing properties.

Methods: Pieces of leaves were boiled on chloral hydrate solution - water (1:1) for 5-10 minutes to enlightenment. Then, the study objects were placed on a slide in a drop of glycerol and separated into two parts with dissecting needle. The object was covered with a cover glass. The object was viewed from both sides with the microscope. First, the object was viewed with a small ($\times 180$), then at high ($\times 720$), an increase by MS-300 microscope (MICROS, Austria) on the technique of microscopic and microchemical studies of medicinal plants.

Results: This manuscript is intended to provide you with information about pharmacognosy, herbs and medicinal plants *Echinops* L., structured from the main issues, such as macro-morphological features of organs leaves, to the deeper and more challenging questions, pharmacognosy as the analysis of active ingredients and other substances or compounds use and healing properties.

Conclusion: This work is offered as a study on the biological characteristics of medicinal plants to identify diagnostic markers and signs for the standardization of herbal medicines..

Keywords: *Echinops albicaulis*, Medicinal plant, Endemic, Anatomy, Morphology.

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INTRODUCTION

In medicine, one of the important genera is *Echinops* L. Genus *Echinops* L. is applied to Asteraceae family. Their growing area extends Eurasia and South Africa and integrates more than 120 species of *Echinops* plants. As Takhtadzhyan defined more than half of the species are found in the territory of the former USSR. Most of them are endemic to Central Asia and Caucasus. 58 species of genus and in Kazakhstan 18 species are found in the territory of the former USSR. Seven of them are endemics. By paleontological data from early times, *Echinopsis* is widespread in the Cam region and on the coast of Chu-Ily. Extracts of plants genus *Echinops* have antiphlogistic, fungicidal, antioxidant, and hepatoprotective activities. In the species of genus *Echinops* L, quinol alkaloids, sesquiterpenoids, flavonoids, triterpenes and thiophenes were determined. Drugs from *Echinops* plants on the peripheral damage, palayzing the facial nerve, plexitis, myopathy, asthenic state when vascular dystonia, forgetfulness, as stimulant nervous-muscle fibers under radiation are used.

One of the plant genera *Echinops*, which is not included in the official medicine is *Echinops albicaulis* - perennial and endemic. It is found in Kyzylorda Region, Betpakdala, Moyynkum, Kyzylkum (north), Aral and Balkhash. To determine its perspective for using in medicine, we need to conduct some botanical research. Through botanical research definition from diagnostic evidence in the basis of morphological and anatomical features of the plant makes it possible for further chemical studies.

The aim of research work is based on morphological and anatomical characteristics of a leaf *E. albicaulis* to determine diagnostic features [1-3].

METHODS

Medicinal plant *E. albicaulis* was collected from Malaysary gorge which is located on southwest spurs of Dzhungar Alatau in June-July, 2015.

Plant resources in this area were determined from research results of laboratory Plants bioresources from Botany and phytointroduction institute.

For the preparation of drugs dried and fixed materials of leaves were used. Pieces of leaves were boiled on chloral hydrate solution - water (1: 1) for 5-10 minutes to enlightenment. Then, the study objects were placed on a slide in a drop of glycerol and separated into two parts with dissecting needle. The object was covered with a cover glass. The object was viewed from both sides with the microscope. First, the object was viewed with a small ($\times 180$), then at high ($\times 720$), an increase by MS-300 microscope (MICROS, Austria) on the technique of microscopic and microchemical studies of medicinal plants (Pharmacopeia of Republic Kazakhstan 1st ed. 2008).

Cross-sections of plant leaves were prepared on microtome with freezing device OL-30 (INMEDPROM, Russia). The thickness of the anatomical sections was 10-15 microns. In particular, an anatomical study of wormwood species was carried out according to the methodological instructions of VN Vekhov with co-authors and MN Prozina [4].

RESULTS AND DISCUSSION

Medium altitude of the plant is 54.16 cm. Medium altitude of stem is 22.7 cm. Stem is one, short branched, densely, white-tomentose and without glandular ptosis.

Leaves are leathery. The topside of leaves has greenish-white color from loose omission. The bottom side of leaves has white color from dense, felted omission without veins. The leaves are hard and prickly (Fig. 2). These features are associated with ecological environment of plant. The leaves of the top formation are smaller than the leaves of the

medium and lower formations. Leaf blade length of the top formation is 8.6 cm, width is 2.9 cm. Leaf blade length of the medium formation is 18.4 cm, width is 6.2 cm. Leaf blade length of the lower formation is 16.68 cm, width is 6.75 cm (Fig. 1).

Medium altitude of the inflorescence is 3.14 cm, width 3.19 cm. Diameter of the single inflorescence is 2.07-3.42 cm. The length of baskets is 2.62 cm (Fig. 3).

Cells of the upper epidermis are polygonal. Cells of parenchyma are located tightly. The type of stoma of the upper epidermis is anomocytic. In these stomata, accessory cells are absent. The guard cells are surrounded by ordinary epidermal cells. The amount of stomata on 1 mm² area of the upper epidermis is 10.06±1.23 (Fig. 4) [5-7].

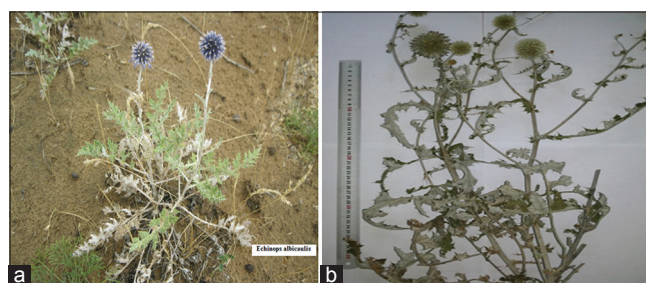


Fig. 1: (a) The locus of the plant, (b) Herbarium of plant *Echinops albicaulis*



Fig. 2: (a and b) Leaves of plant *Echinops albicaulis* Kar et.Kir: (a) The upper epidermis, (b) the lower epidermis

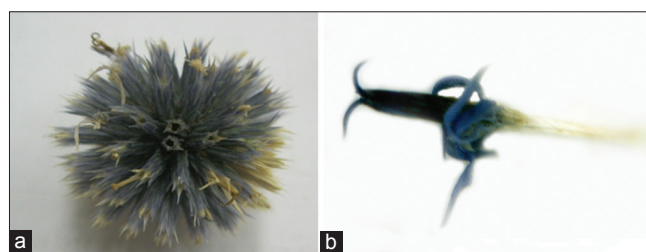


Fig. 3: (a) Inflorescence, (b) flower

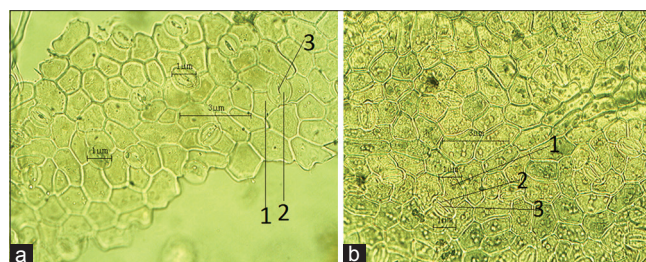


Fig. 4: The upper epidermis x40. (a and b) 1-Epidermal cells, 2-guard cells of stoma, 3 -pore of stoma

The upper epidermis has many trichomes. Trichomes are elementary, long, celled. A lot of trichomes keep the plant insulated and perform protective function. This plant is psammofit, so it grows on sand (Fig. 5).

Compared with the upper epidermis, the lower epidermis has many trichomes. Trichomes of the lower epidermis are elementary, long, celled. The lower epidermis of the leaf is felt and white trichomes (Fig. 6).

Cells of the lower epidermis are also polygonal and located tightly. The stoma type of the lower epidermis is anomocytic. The amount of stomata on 1 mm² area of the lower epidermis is 8.4±0.8 (Fig. 7) [8,9].

Substances produced during the metabolism of plants are mostly stored in the form of an amorphous solid or crystals, which are called, cell compounds. On the upper and lower epidermal preparations needle-shaped crystals were found. The nature of crystals of various plants is calcium oxalate, silica, protein, and carotene. Needle-shaped crystals are in the form of rafids. Rafids are needle-shaped crystals that are connected in bunches (Fig. 8) [4,10].

Chlorophyll grains participating in photosynthesis, promotes the synthesis of plant organic substance. For the synthesis of organic compounds carbon dioxide, water, and solar energy are required (Fig. 9) [11].

The upper epidermis cells of the leaf are tetragonal and thick. The lower epidermis cells of the leaf are oval and compared with the upper epidermis its size is small. Below the upper epidermis columnar mesophyll is located in two rows. The spongy mesophyll is located after columnar mesophyll. Xylem is located closer to the upper epidermis

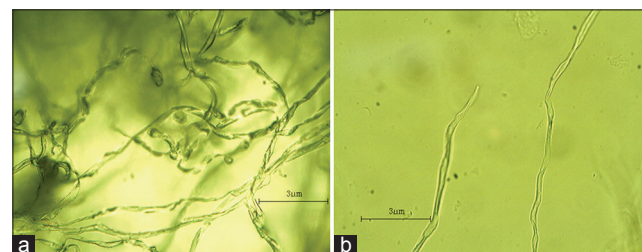


Fig. 5: (a and b) Elementary trichomes of the upper epidermis x40

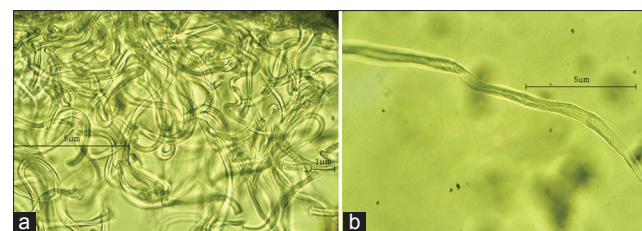


Fig. 6: (a and b) Trichomes of the lower epidermis (x40)

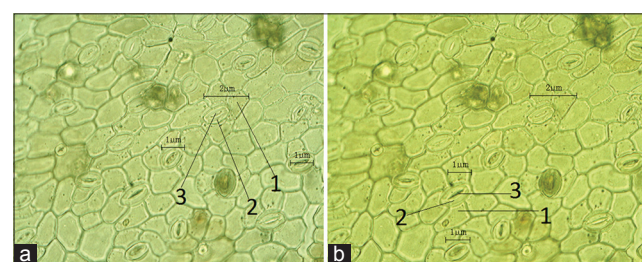


Fig. 7: (a and b) The lower epidermis x40. 1 - epidermal cells, 2 - guard cells of stoma, 3 - pore of stoma

and phloem to the bottom. Hence, this is an indoor collateral ray. It is surrounded by sclerenchyma [11].

Collenchyma is located on the top and bottom of the vascular bundle. The lower epidermis of the leaf has many trichomes than the upper epidermis (Fig. 10) [12].

CONCLUSION

As a result, morphological and anatomical diagnostic features of medicinal plant *E. albicaulis* were determined. Morphological features. Medium altitude of plant is 54.16 cm. Medium altitude of stem is 22.7 cm. Stem is one, short branched, densely, white-tomentose, and without glandular ptosis. Leaves are leathery. The topside of the leaf is greenish-white from loose omission. The bottom side of the leaf is white from dense, felted omission without veins. Leaves are hard and prickly. These features are associated with ecological environment of the plant. The leaves of the top formation are smaller than the leaves of the

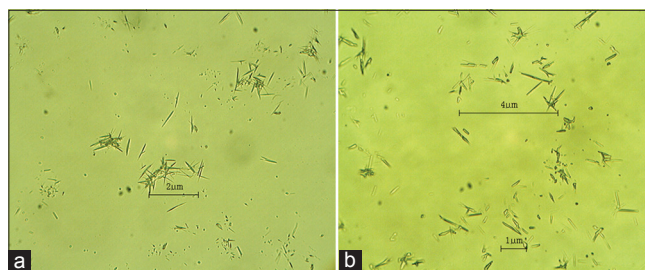


Fig. 8: (a and b) Needle-shaped crystals of the upper and lower epidermal preparations $\times 40$

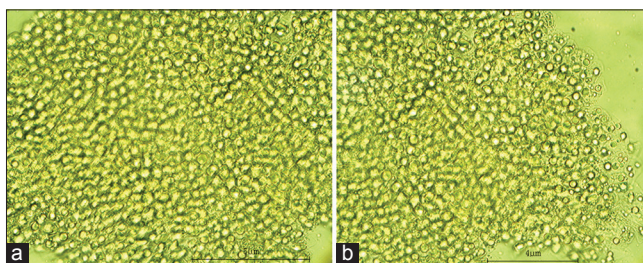


Fig. 9: (a and b) Leaf chlorophyll grains of medicinal plant *Echinops albicaulis*

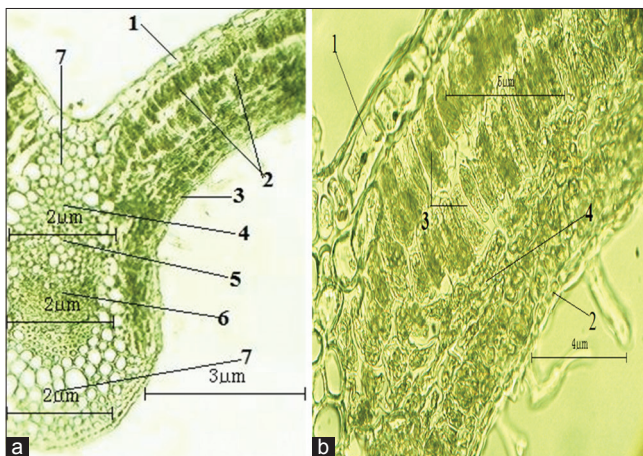


Fig. 10: Cross section of *Echinops albicaulis* leaf ($\times 40$).
(a) 1 - The upper epidermis, 2 - columnar mesophyll, 3 - the lower epidermis, 4 - sclerenchyma, 5 - xylem, 6 - phloem, 7 - collenchyma; (b) 1 - the upper epidermis, 2 - the lower epidermis, 3 - columnar mesophyll, 4 - spongy mesophyll

medium and lower formations. Leaf blade length of the top formation is 8.6 cm, width is 2.9 cm. Leaf blade length of the medium formation is 18.4 cm, width is 6.2 cm. Leaf blade length of the lower formation is 16.68 cm, width is 6.75 cm. Medium altitude of inflorescence is 3.14 cm, width is 3.19 cm. Diameter of single inflorescence is 2.07-3.42 cm. The length of baskets is 2.62 cm.

Anatomical features. The upper and lower epidermis consisted of polygonal cells that are located tightly. The upper and lower epidermis have trichomes, but on the lower epidermis they are more felt and a lot. Trichomes are elementary, long, celled. The upper and lower epidermis have stomata, and they are of anomocytic type. In these stomata, accessory cells are absent. The guard cells are surrounded by ordinary epidermal cells. The amount of stomata on 1 mm² area of the upper epidermis is 10.06 ± 1.23 . The amount of stomata on 1 mm² area of the lower epidermis is 8.4 ± 0.8 . On the upper and lower epidermal preparations needle-shaped crystals were found. The nature of crystals of various plants is calcium oxalate, silica, protein, carotene. Needle-shaped crystals are in the form of rafids. Rafids are needle-shaped crystals that are connected in bunches. The upper epidermis cells of the leaf are tetragonal and thick. The lower epidermis cells of leaf are oval and compared with the upper epidermis its size is small. Below the upper epidermis columnar mesophyll is located in two rows. The spongy mesophyll is located after columnar mesophyll. Xylem is located closer to the upper epidermis and phloem to the bottom. Hence, this is an indoor collateral ray. It is surrounded by sclerenchyma. Collenchyma is located on the top and bottom of the vascular bundle. The lower epidermis of the leaf has many trichomes than the upper epidermis [13,14].

This work is offered as a study on the biological characteristics of medicinal plants to identify diagnostic markers and signs for the standardization of herbal medicines.

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