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Determination of macroscopic diagnostic signs of raw materials of *Thymus serpyllum* and *Thymus crebrifolius*

The analysis of macroscopic indicators of medicinal raw materials of *Thymus serpyllum* and *Thymus crebrifolius* is carried out. Both species grow in the territory of the Karaganda region, forms considerable formations. Results of investigation have shown that *Thymus serpyllum* and *Thymus crebrifolius* has the general and distinctive signs. The morphological features important for diagnostics of raw materials of two species are following: for a stalk — the cross section of a stalk, the nature of their omission, color of young and lignified stalks; for a leaf — a form of leaves, existence of a leaf stake, extent of omission, an arrangement of essential oil glandules and expressiveness of veins; for inflorescences — a form and the size of an inflorescence; for a cup — a form and the size of teeth of a cup, extent of omission, existence of glandules, color; for a nimbus — the direction of growth of hairs, existence of glandules, color of a nimbus.

Keywords: *Thymus crebrifolius*, *Thymus serpyllum*, herb, medical raw material, morphology, diagnostic signs.

Introduction. One of the most important problems of modern botanical and pharmaceutical science is research of new effective medicines on the basis of natural compounds.

Finding of independence by Kazakhstan raises for researchers questions of replacement of import raw materials on local, having similar pharmacological activity. From this point of view the species from *Thymus* L. gene (*Lamiaceae* family) are very perspective plants.

Kazakhstan official herbs is *Thymus serpyllum* L. and *Thymus vulgaris* L. [1], which have antimicrobial, anti-inflammatory, bile-expelling, diuretic, expectorant and other properties [2–5]. The raw material is applied at treatment of diseases of the top respiratory tracts, as restful, anesthetizing and a diuretic [6, 7], is a part of the drugs «Pertussinum», «Bronkhipret», «Passifit» and others [8].

However, on the territory of the Central Kazakhstan the large number of species of *Thymus* gene grows, which can find application in official medicine. The most perspective by accumulation of essential oils and biological activity are *Thymus marschallianus* Willd. and *Thymus crebrifolius* Klok.

Modern demands to quality of medicinal plant materials provide improvement of methods of assessment of authenticity of raw materials, including on the basis of morphological indicators. Development of exact criteria by which species can be distinguished from each other is necessary for suppliers.

The purpose of the real research was definition of macroscopic indicators of raw materials of *Thymus crebrifolius* Klok. in comparison with officinal species *Thymus serpyllum* L.

Methodology

Object of researches were aboveground organs (leaves, stalks, flowers) of *Thymus crebrifolius* and *Thymus serpyllum*. Raw materials of *Thymus crebrifolius* were collected in 1st decade of August, 2016 in phenological stage blossoming — fructification in the territory of the mountains Ulytau (Ulytausky rayon of Karaganda region), raw materials of *Thymus serpyllum* — in the middle of July, 2016 in phase of blossoming — flowering in the territory of the mountains Karkaraly (Karkaraly rayon of Karaganda region).

Raw materials were collected by cutting at the height of 5–6 cm from the ground's surface. Drying was conducted in the room protected from sunshine with the subsequent packaging in paper 2-layer bags. Storage was performed according to the regulating documents developed for raw materials of *Thymus serpyllum* [9].

Samples of dry raw materials were analyzed according to standard methods of the morphological analysis [10, 11] using a binocular magnifying glass with increasing 2x14 and 4x14. On samples of plants analyzed a form and a structure of stalks, leaves, sepals and nimbuses of a flower. In case of the description of diagnostic signs paid attention to structure of a surface, availability of stalks, extent of omission and availability of essential oil glandules.

Medicines photographed in case of different increase, carried out handling the computer in the Paint program, version 10.0.

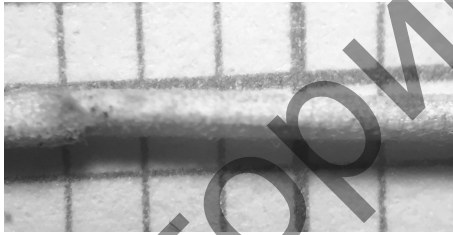
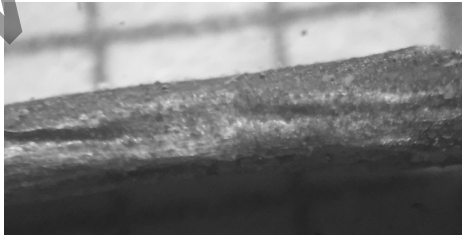
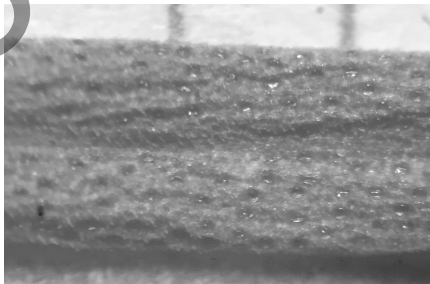
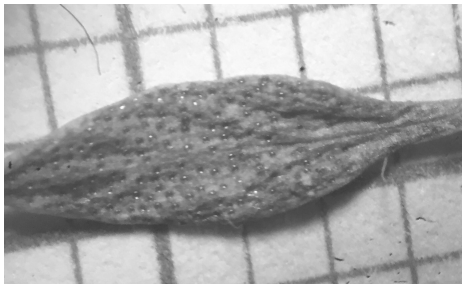
Results and discussion

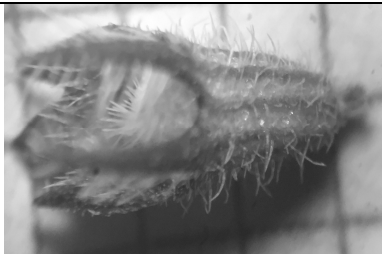
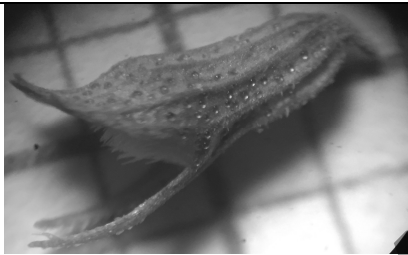
The preliminary analysis of morphological features has shown [12–14] that morphological features of thymes of the Central Kazakhstan are well described only from the point of view of botanists, however, the given signs are not sufficient for suppliers and specialists of pharmacognosy.

Thymus crebrifolius and *Thymus serpyllum* morphologically are semi-low shrubs with the lying or slightly raising partially lignescent stalks, from which grassy peduncles are departed [12]. Externally species are similar at each other, but there is a number of differences on a structure of stalks, leaves, a cup and a nimbus of a flower that allows to use them for identification of species.

Thymus serpyllum L. — stalks cylindrical or not clearly 4-faced, green; are trimmed under an inflorescence the rare small hairs located perpendicular to a pedicel, or down sent (Table).

Table
Comparative characteristics of morphological signs of *Thymus serpyllum* and *Thymus crebrifolius*

Diagnostic signs	<i>Thymus serpyllum</i>	<i>Thymus crebrifolius</i>
1	2	3
Cross section of stalk	Cylindrical or not clearly tetrahedral	Rounded tetrahedral
Nature of omission of a stalk	Omission is rare, small hairs, on lignified stalks — omission isn't expressed.	Omission on green escapes poorly expressed, on lignified stalks — is absent. The surface is covered with numerous essential oil glandules.
		
Form of leaf	Linear or tightly elliptic	Tightly elliptic or elliptic
Existence of a leaf scape	Leaves are sedentary, sometimes there is very short scape	There is a short scape
Omission of leaves	Leaves are usually almost naked, sometimes in the lower part — omission, glandulous.	Leaves are naked, sometimes near a scape have single trichomes; on both sides strong glandulous.
		
Inflorescence type	Capitated	Capitated
Form of cup	Narrow belly	Narrow belly
Color of cup	Liliac	Green or yellowy-brown
Omission of cup	Dense omission	Cup surface is naked, omission – on teeth of cup

1	2	3
		
Characteristic of teeth of a cup	Teeth are small, pointed, direct	Teeth are 2 types: small and unbent, long and pointed
Color of a nimbus	Brightly lilac	Brightly violet
Omission of nimbus	Edge is omission	The surface is naked, glandulous

On lignified parts of a stalk omission isn't observed; color — brown or yellowy-brown. Leaves are sedentary, it is rare — on very short scapes; linear or tightly elliptic; 10–15 mm long and 1,5–3 mm wide. A surface of leaves naked, it is rare — with trichomes in the lower part, epidermis on both sides is glandulous; on the top side the numbers of essential oil glandules are more. On the lower side of a leaf veins are well expressed.

Inflorescence is extended capitated, consisting of several semi-verticils; a cup — narrow belly, lilac on teeth and ribs; between edges is greenish; teeth of a cup are 4–5 mm long, small, don't exceed $\frac{1}{4}$ from the total length of a cup. Teeth — straight lines and pointed. The surface of a cup is densely trimmed the long trichomes located perpendicular to a surface. Especially dense omission is observed on cup teeth. The nimbus is lilac, well moves forward from a cup during mass blossoming. A flower nimbus surface is naked, only on edge — with trichomes and glandulous.

Smell of dry raw materials is spicy, fragrant, taste is bitter and spicy.

Thymus crebrifolius Klok. is endemic plant of Kazakhstan, it is widespread in mountains and in a foothill zone of Ulytau, occupies granite surfaces on which forms dominant communities. This species of a thyme is widely used by local population as a herb [15].

Stalks on a cross cut — rounded tetrahedral, young — lilac color, lignified — dark brown (table 1). Leaves sit on a stalk on short scapes, a form of leaves — tightly elliptic (for the top leaves) or elliptic (for the lower or average leaves). Length of leaves is 4–5 mm, width is 1–1,5 mm, a scape is 0,5–0,7 mm long. Surface of all leaves naked; on both sides — with the numerous essential oil glandules, which are well expressed. Veins of a leaf are well looked through, both with upper, and from the lower sides.

Inflorescence is capitated, dense, almost spherical. A cup is narrow belly with teeth, different in a form; 3–4 mm long; a surface — small — ridge. Three teeth are small and unbent at an acute angle aside; two teeth are sharp (almost awl-shaped), direct, long — to a half from the total length of a cup. Color of a cup is green or yellowy-brown. Omission on a surface is absent, dense eyelashes only on edge of teeth of a cup are noted. The nimbus is bright violet, to a half moves forward from a cup during blossoming. A nimbus surface is naked, strong and glandulous.

Raw materials smell — strong lemon fragrant, taste — spicy.

The comparative analysis has shown that raw materials of *Thymus crebrifolius* are characterized by tetrahedral stalks, elliptic leaves with short scapes, cups with different teeth and weak omission of leaves, stalks, inflorescences, color of separate bodies. Raw materials of *Thymus serpyllum* are differ in a roundish stalk, sedentary leaves, cups with teeth of an identical form, existence of omission of a stalk, leaves and inflorescences. Diagnostic signs of raw materials for both species are defined.

Conclusion. Thus, the analysis of morphological features of plants of 2 species of *Thymus* has shown that *Thymus crebrifolius* and *Thymus serpyllum* has the general and distinctive signs. The morphological features which are important for diagnostics of raw materials of two species are the following:

- for a stalk — the cross section of a stalk, the nature of their omission, color of young and lignified stalks;
- for a leaf — a form of leaves, existence of a scape, extent of omission, an arrangement of essential oil glandules and expressiveness of veins;
- for inflorescences — a form and the size of an inflorescence;
- for a cup — a form and the size of teeth of a cup, extent of omission, existence of pieces of iron, color;
- for a nimbus — the direction of growth of hairs, existence of pieces of iron, color of a nimbus.

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Жатаған жебіршөп пен топжапырақты жебіршөп дәрілік шикізатының макроскопиялық диагностикалық белгілерін анықтау

Жатаған жебіршөп пен топжапырақты жебіршөптің дәрілік шикізатының макроскопиялық зерттеулері нәтижесінің көрсеткіштері берілген. Қарағанды облысының аумағында екі түрде кездеседі, әрі олар біршама үлкен қопаларды құрайды. Нәтиже көрсеткіштері бойынша, топжапырақ жебіршөп пен жатаған жебіршөпте ортақ және айырмашылық белгілер бар. Екі түрге де тән дәрілік шикізаттың маңызды диагностикалық белгілері болып саналатын морфологиялық белгілерге: сабақтың көденен кесіндісінің пішіні, олардың түктерінің сипаты, жас және қасанданған сабақтардың түстері, жапырақтың пішіні, сағақтың болуы, түктену деңгейі, эфир-майлары түзілетін бездеуіттердің орналасуы және жүйкеленудің айқындығы; гүл шоғырының пішіні мен мөлшері; тостағаншаның пішіні мен мөлшері тостағанша тісшелері, түктену деңгейі, бездеуіттің болуы, күлте жапырақшаларының түсі түктердің ұзындығы мен өсу бағыты, бездеуіт түктердің болуы жатады.

Кілт сөздер: *Thymus crebrifolius*, *Thymus serpyllum*, дәрілік өсімдік, өсімдік шикізаты, морфологиясы, диагностикалық белгілері.

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Определение макроскопических диагностических признаков сырья тимьяна ползучего и тимьяна частолистого

Проведен анализ макроскопических показателей лекарственного сырья — тимьяна ползучего и тимьяна частолистого. Оба вида произрастают на территории Карагандинской области, образуют значительные заросли. Результаты показали, что тимьян частолистый и тимьян ползучий имеют общие и отличительные признаки. Отмечено, что морфологическими признаками, имеющими значение для диагностики сырья двух видов, являются: для стебля — поперечное сечение стебля, характер опушения, цвет молодых и одревесневших стеблей; для листа — форма листьев, наличие черешка, степень опушения, расположение эфирно-масличных железок и выраженность жилок; для соцветий — форма и размер соцветия; для чашечки — форма и размер зубцов чашечки, степень опушения, наличие железок, цвет; для венчика — направление роста волосков, наличие железок, цвет венчика.

Ключевые слова: *Thymus crebrifolius*, *Thymus serpyllum*, лекарственное растение, лекарственное растительное сырье, морфология, диагностические признаки.

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