UDC 615.322

M.A. Zhunussova[1], M.Yu. Ishmuratova[2], R.A. Abdullabekova[1], I.A. Zhuravel[3]

[1]Karaganda State Medical University, Kazakhstan;
[2]Ye.A. Buketov Karaganda State University, Kazakhstan;
[3]National Pharmaceutical University, Kharkiv, Ukraine
(E-mail: maira.zhunusova@mail.ru)

Comparative morphological analysis of raw material of *Scabiosa isetensis* and *S. ochroleuca*

Results of the morphological analysis of *Scabiosa ochroleuca* and *Scabiosa isetensis* raw materials are given in article. The following diagnostic signs of raw materials of both species are marked out: for a stalk — extent of branching and structure of a surface, extent of omission, color of stalks; for leaves — a form and the size of a sheet plate, section degree, degree of expressiveness of the main vein, color and omission; for inflorescences — a form and the size of an inflorescence; for leaflets of a wrapper — a form, color and degree of an omission; for a flower — a form and the size of a flower, color of a nimbus, length of a spathe and degree of omission.

Keywords: *Scabiosa ochroleuca*, *Scabiosa isetensis*, raw material, morphology, herbs, diagnostic sign.

Studying of new herbs and their introduction in pharmaceutical and medical practice is an important applied task of development of the industry of Kazakhstan [1–3].

The Flora of Kazakhstan contains 5500 plant species or so [4, 5], from which about 115 species are used as herbs. Although in folk medicine are used more then 1000 species [6].

Species of *Dipsacaceae* family have practical interest as the sources of medical preparation with antioxidant, hepato-protective, antipyretic aactivity; against illnesses of a bladder, kidneys and urinary tract, as a part of difficult prescriptions at heart troubles, a sepsis, at stomach diseases, a gastroenteritis, gastroenterocolites, pneumonia; an angina, a diarrhea, a pulmonary tuberculosis, respiratory infections, liver diseases, hepatitis, pneumonia [7–10].

In Kazakhstan there are big raw material resources of *Scabiosa isetensis* L. and *S. ochroleuca* L. For preparation of pharmacopiean article for these species it is nessesary to study morphological structure of both plants and find the diagnostic signs for future identification of whole and crushed raw materials.

The purpose of the present researching is comparative study of morphological structure of aboveground organs of *Scabiosa ochroleuca* and *S.isetensis* and definion of macroscope signs of raw materials.

Methodology

Object of a research were aboveground parts (leaves, stalks and flowers) of *Scabiosa isetensis* and *S. ochroleuca*. Raw material was collected in 2nd decade of August, 2017 in phenological stage — flowering, in the territory of the Buyratau Mountains (Osakarov rayon of Karaganda region).

Raw material was collected by cutting by heitgh of 7–10 cm from soil's surface. Gathered raw materials were dried in closed room protected from sunshine insolation and at temperature 25 ºC during 3–5 days. Drying raw material was packed in paper container.

Samples of drying raw materials of *Scabiosa isetensis* and *S.ochroleuca* were analyzed according to standard methods of the morphological analysis [11, 12] using a binocular magnifying glass with increasing 2×14 and 4×14. 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 trichomes.

Micropreparations were photographed by camera Sony Cyber Short DSC-WX60, figures were carried out in Paint program, version 10.5.

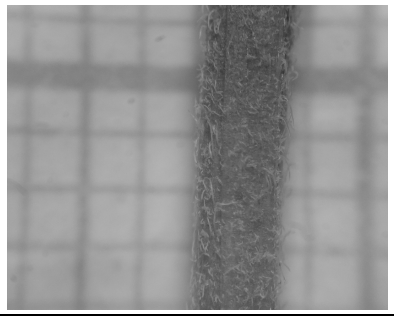
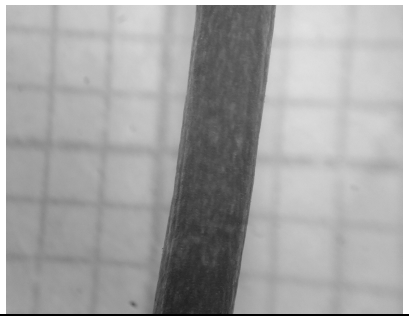
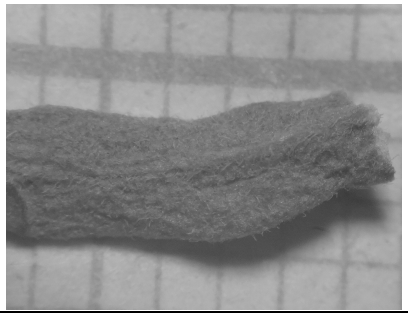
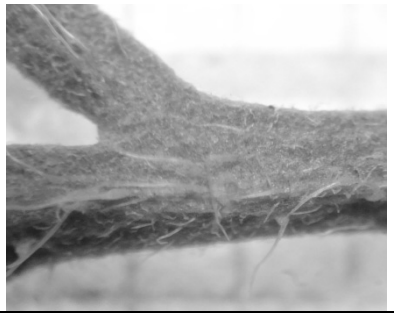
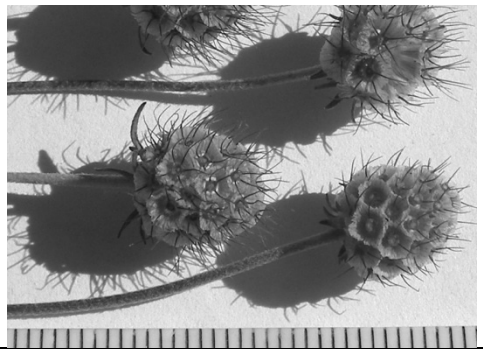
Results and discussion

The morphological analysis of two species of *Scabiosa* has shown that plants have the characteristic signs distinguishing plants among themselves. Species in nature of the Central Kazakhstan occupy different ecological niches. So, *Scabiosa ochroleuca* grows on meadow thickets, meadow steppes, is dated for interhills decreases and shrubby thickets. *Scabiosa isetensis* prefers drier and stony sites.

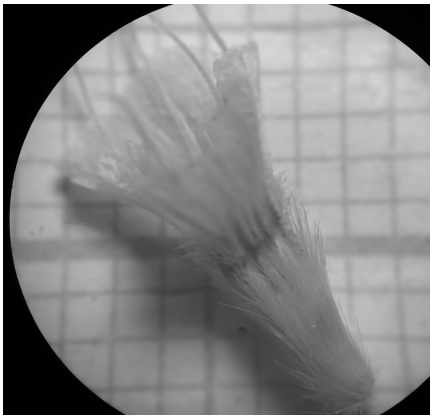
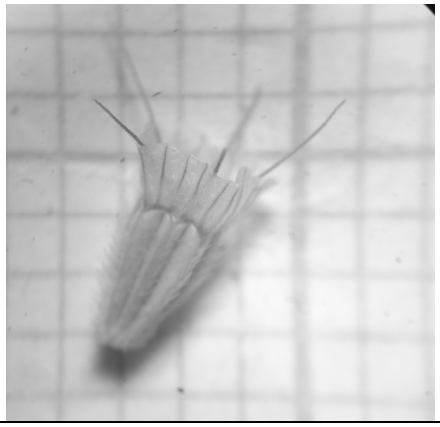
Both species differ in a form of a stalk and a leaf, opushennost degree, color of separate elements (Table 1).

Table 1

Comparative morphological characteristics of *Scabiosa isetensis* and *S. ochroleuca*

Diagnostic signs	*Scabiosa isetensis* L.	*Scabiosa ochroleuca* L.
1	*2*	*3*
Form of stalk	The stalk is upright, on a cross cut roundish, not branching	The stalk is upright, on a cross cut roundish, from the middle — plentifully branching
Structure of surface of stalk	Surface small — rough, not clear and curly and hairy, in the top part with more dense omission with impurity of rare and long hairs 	The surface is naked, only in the most lower part and under a head — curly and fluffy 
Colour of stalk	Silvery-green	Green
Form of leaves	Stem leaves are sedentary, elliptic, plumose and separate, final shares are linear or lanceolate; 3–10 mm long and 1,5 mm wide, often made an incision. Radical leaves are 5–10 cm long, on scapes of 1–2 cm long	Radical leaves are petiolar, elliptic, integral, gear or lira-shaped — cutted; stem leaves are lira-shaped — cutted or plumose-dissected on the lanceolate, gear or plumose-dissected shares, shares of average leaves in turn cut on lira or lanceolate segments; 10–12 cm long and 3–5 cm wide
Structure of leaf's surface	Leaves on both sides are pressed — hairy, the main vein is poorly expressed 	Leaves on both sides are short — hairy, the gladny vein is well expressed from the lower party 
Colour of leaves	Yellow-green, silvery-green	Light-green
Type of inflo-rescence	Inflorescences are spherical, 1,5–2 cm in the diameter 	Inflorescences are heady, 2–3 cm in the diameter 

Continuation of Table 1

1	*2*	*3*
Forms of leaflets of spathes	Leaflets of spathes are oblong and ovoid, up narrowed, on length don't exceed an inflorescence	Leaflets of spathes are linear, pointed, green, is longer than flowers, are very seldom equal to them on length
Structure of surface of leaflets of spathes	Densely, almost felt trimmed	Usually shortly — fluffy
Colour of surface of leaflets of spathes	Silvery-green	Green
Form of cup surface	In the top part are slit-foveolar, in lower are ridged, pressed-white-setaceous, filmy, 3–8 mm long; sometimes at edges with the painted shares	Lanceolate, above hairy, from top to bottom narrowed, naked
Form of flower	Lateral flowers are 10–15 mm long, median are 6–8 mm long, wrappers are long, wide — funnel-shaped, sides are expressed poorly 	Median flowers are 5–7 mm long, lateral are up to 10–12 mm wide; beam, wrappers are tightly funnel-shaped, 3–4 mm long, 8-faced 
Structure of flower surface	Outside densely — trimmed, on sides hairy	Outside trimmed, on all length deep and channeled; on sides hairy
Color of a nimbus	Yellow-white or pinkish-white	Pale-yellow

Stalk on a cross cut is roundish at both species; at *Scabiosa isetensis* branches from the middle whereas at *Scabiosa ochroleuca* — doesn't branch. A surface of the first species is small — rough, with the dense bulged hairs; at the second species has a surface almost naked, places — curly and fluffy.

Leaves of *Scabiosa isetensis* are plumose and separate, whereas at *Scabiosa ochroleuca* are lira-shaped-cutted or plumose-cutted. Degree an omision of a surface of a sheet plate of *Scabiosa isetensis* is higher, than at *Scabiosa ochroleuca*. Color of the first species varies from flavovirent to silvery-green; at the second — light-green.

The form of inflorescences varies from spherical at *Scabiosa isetensis* to heady and larger by the size — at *Scabiosa ochroleuca*. Leaflets of wrappers of an inflorescence of *Scabiosa isetensis* are oblong and ovoid; there is less than diameter of inflorescence; whereas at *Scabiosa ochroleuca* are linear and longer. Extent of their omission at the first species is higher, than at the second species.

Flowers of *Scabiosa isetensis* are larger by the size of flowers of *Scabiosa ochroleuca*, more trimmed. Color of a nimbus of a flower of the first species is yellow-white or pinkish-white, at the second is pale yellow.

Conclusion

Thus, the analysis of morphological indicators of elevated bodies of 2 species of *Scabiosa* has shown some differences in a structure of vegetative and generative bodies.

The following diagnostic signs of raw materials of *Scabiosa isetensis* and *S.ochroleuca* are marked out:

– for a stalk — extent of branching and structure of a surface, extent of omission, color of stalks;

– for leaves — a form and the size of a sheet plate, section degree, degree of expressiveness of the main vein, color and omission;

– for inflorescences — a form and the size of an inflorescence;
– for leaflets of a wrapper — a form, color and degree of an omission;
– for a flower — a form and the size of a flower, color of a nimbus, length of a spathe and degree of omission.

References

1 Адекенов С.М. Развитие фитохимии и перспективы создания новых лекарственных препаратов / С.М. Адекенов // Поиск и создание методов получения фитопрепаратов. — Алматы: Ғылым, 1997. — С. 3–22.

2 Государственная фармакопея Республики Казахстан: в 2 т. Т. 1. — Астана, 2008. — 592 с.

3 Государственная фармакопея Республики Казахстан: в 2 т. Т. 2. — Астана, 2009. — 802 с.

4 Флора Казахстана: в 9 т. Т. 1–9. — Алма-Ата, 1956–1966.

5 Абдуллина С.А. Список сосудистых растений Казахстана / С.А. Абдуллина. — Алматы, 1999. — 215 с.

6 Грудзинская Л.М. Список лекарственных растений Казахстана (справочник) / Л.М. Грудзинская, Н.Г. Гемеджиева. — Алматы, 2012. — 139 с.

7 Абышева Л.Н. Дикорастущие полезные растения России / Л.Н. Абышева, Л.М. Беленовская, Н.С. Бобылева. — СПб.: Изд-во СПХФА, 2001. — 663 с.

8 Zhunusova M.A. Constituent composition and biological activity of CO_2-extract of Scabiosa isetensis and S.ochroleuca / M.A. Zhunusova, E.M. Suleimen, Zh.B. Iskakova, M.Yu. Ishmuratova, R.M. Abdullabekova // Chemistry of natural compounds. — 2017. — Vol. 53, № 4. — P. 775–777.

9 Растительные ресурсы СССР: Цветковые растения, их химический состав, использование; семейства *Caprifoliaceae — Plantaginaceae*. — Л.: Наука, 1990. — 328 с.

10 Лавренова Г.В. Энциклопедия лекарственных растений. Т. 2 / Г.В. Лавренова, В.К. Лавренов. — Донецк: Донеччина, 1997. — С. 192–193.

11 Лотова Л.И. Ботаника: Морфология и анатомия высших растений / Л.И. Лотова. — М.: Изд-во МГУ, 2007. — 512 с.

12 Пермяков А.И. Микротехника / А.И. Пермяков. — М.: Изд-во МГУ, 1988. — 120 с.

М.А. Жунусова, М.Ю. Ишмуратова, Р.А. Абдуллабекова, И.А. Журавель

Scabiosa isetensis және *S. ochroleuca* шикізаттарына морфологиялық салыстырмалы талдау

Мақалада *Scabiosa ochroleuca* және *Scabiosa isetensis* шикізаттарына морфологиялық талдау жасау нәтижелері келтірілді. *Scabiosa isetensis* және *Scabiosa ochroleuca* шикізаттарының диагностикалық белгілері мынадай: сабағы үшін — тармақталу дәрежесі мен құрылымы, түктену беті, түсі; жапырақтар үшін — жапырақ нысаны мен мөлшері, түсі және талшықтың бөліну деңгейі, бөліну дәрежесі — жапырақ күлте, басты мамықтану; гүлшоғыры үшін — пішіні мен өлшемін жапырақтың орауыш үшін формасы, түсі және мамықтану дәрежесі; гүл үшін — нысаны мен мөлшері, түсі мен дәрежесі, гүл үшін ұзындығы —тәжінің орауыш және мамықтану дәрежесі.

Кілт сөздер: Scabiosa ochroleuca, Scabiosa isetensis, өсімдік шикізаттары, морфология, дәрілік өсімдік, диагностикалық белгілері.

М.А. Жунусова, М.Ю. Ишмуратова, Р.А. Абдуллабекова, И.А. Журавель

Сравнительный морфологический анализ сырья *Scabiosa isetensis* и *S. ochroleuca*

В статье приведены результаты морфологического анализа сырья *Scabiosa ochroleuca* и *Scabiosa isetensis*. Выделены следующие диагностические признаки сырья скабиозы исетской и скабиозы бледно-желтой: для стебля — степень ветвления и структура поверхности, степень опушения, цвет побегов; для листьев — форма и размер листовой пластинки, степень рассеченности, степень выраженности главной жилки, цвет и опушение; для соцветий — форма и размер соцветия; для листочков обвертки — форма, цвет и степень опушенности; для цветка — форма и размер цветка, цвет венчика, длина оберточки и степень опушенности.

Ключевые слова: *Scabiosa ochroleuca*, *Scabiosa isetensis*, сырье, морфология, лекарственные растения, диагностический признак.

References

1 Adekenov, S.M. (1997). Razvitie fitokhimii i perspectivy sozdaniia novykh lekartsvennykh preparatov [Development of phytochemistry and perspectives of creation of new medical preparations]. *Poisk i sozdanie metodov polucheniia fitopreparatov — Searching and creation methods of creation of phytopreparations*. Almaty: Gylym [in Russian].

2 *Gosudarstvennaia Farmakopeia Respubliki Kazakhstan [State Pharmacopoeia of Rebublic of Kazakhstan]*. (2008). (In 2 Vols.; Vol. 1). Astana [in Russian].

3 *Gosudarstvennaia Farmakopeia Respubliki Kazakhstan [State Pharmacopoeia of Rebublic of Kazakhstan]*. (2009). (In 2 Vols.; Vol. 2). Astana [in Russian].

4 *Flora Kazakhstana [The Flora of Kazakhstan]*. (1956–1966). (Vols. 1–9). Alma-Ata [in Russian].

5 Abdullina, S.A. (1999). *Spisok sosudistykh rastenii Kazakhstana [The list of vascular plants of Kazakhstan]*. Almaty [in Russian].

6 Grudzinskaya, L.M., & Gemedjieva, N.G. (2012). *Spisok lekarstvennykh rastenii Kazakhstana [The list of herbs of Kazakhstan]*. Almaty [in Russian].

7 Abysheva, L.N., Belenovskya, L.M., & Bobyleva, N.S. (2001). Dikorastushchie poleznye rasteniia Rossii [The wild useful plants of Russia]. Saint-Petersburg: Publ. SPCPA [in Russian].

8 Zhunusova, M.A., Suleimen, E.M., Iskakova, Zh.B., Ishmuratova, M.Yu., & Abdullabekova, R.M. (2017). Constituent composition and biological activity of CO_2-extract of Scabiosa isetensis and S.ochroleuca. *Chemistry of natural compounds. 53, 4*, 775–777.

9 *Rastitelnye resursy SSSR: Tsvetkovye rasteniia, ikh khimicheskii sostav, ispolzovanie; semeistva Caprifoliaceae — Plantaginaceae [Plant resources of USSR: Flower plants, their chemical composition, using; Families Caprifoliaceae — Plantaginaceae]*. (1990). Leningrad: Nauka [in Russian].

10 Lavrenova, G.V., & Lavrenov, V.K. (1997). *Entsiklopediia lekarstvennykh rastenii [Encyclopedy of herbs]*. (Vol. 2). Donetsk: Publ. Donetchina [in Russian].

11 Lotova, L.I. (2007). *Botanika: morpholohiia i anatomiia vysshikh rastenii [Botany: morphology and anatomy of vascular plants]*. Moscow: Publ. MSU [in Russian].

12 Permyakov, A.I. (1988). *Microtekhnika [Microtechnics]*. Moscow: Izdatelstvo MGU [in Russian].