

Study of the morphological and anatomical structure of crushed raw materials and thyme herb powder *Thymus serpyllum* L.

V.N. Bubenchikova¹, Yu.A. Starchak²

(1Kursk State Medical University, Kursk, 2Orlovsky State University Medical Institute. Oryol)

Study of morphological and anatomical structure of grinded raw herb and powder of thyme (*THYMUS SERPYLLUM* L.) VN

Bubenchikova¹, Yu.A. Starchak²

1Kursk state medical university, Deptment of pharmacognosy and botanics (Kursk, Russia), 2Orel state university Medical institution (Orel, Russia)

SUMMARY

Carried out morphological and microscopic research crushed raw materials and powder of thyme herb. The main diagnostic features have been established, which make it possible to establish the authenticity of crushed raw materials and powder.

Key words: creeping thyme, thyme, morphological and anatomical research, authenticity.

RESUME

Morphological and microscopic study of grinded raw herb and powder of thyme. Main diagnostic signs allowing to distinguish raw herb and powder were found and described.

Keywords: creeping thyme, thymus, morphological and anatomical studies.

Introduction

The herb of creeping thyme (thyme) - *Thymus serpyllum* L., of the Lamiaceae family has long been used in medical practice in Russia. It finds application in the form of an infusion as an expectorant with antimicrobial, antimycotic and analgesic properties. There is experience in the use of infusion for the treatment of alcoholism. A liquid extract is obtained from the herb of thyme, which is used to obtain the preparations "Pertussin", "Passifit" [2, 3].

The pharmacological activity of thyme herb is due to the presence of essential oil in it, the main components of which are thymol and corvacrol. Related substances include triterpene saponins: ursolic and oleanolic acids, which have cholesterol-lowering properties. The raw materials also contain flavonoids, tannins [2].

In the current SP XI edition on thyme herb there are no characteristics of authenticity for crushed raw materials and powder [1]. In addition, in the current pharmacopoeial monograph on thyme herb, microscopic studies are given

only for the leaf, which does not allow to fully characterize the anatomical structure of the aboveground part of plants, including stems, flower, leaf petioles. Therefore, the development of characteristics of the authenticity of crushed raw materials and powder for thyme herb is relevant.

The aim of the work is to carry out morphological and anatomical studies of crushed raw materials and powder for the project FS "Thyme grass" for the State Fund of the XII edition in accordance with modern requirements.

Materials and research methods

To determine external signs, the raw materials were examined with the naked eye and using a magnifying glass (10x) or a stereomicroscope (8x, 16x) in accordance with the section "Methods of analysis of medicinal plant materials, article" Herbs "[1].

Microscopic examination was carried out according to the method of preparation of preparations from crushed raw materials of herbs [1], while the sepal, corolla, stem, leaf were examined from the surface. To obtain a micrograph, a laboratory microscope "Biolan S-11" with a digital attachment was used. The photographs were processed on a computer using the Adobe Photoshop 7.0 program.

Results and its discussion

As a result of the studies carried out, it was found that the crushed raw thyme is a mixture of pieces of thin stems, leaves and flowers passing through a sieve with 7 mm holes. Pieces of stems are tetrahedral, thin (up to 0.5 cm), greenish or yellowish brown, sometimes with a purple tint. Leaves are whole, lanceolate, elliptical or oblong-elliptical, or in pieces of various shapes, green or grayish-green. The flowers are small, solitary, with a blue-violet double-lipped corolla and a reddish-brown double-lipped calyx, often crushed.

When viewed under a magnifying glass (10x) or a stereomicroscope (8x, 16x), it can be seen that pieces of tetrahedral stems are pubescent, with yellowish-brown dots (essential oil glands) on the surface, large bristly hairs or their fragments are visible at the base of the leaves; the corolla is not haired outside, the calyx is pubescent outside and with ciliated hairs along the edge. The smell is aromatic, the taste of the water extract is bitter-spicy.

The study of the powder revealed that it is represented by a mixture of pieces of thin stems, leaves, flowers passing through a sieve with holes 2 mm in diameter.

When viewed under a magnifying glass (10x) or a stereomicroscope (8x, 16x), one can see: pieces of tetrahedral stems, slightly pubescent or glabrous greenish or reddish brown or light brown, often with a violet tint; pieces of slightly pubescent leaves with numerous yellowish-brown dots (rounded essential oil glands); on separate pieces of leaves (at the base of the leaf), sparse simple bristly hairs are visible; small pieces of blue-violet corolla and brownish-red calyx covered with hairs. The smell is aromatic, the taste of the water extract is bitter-spicy.

Microdiagnostic studies of crushed raw materials showed that when

examination of the preparations of the leaf from the surface shows that the cells of the upper and lower epidermis with winding side walls; on the upper epidermis and along the edge of the leaf, folds of the cuticle and a clearly visible thickening of the cell walls are sometimes noticeable. The stomata are present on both sides of the leaf; there are much more of them on the underside; the stomata are accompanied by two peri-stomatal cells, the adjacent cells of which are located perpendicular to the stomatal cleft (diacytic type). Essential oil glands are large, consist of 8 excretory cells located radially; cells of the epidermis around the place of attachment of the gland often form a rosette. Hair of several types: very large, multicellular, warty, located at the base of the leaf ("bristly hairs"); higher along the edge of the sheet there are smaller simple two-, three-celled hairs with a warty surface; capitate hairs very small with an oval unicellular head on a short unicellular stalk, found over the entire leaf surface; papillary outgrowths of the epidermis, smooth or slightly warty, are more common on the upper side and along the edge of the leaf (Fig. 1).

Stem epidermal cells are rectangular, elongated, with straight or beveled ends, with a clearly visible thickening of the cell walls; stomata are located mainly along the ribs. The epidermis is pubescent with simple, geniculate-curved two-, five-celled hairs with a warty cuticle, capitate hairs with an oval unicellular head on a short unicellular stalk; papillary outgrowths of the epidermis with a smooth or slightly warty cuticle are less common; there are essential oil glands, consisting of 8 excretory cells located radially (Fig. 1). On the epidermis of the petiole, there are papillary outgrowths with a smooth or slightly warty cuticle and multicellular hairs with a warty cuticle. The cells of the outer and inner epidermis of the calyx leaflets are highly convoluted; there are three types of hairs: simple, two-,

The epidermis of the corolla tube is straight-walled, with longitudinal folds of the cuticle with straight or beveled ends. In the pharynx and limb of the corolla, the epidermis is sinuous, with papillary outgrowths, pubescent with simple and capitate hairs. Simple hairs of two-, four-, rarely five-celled with a warty cuticle. Head hairs of two types, with an oval unicellular head on a short unicellular stalk and an oval unicellular head on a bicellular stalk (Fig. 1). On the epidermis of the calyx and corolla leaflets, there are large essential oil glands, sometimes with yellow-brown contents, consisting of 8 excretory cells located radially; cells of the epidermis around the place of attachment of the gland sometimes form a rosette.

When examining preparations of a fine fraction of the powder under a microscope, one can see (Fig. 2): scraps of the epidermis of leaves with sinuous, sometimes beaded, thickened lateral walls and stomata of diacytic type (surrounded by peri-stomatal cells, the adjacent walls of which are perpendicular to the stomatal fissure); with rounded essential oil glands with 8 excretory cells,

located radially. Simple hairs of three types: very large multicellular warty ("bristly") hairs or their fragments; smaller two-, three-celled hairs with a warty surface, often slightly bent at the points of articulation; papillary outgrowths with a smooth or slightly warty surface. Hair and essential oil glands are found on fragments of leaves, corolla, calyx, stem and separately.

conclusions

1. Conducted anatomical and morphological study of crushed raw materials and thyme herb powder.

2. Diagnostic signs of medicinal raw material "Thyme grass" are essential oil glands with 8 excretory cells located radially, simple hairs of three types: very large multicellular warty ("bristly") hairs, smaller two-, three-celled hairs with a warty surface, often slightly bent at the articulation points; papillary outgrowths with a smooth or slightly warty surface.

3. Revealed morphological and anatomical signs of crushed and powdered raw materials "Thyme grass" are included in the sections of the monograph on raw materials "Thyme grass" ("Microscopy", "External signs") for the State Pharmacopoeia of the XII edition.

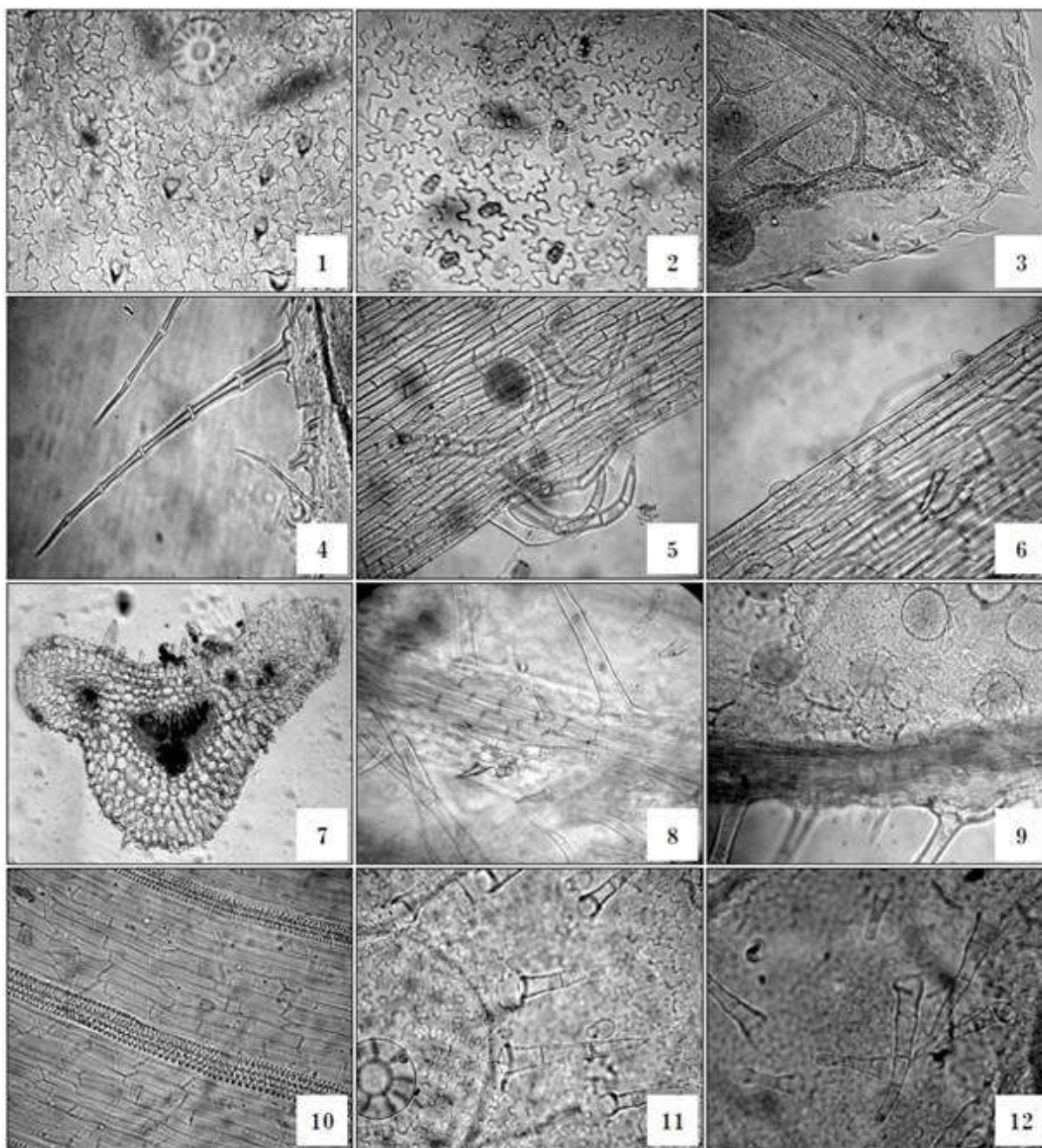
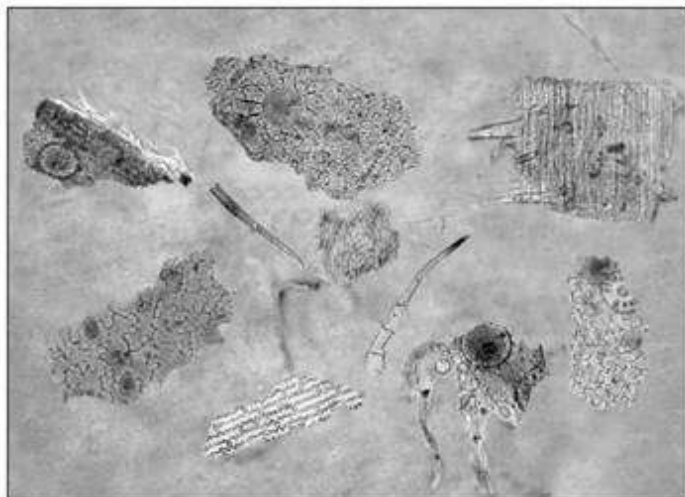


Fig 1. Thyme herb. 1 - a fragment of the upper epidermis of a leaf with essential oil glands (top view), with papillary outgrowths, took away. 300 ×, 2 - fragment the lower epidermis of the leaf with a capitate hair, stomatal complex of the diacytic type, took away. 300 ×, 3 - a fragment of the leaf edge with essential oil glands (top view), with papillary outgrowths, taken away. 300 ×, 4 - fragment of leaf margin with multicellular warty and three-celled hairs, taken away. 300 ×, 5 - a fragment of the epidermis along the stem with essential oil glands (top view), multicellular simple hairs, taken away. 300 ×, 6 - a fragment of the epidermis along the stem with capitate hairs, taken away. 300 ×, 7 - cross section of the leaf petiole, took away. 120 ×, 8 - a fragment of the calyx epidermis with multicellular simple and capitate hairs, with papillary outgrowths, removed. 300 ×, 9 - fragment of the calyx epidermis with essential oil glands (top view), taken away. 300 ×, 10 -

a fragment of the corolla tube epidermis, taken away. 300 ×, 11 - a fragment of the epidermis of the bend of the corolla with papillary outgrowths, capitate and simple multicellular hairs, essential oil glands (top view), taken away. 300 ×, 12 - fragment of corolla epidermis with simple multicellular and capitate hairs on bicellular stalk, led away. 300 ×.



Rice. 2. Fragment of fine fraction (powder) (Increase x120): essential oil glands; papillary outgrowths; scraps of simple hairs; scraps of epidermis cups; stoma.

Literature

1. State Pharmacopoeia of the USSR: Issue 1. General methods of analysis / MoH THE USSR. 11th ed., Add. - M.: Medicine, 1987. -- 336 p.
2. Medicinal plants of the State Pharmacopoeia. Pharmacognosy, under ed. I.A. Samylina, V.A. Severtsev. - M.: OOO "ANMI", 1999. - 488 p. with silt
3. Plant resources of the USSR: Flowering plants, their chemical composition, usage; Families Hippuridaceae - Lobeliaceae, Leningrad: Nauka, 1991, 200 p.

Author's address

D. farm. Sciences, Professor Bubenchikova V.N.

Head Department of Pharmacognosy and Botany, Kursk State Medical University (Kursk).

fg.ksmu@mail.ru

Bubenchikova, V.N. Study of the morphological and anatomical structure of crushed raw materials and powder of thyme herb *Thymus serpyllum* L. / V.N. Bubenchikova, Yu.A. Starchak // Traditional medicine. - 2012. - No. 1 (28). - S.47-50.

[To favorites](#)