

Research on the development of a collection for the treatment and prevention of urolithiasis diseases: identification G.E.

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The research of development of herbal tea for the treatment and prevention of urolithiasis identification

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SUMMARY

When developing a collection for the treatment and prevention of urolithiasis, the morphological signs of the collection and its individual components of varying degrees of crushing were studied: bearberry leaves, rhizomes and roots of madder, horsetail grass, highlander grass, rose hips, peppermint leaves, birch leaves, rhizomes and roots elecampane, wild strawberry leaves. Anatomical and diagnostic features of the collection and its individual components are revealed. It has been established that the particle size of raw materials does not have a significant effect on the manifestation of anatomical and diagnostic features.

Keywords: urolithiasis, collection, authenticity, external signs, microscopy.

RESUME

The morphological signs of the herbal tea and its individual components varying in size factor, such as bearberry leaves, madder rhizomes and roots, horsetail herb, knotgrass herb, rose hips fruits, peppermint leaves, birch leaves, elecampane rhizomes and roots, wildberry leaves were investigated. The anatomic and diagnostic signs of the herbal tea and its individual components were revealed. The particle size of the raw material was established to have no substantial effect on the realization of the anatomic and diagnostic signs.

keywords: urolithiasis, herbal tea, identification, microscopy, external signs.

Introduction

Urolithiasis occupies one of the leading places in the structure of urological diseases in terms of prevalence, and lithotomy is one of the earliest surgical operations [1].

Currently, urolithiasis occurs in 1–15% of the world's population, and in countries with a high standard of living, the prevalence of urolithiasis is especially high (10–15%) [2, 3].

Men are more likely to develop nephrolithiasis, their proportion among patients with urolithiasis is 65–80%. In men, the first episode of urolithiasis often occurs at the age of 30-40 years, while in women, urolithiasis, as a rule, is detected later - at 35-55 years. The risk of recurrence is estimated at 50% during the first 10 years after the first episode and 75% over a 20-year period. Some patients have 10 or more episodes of urolithiasis during their lifetime [4, 5, 6].

Every year, urolithiasis causes 15,000 deaths, with an increase in mortality [7]. In Russia, according to WHO, mortality from urolithiasis, unfortunately, remains at a high level.

Tactics of treatment of patients with urolithiasis is different. To destroy stones, ultrasonic crushing methods are used, surgical methods for extracting stones from the urethra, bladder, ureters and kidneys, in some cases it is necessary to remove the kidney. Thanks to ultrasound scanning, the detection of the initial stages of urolithiasis has significantly increased, as a result of which cases of urolithiasis diathesis fall into the category of “disease”.

Given the chronic nature of urolithiasis, the polyetiological nature of the disease, it is advisable to consider herbal medicine as the preferred method of treatment. In addition, since this disease can be asymptomatic for a long time, not only a therapeutic, but also a preventive approach is important, which can be implemented through the use of medicinal and food plants, both in urolithiasis and in diathesis. Therefore, it was decided to develop an effective and low-toxic multicomponent collection, the infusion of which can be recommended for the treatment and prevention of urolithiasis.

We have developed a collection for the treatment and prevention of urolithiasis, which includes 7 types of official medicinal plant materials (MPR): bearberry leaves, rhizomes and roots of madder, horsetail grass, highlander herb, rose hips, peppermint leaves, leaves of orthosiphon staminate (or birch leaves).

Bearberry leaves are included in the composition of the collection in order to restore urodynamics and impact on microorganisms localized in the urinary tract. The antiseptic effect of aqueous extracts from raw materials is mainly due to hydroquinone excreted in the urine - the aglycone of arbutin phenol glycoside - formed in the body during the hydrolysis of the latter.

Of particular importance for the treatment of urolithiasis is the use of antispasmodics, with which you can ease the symptoms of colic and to some extent relieve the pain syndrome caused by the movement of urinary stones. At the same time, the dynamics of urine excretion improves and, therefore, the chances of removing urinary calculi or destroying their compact structure increase.

For this purpose, rhizomes and roots of madder were included in the collection, since anthraquinones (anthracene derivatives) of the alizarin group, among which the main glycoside is ruberitric acid, have an antispasmodic and diuretic effect; promote loosening of the urinary

stones, especially those containing calcium and magnesium phosphates.

In order to increase the antispasmodic activity of the collection, the choice was made in favor of peppermint leaves.

Promotes loosening urinary stones and shows diuretic activity of the herb knotweed is one of the dominant components of the collection. Infusion of herbs reduces the formation of urates, and also has an analgesic, anti-inflammatory and hemostatic effect.

The next component included in the composition of the collection was the herb horsetail, water extracts from which have a diuretic effect; the effect is manifested from the first day of admission and is observed throughout the entire period of treatment.

In the initial stage of urolithiasis and in the postoperative period, aqueous extracts from MPC containing soluble silicic acid compounds (Knotweed grass and horsetail grass) are useful, playing the role of a protective colloid and preventing small urinary calculi from sticking together.

In order to increase diuresis, the composition of the collection includes leaves of orthosiphon stamens (or birch leaves), the infusion of which is used as a diuretic. The diuretic effect of the infusion of orthosiphon staminate (kidney tea) is also accompanied by the excretion of chlorine, urea and uric acid in the urine.

And, finally, the inclusion of rose hips in the composition of the collection is primarily due to the fact that the fruit infusion, a multivitamin remedy, increases the nonspecific resistance of the organism [8–11].

The method of using the infusion from the indicated collection was tested in the clinic of urology of the First Moscow State Medical University. THEM. Sechenov. The composition of the collection and its purpose are protected by a patent of the Russian Federation [11]. However, this collection does not have a pronounced anti-inflammatory effect, while in the treatment of urolithiasis, kidney stones cause not only inflammation of the mucous membrane of the pelvis and calyx, but also secondary interstitial nephritis. Inflammation and obstruction of the urinary tract exacerbate pathological changes (apostematous nephritis, calculous pyelonephritis, etc.) and impair kidney function.

In order to increase the effectiveness of the treatment of urolithiasis by increasing the anti-inflammatory activity of the collection, as well as to increase diuresis and increase the nonspecific resistance of the organism, elecampane rhizomes and roots and wild strawberry leaves, respectively, were included in the composition of the latter.

As a result of the conducted studies, it was found that the inclusion of these two types of MPC in the collection was justified. The composition of the collection and its purpose are protected by a patent of the Russian Federation [12, 13].

The purpose of the study is a morphological and anatomical study of the collection for treatment and prevention of urolithiasis and identification of its diagnostic features.

Materials and methods

The object of the study was an experimental sample of the collection for the treatment and prevention of urolithiasis (prescription with birch leaves) with a fineness of 5 and 2 mm, prepared in the laboratory.

The study of morphological and anatomical and diagnostic features of the components of the collection was carried out on a Biomed 6.0 microscope in accordance with the requirements of the general pharmacopoeial articles of the GF XI edition "Collections" and "Technique for microscopic and microchemical examination of medicinal plant materials", the State Fund of the Russian Federation XIII edition "Technique for microscopic and microchemical examination of medicinal herbal raw materials and medicinal herbal preparations" (OFS.1.5.3.0003.15), as well as the existing scientific literature [14–19]. Visualization of anatomical and diagnostic features was performed using a digital camera.

results

When studying the external features, it was found that the crushed collection was a mixture of heterogeneous particles of VP of grayish-green color, with dark green, green, light green, gray-green, grayish-green, grayish-brown, orange-red, brownish-red, reddish-brown, whitish or cream, dark brown, light yellow, yellowish-white, yellowish-gray inclusions passing through a sieve with holes with a diameter of 5 mm.

When examining the collection under a magnifying glass (10x) or a stereomicroscope (16x), the following were visible: pieces of naked shiny or matte leathery bearberry leaves from light green to dark green; pieces of roots and rhizomes of madder with smooth edges of a reddish-brown or orange-red color, on separate pieces a reddish-brown longitudinally wrinkled cork is preserved; grayish-green pieces of longitudinally furrowed hollow stems of horsetail, sometimes with the presence of reduced leaflets, fused into tubular sheaths of dark brown color; pieces of slender, cylindrical stems and leaves of bird's grayish-green Knotweed, as well as whitish or cream flower fragments and fragments of serrated perianth. There were pieces of rosehip hypanthium from orange-red to brownish-red, on the one hand - wrinkled, on the other hand, they are covered with hard bristly hairs, as well as small, hard, oblong nuts or their pieces of light yellow color, slightly squeezed from the sides, with weakly pronounced edges. Pieces of peppermint leaves of light green, green and dark green color were clearly visible, glabrous, only from below along the veins with sparse, adpressed hairs and throughout the plate with shiny golden yellow or darker glands and green or gray-green pieces of leaves. birches, pubescent or bare, with golden-yellow shiny glands all over the blade, as well as pieces of petioles.

Rhizomes and roots of elecampane looked like pieces of fragrant, hard roots and rhizomes with a slightly granular structure with noticeable brownish shiny dots (receptacles with essential oil) of a yellowish-white or yellowish-gray color. On separate pieces, a grayish-brown

longitudinally finely wrinkled cork.

Wild strawberry leaves were identified by pieces of green or grayish-green leaves with grayish hairs (sparse on the upper side and more numerous on the lower surface of the leaf) and yellowish veins protruding from one side of the leaf, as well as fragments of a grayish-green petiole densely covered with grayish hairs.

The collection had a weak, fragrant smell, the taste of water extract was bitter, slightly astringent.

The coarse powder of the collection looked like a mixture of heterogeneous particles of grayish-green vegetable raw materials with dark green, green, light green, grayish-green, grayish-brown, orange-red, brownish-red, reddish-brown, whitish or cream, dark - brown, light yellow, yellowish white, yellowish gray inclusions passing through a sieve with holes with a diameter of 2 mm.

When studying the powder under a magnifying glass (10x) or a stereomicroscope (16x), the following were visible: pieces of leaves of bearberry, peppermint, birch, wild strawberry, fragments of stems, leaves, flowers of Knotweed and horsetail stems, pieces of rose hips, pieces of roots and rhizomes of madder and elecampane. The powder also had a faint, aromatic odor, and the aqueous extract had a bitter, slightly astringent taste.

At the next stage of the study, a microscopic analysis of the collection was carried out and diagnostic signs characteristic of its individual components were identified.

For this, a part of the analytical sample of the crushed collection was placed on a clean, smooth surface, and the constituent components of the collection were isolated by external signs, examining them with the naked eye, using a magnifying glass (10x) or a stereomicroscope (16x).

For each component, 25–30 pieces uniform in appearance were selected; Micropreparations were prepared from several selected ones according to the method of preparing micropreparations from crushed VP.

Micropreparations were prepared from small, hardly recognizable particles of the collection passing through a sieve with openings of 0.25 mm according to the method of preparing micropreparations from powder. Particles corresponding to each component of the collection were isolated from a part of the analytical sample of the powder using a stereomicroscope, and micropreparations were prepared according to the method of preparing micropreparations from crushed VP. From small, hard-to-recognise collection particles passing through a sieve with holes of 0.18 mm in size, micropreparations were prepared according to the method of preparing micropreparations from powder. When studying micropreparations from the surface of large particles of crushed collection and collection powder under a microscope, fragments of the epidermis characteristic of bearberry leaves were visible, consisting of polygonal cells with straight thick walls, with anomocytic stomata, calcium oxalate crystals in the form of prisms, their intergrowths and drusen along large veins (Fig. 1). Two types of fragments of the epidermis of the stem and reduced leaves of horsetail grass were observed (Fig. 2): one had slightly elongated cells with sinuous porous walls, with

stomata, slightly submerged, with a characteristic radiant folding of the cuticle (epidermis of grooves and reduced leaves from the surface), the other - strongly elongated cells with thickened straight or slightly sinuous porous walls, without stomata (rib epidermis), on the walls of the ends (joints) of some cells were characteristic outgrowths are noticeable, from the surface having the form of paired circles, in the longitudinal position - rounded or serrated with a clearly defined septum.

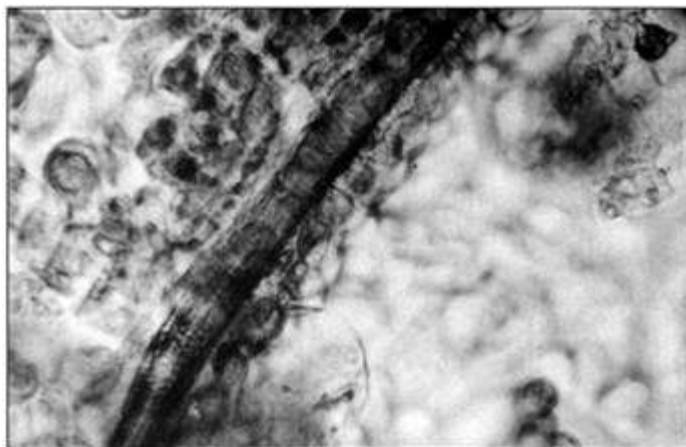
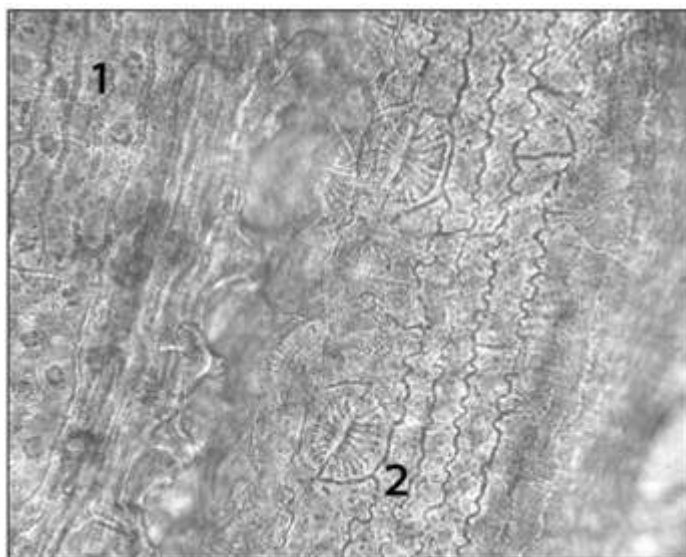


Fig.1. Bearberry leaf. drug from the surface. Vein with oxalate crystals calcium. SW. x90

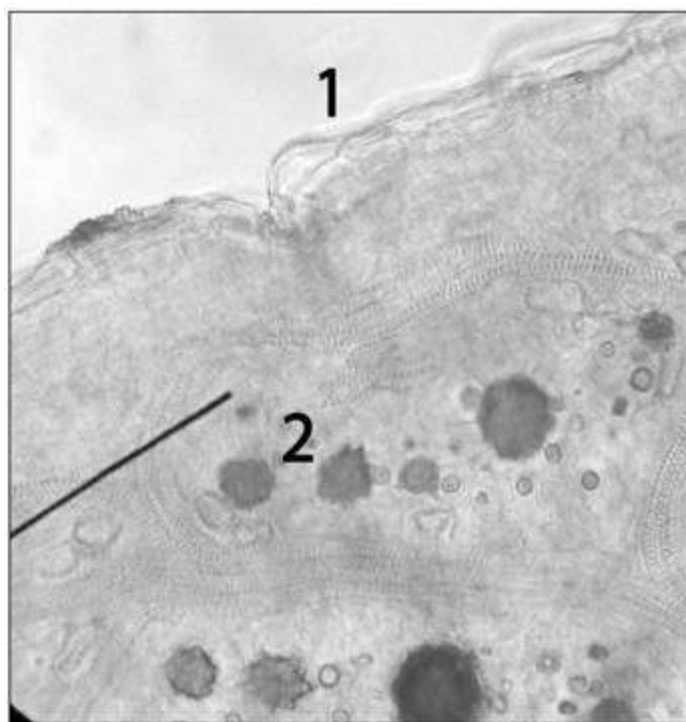


Rice. 2. Herb horsetail. drug from the surface. Stem epidermis:
1 - stomata in grooves; 2 - epidermal cells on the ribs. SW. x400

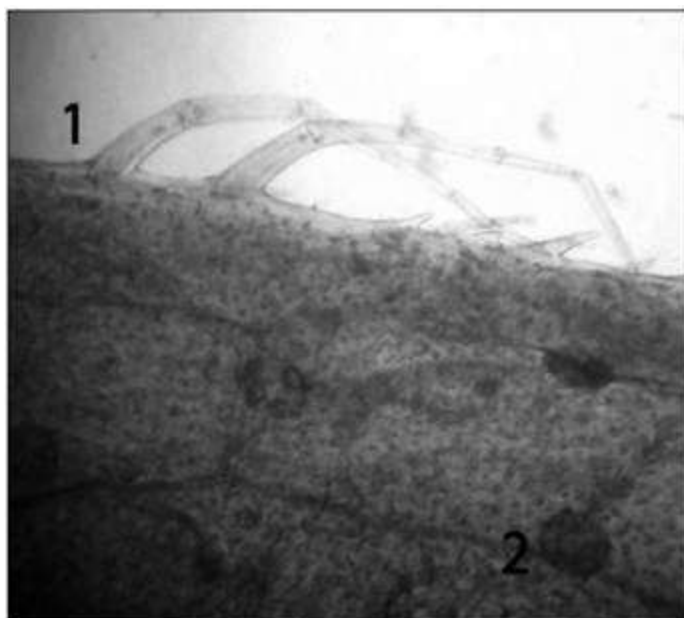
Knotweed grass was determined by fragments of the epidermis of the leaf edge, which has straight, thickened cell walls, slightly elongated into a papilla, anisocytic stomata. The mesophyll contained calcium oxalate druses and mechanical fibers with a sinuous contour and thick shells (Fig. 3).

Scraps of the epidermis with cells with highly sinuous walls, stomata of the diacytic type, simple multicellular hairs with a warty surface, capitate hairs on a unicellular stalk with a unicellular obovate head, with rounded essential oil glands with 6–8 radially located excretory cells, which is typical for mint leaves, were well diagnosed. pepper (Fig. 4).

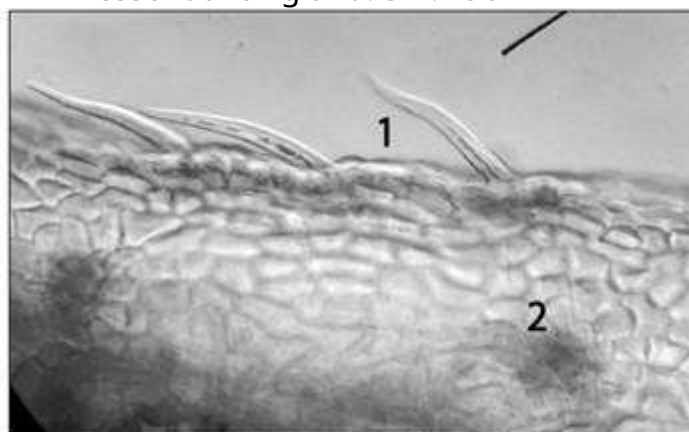
The authenticity of birch leaves could be established by fragments of the epidermis, which had polygonal cells with straight or slightly sinuous walls and large stomata of the anomocytic type and without them, as well as simple unicellular hairs with thick walls, an expanded base and a pointed apex, and their fragments, with numerous glands; the inner cells of the gland are rounded or oblong-elongated, filled with brown content, the peripheral cells are transparent, radially elongated (Fig. 5). Along the veins of the leaf, the glands are rounded, on the teeth they are oblong. In the mesophyll, near the veins, there were large prismatic crystals and small druses of calcium oxalate. Fragments of petiole epidermis with glands of a characteristic structure and simple hairs were encountered.



Rice. 3. Leaf mountaineer bird. Surface preparation: 1 - sheet edge c papillary outgrowths; 2 - druses of calcium oxalate. SW. x400



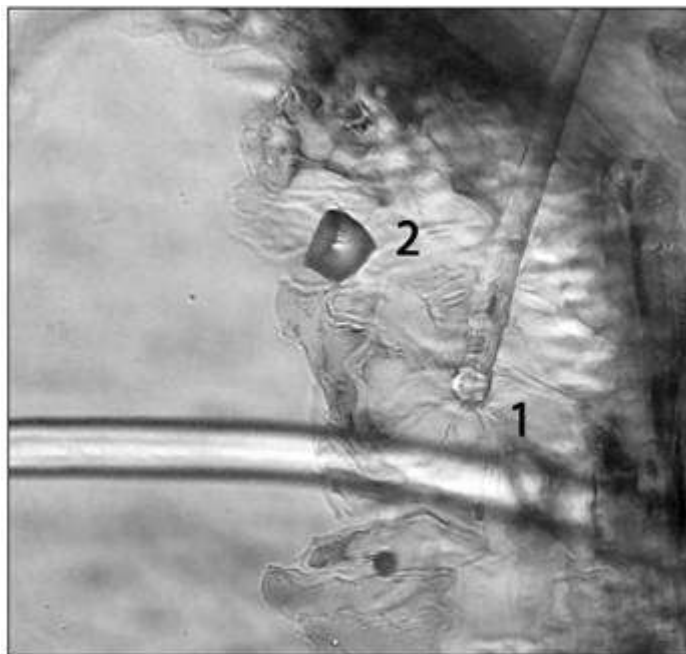
Rice. 4. Peppermint leaf. Preparation from the surface:1 - simple hair; 2- essential oil gland. SW. x90



Rice. 5. Birch leaf. Surface preparation:1 - simple hair; 2 - piece of iron. SW. x400

The leaves of wild strawberry were identified by fragments of the epidermis with cells with sinuous walls, in some places having clearly visible thickenings, stomata, rounded, submerged, anomocytic type, located mainly on the underside of the leaf, as well as two types of hairs: simple hairs - straight or curved at bases, unicellular, thick-walled, with a smooth or slightly wavy surface, with a cavity expanded at the base, tapering at the tip to filiform (epidermal cells form a rosette at the attachment points of hairs) (Fig. 6) and capitate hairs (mainly on the underside of the leaf) - thin-walled on a 2-3-celled stalk with a unicellular oblong-oval or spherical head, sometimes with light brown contents. In the mesophyll, especially along the veins, there were druses of calcium oxalate, rarely prismatic crystals of calcium oxalate. There were fragments of cells of the petiole epidermis of a prosenchymal form, 5-7-angled, with straight lines.

walls elongated along the petiole, with simple and capitate hairs, having a structure similar to the hairs of the leaf epidermis. In the cells of the parenchyma of the petiole, especially along the veins, there were druses of calcium oxalate.



Rice. 6. Leaf of wild strawberry. Surface preparation: 1 - simple hair; 2- prismatic crystals of calcium oxalate. SW. x400

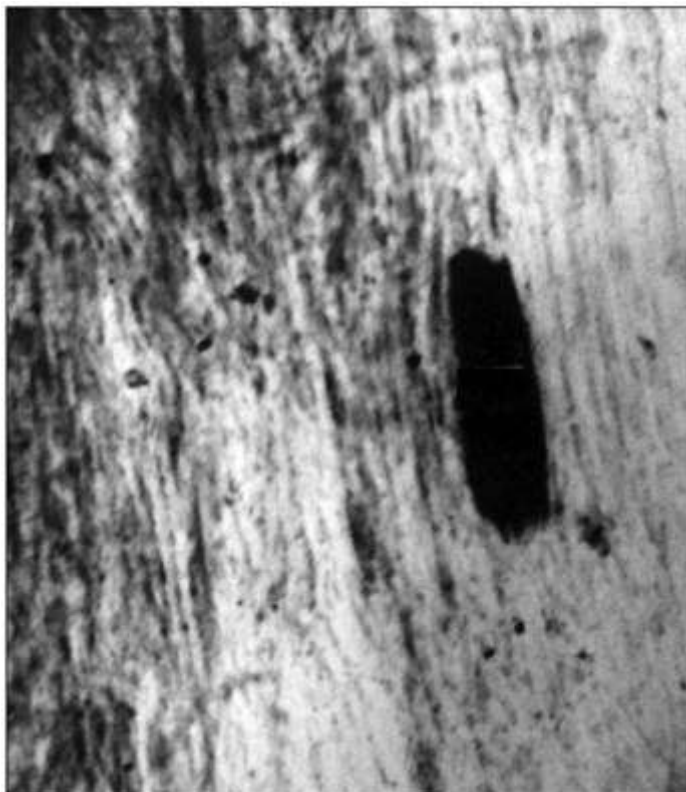
The anatomical structure of the rhizomes and roots of madder and elecampane, as well as rose hips, was studied on "pressed" preparations. Fragments of the underground organs of the madder were characterized by fragments of cork, fragments of porous vessels, fragments of the parenchyma of the cortex and core, in the cells of which calcium oxalate rafids were found (Fig. 7); fragments of large core cells with thickened porous walls were visible.

Fragments of the underground organs of elecampane were diagnosed by fragments of a multi-row cork, fragments of large scalariform and porous vessels (Fig. 8), fragments of large parenchymal cells containing inulin in the form of shapeless, colorless, highly refracting clumps of light (when considering a "pressed" micropreparation without heating) , as well as fragments of the parenchyma with large schizogenic receptacles with resin and essential oil, partially destroyed, less often intact with a clearly visible layer of excretory cells. Occasionally there were strands of bast fibers.

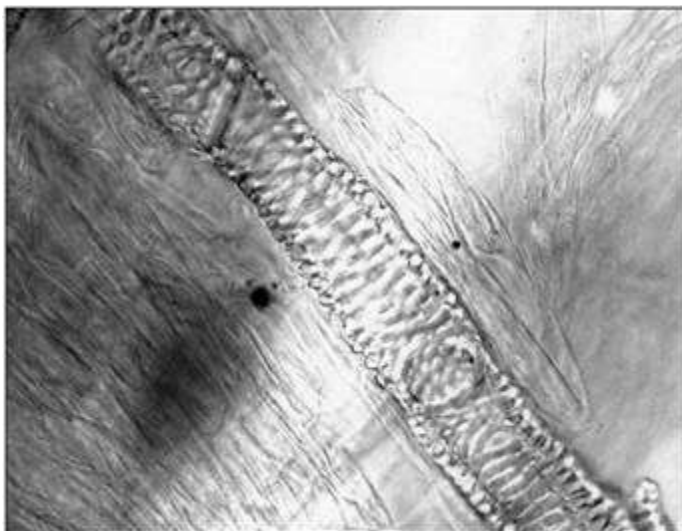
In a micropreparation of rose hips, the following were observed: fragments of the outer epidermis of the hypanthium in the form of light yellow layers, consisting of polygonal cells with straight, unevenly thickened walls and rare stomata; fragments of the pulp of the fetus, consisting of thin-walled parenchymal cells containing orange-red clumps of carotenoids and numerous drusen of calcium oxalate; numerous large unicellular hairs of two types or their fragments: very large straight hairs with a thick wall and a narrow cavity (Fig. 9) and

smaller, slightly sinuous with a wide cavity; fragments of conducting bundles with spiral vessels.

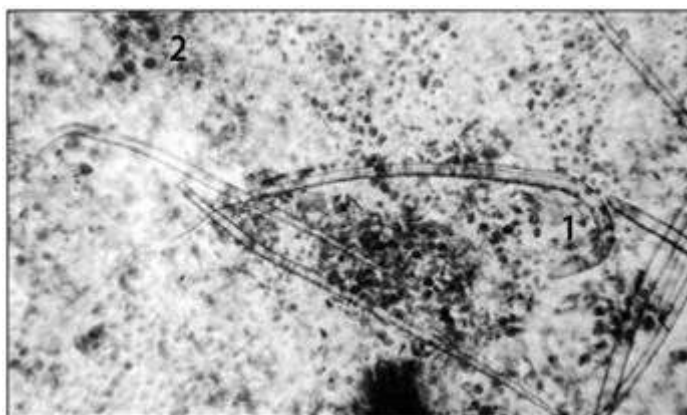
In the study of micropreparations from small particles of the collection (crushed, powder), passed through a sieve with holes of 0.25 and 0.18 mm, respectively, fragments of the collection components with diagnostic features characteristic of this type of raw material were visible under the microscope. There were fragments of leaf blades in cross section; individual hairs and their fragments, calcium oxalate druses both inside and outside cells, calcium oxalate rafids, prismatic calcium oxalate crystals, as well as hard-to-recognise particles of plant material.



Rice. 7. Madder root. "Pressure" drug. Rafid calcium oxalate. SW. X90



Rice. 8. Elecampane root. "Pressure" drug. Vessel with ladder thickening walls. SW. x400



Rice. 9. Rosehip. "Pressure" preparation of the fetus: 1 - simple hairs; 2 - druze calcium oxalate. SW. x90

conclusions

1. In the course of the study, diagnostic signs of appearance and anatomical structure necessary to determine the authenticity of the collection.

2. It is shown that the particle size of the collection components (5 mm and 2 mm) does not significant impact on the manifestation of microscopic signs. All anatomical and diagnostic features are clearly visualized.

3. The results obtained were used to develop the project Pharmacopoeia article on the proposed collection for the treatment and prevention of urolithiasis.

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Pronchenko, G.E. Research on the development of a collection for the treatment and prevention of urolithiasis: identification / G.E. Pronchenko, T.D. Rendyuk, E.V. Bulykin // Traditional medicine. - 2017. - No. 1 (48). - P.32-38.

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