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Research Article

Microscopic And Spectrophotometric Study Of The Drug "Alerva"

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ABSTRACT

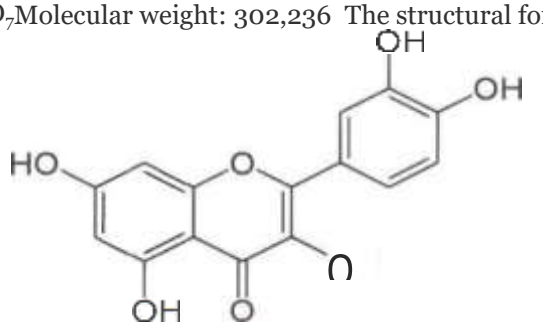
The article presents the results of studying the drug "Alerva" by microscopic and spectrophotometric methods. The morphological and anatomical characteristics of the crushed aerial parts of Yantak plants of the species Alhagi pseudalhagi and the woolly erva grass have been established. A spectrophotometric study of the Alerva drug showed a quercetin content of at least 0.1%.

Key words: yantak, morphological and anatomical study, microscopy, epidermis, veins, stomata, calcium oxalate crystals, spectrophotometry, flavonoids, quercetin.

INTRODUCTION

In recent years, certain successes have been achieved in our republic in the formation of a healthy lifestyle among the population, which is the main direction of health care reforms, providing them with high-quality harmless medicines that meet the requirements of international regulatory documents. In the fourth direction of the development strategy of the new Uzbekistan for 2022-2026, one of the important urgent tasks is to "increase the share of medicines and medical devices produced in the country to 80 percent." In this regard, it is important to conduct scientific research on optimizing the volume and composition of imported products, expanding the range of medicines of various pharmacotherapeutic groups produced at domestic enterprises, including ensuring the quality of medicines using reliable and modern analysis methods.
The drug "ALERVA" developed by us is used as a diuretic, consists of dried crushed aboveground parts of the camel thorn plant (yantak) — Alhagi pseudalhagium, Legume family and perennial herbaceous plant erva woolly (half-floor) - Aerva lanata (L.) Juss., Amaranth family, in the ratio (1:1). It is available in filter bags of 1 rp. [1, 2].

The main active ingredient is quercetin, which should be at least 0.1% in the preparation.
Chemical name 3,3',4',5,7 - pentahydroxyflavone.
The traditional name is quercetin
The empirical formula: $C_{15}H_{10}O_7$Molecular weight: 302,236 The structural formula:



The purpose of our research is the microscopic and spectrophotometric study of the drug "ALERVA", which is important for establishing the signs that ensure the quality of this herbal preparation.

Microscopy of camel thorn *(Alhagi pseudalhagium)).* Microscopic studies were carried out on crushed dried raw materials, according to generally accepted methods. The crushed raw materials {Alhagi) for microscopic examination were prepared manually, stained with methylene blue, followed by gluing into

glycerin. The finished raw materials were studied under a microscope "Motic B1- 220A-3" with an eyepiece 7, lenses 4>, 8x, 20x, 40x (at magnification x28; x40; x56; x80; x140; x200; x280; x400). The objects were recorded with a CanonA123 digital camera. The images were processed on a computer in the program "PhotoshopCS5" [3-5].

When considering the crushed aboveground organs of the studied type of raw material, the taxa of the leaf epidermis consists of a single cellular layer. The epidermal cells on the ad axial and biaxial surface of the leaf differ significantly in size and shape. They are regularly or irregularly elongated, with straight and either straight or slightly wavy walls. The features of the leaf epidermis are of taxonomic interest because they differ significantly between species. The size and shape of epidermal cells can be considered as good diagnostic features for species identification based on leaf anatomy. On both sides of the leaf there are unicellular, straight, unbranched, shearing hairs. The types and features of stomata are often considered important features in determining taxa. The stomata are anisocytic (cruciferous type) with three parietal cells surrounding the stomata of this species has amphistomatic leaves. Large veins are visible in the mesophyll of the leaf and stem. The cells of the parenchyma contain numerous prismatic crystals of calcium oxalate, forming a crystal-bearing lining of blood vessels (Fig. a-e) [6].

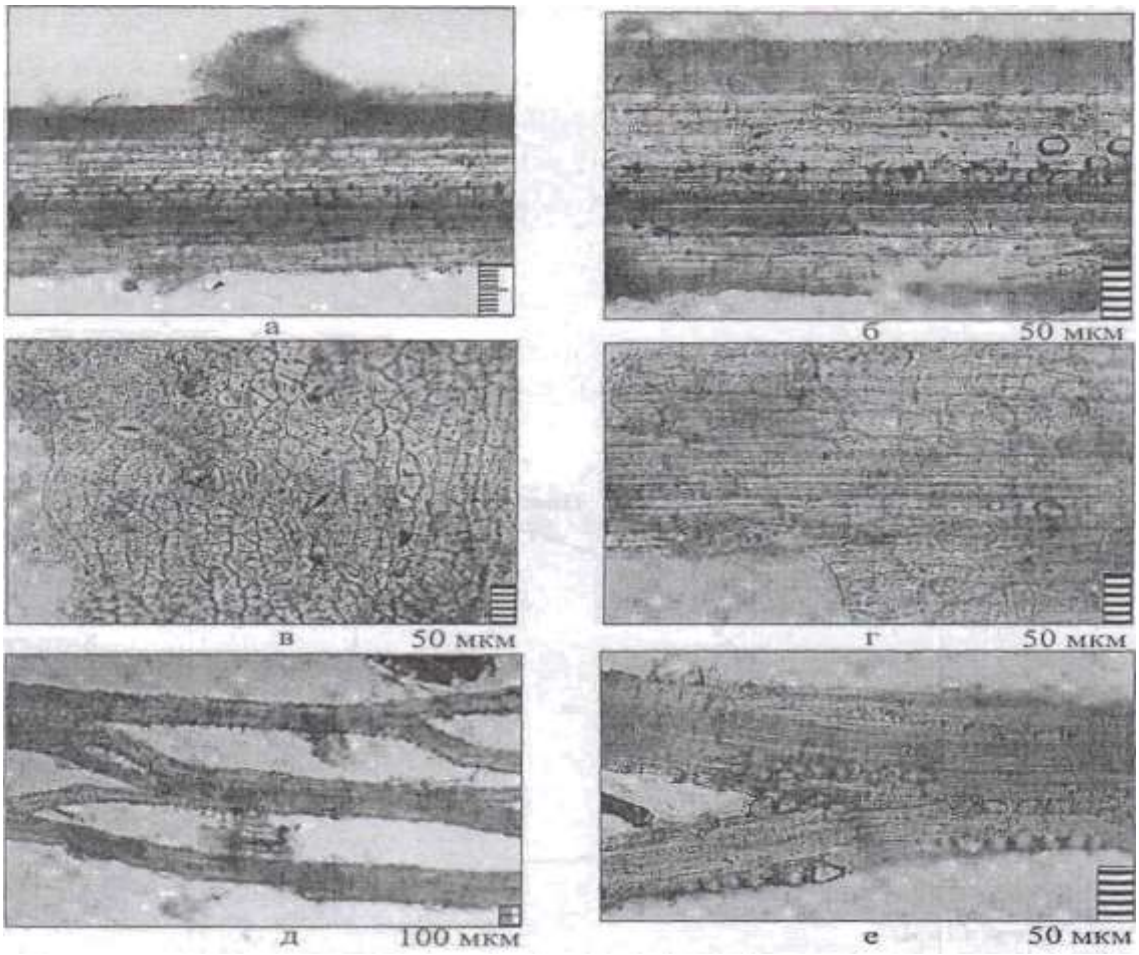


Fig. a-6. - fragment of the stem vein (8x7. 20x7); c-g - epidermis of the upper the sides of the sheet (20x7), d-e - numerous prismatic calcium oxalate crystals form a crystal-bearing lining of vessels (3,7x7, 20x7).

Microscopy of the herb Aerva lanata (L.) Juss.).

When examining the leaf from the surface, the cells of the epidermis are sinuous on the lower side, less sinuous on the upper side, or straight-walled. The cells of the epidermis are covered with a folded cuticle. Stomata are located on both sides and are surrounded by 3-4 cells of the epidermis (anomocyte type). On both sides of the leaf there are 3-7 cellular, simple, segmented hairs, mostly curved (Fig.

On the cross section, the structure of the leaf is dorsiventral, the palisade tissue is 1-2 rows, the cuticle is thick, protruding in the form of tubercles, under which essential oils are localized in the form of essential oil spots (Sudan III). The type of conducting beam of the main wolf is collateral, on the upper side there are phloem elements, on the lower side there are xylem elements (Fig. i).

In the mesophyll of the leaf, in the spongy parenchyma, there are arranged in one row large druze (fig. i). When examining the powder of crushed raw materials, fragments of leaf, flower and stem tissue, numerous segmented, curved multicellular hairs, as well as druses are visible (Fig. k).

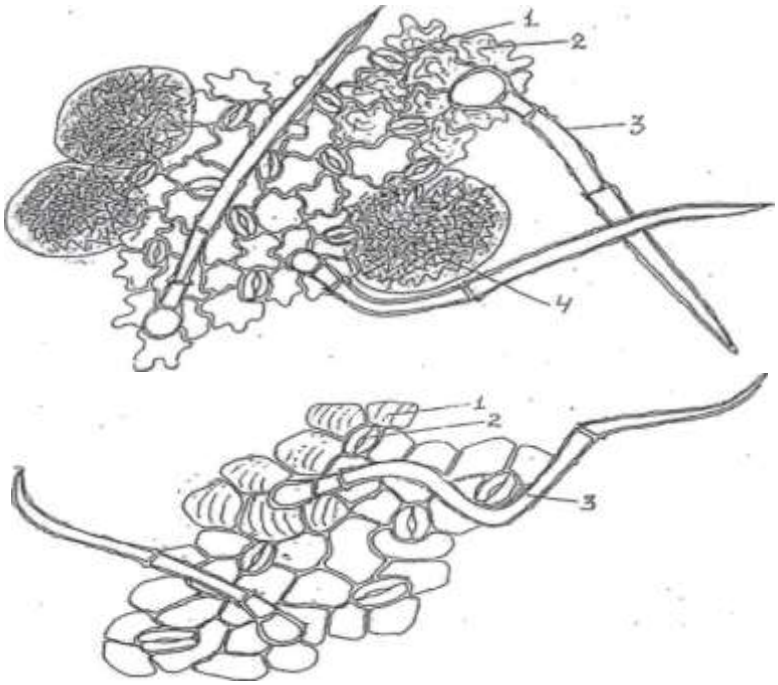


Fig. g. The lower epidermis of the woolly willow leaf (max. x 280): 1 —stomata; 2 — folded cuticle; 3 — hairs; 4 — druses.

Fig. z. Upper epidermis of the woolly willow leaf (max. x 280):l- folded cuticle; 2 — stomata; 3 — hairs.

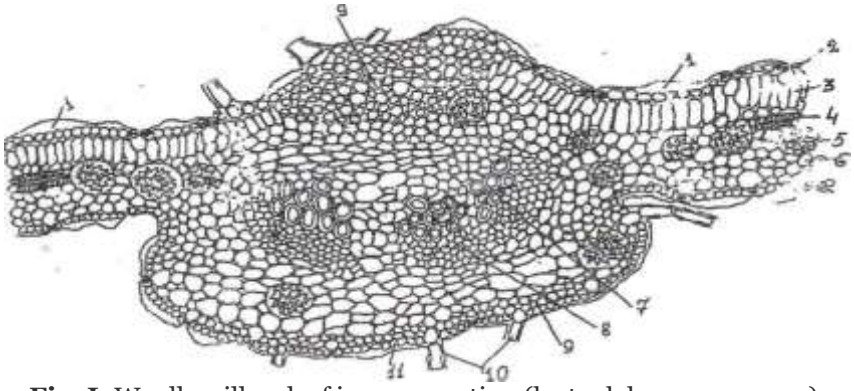


Fig. I. Woolly willow leaf in cross section (he took her away. x 120).

1 — cuticle with essential oils; 2 — stomata; 3 — palisade fabric; 4 — vein; 5 — druze; 6 — spongy fabric; 7 — xylem; 8 — phloem; 9 — collenchyma; 10 — hairs (segments); 11 — cells of the epidermis.

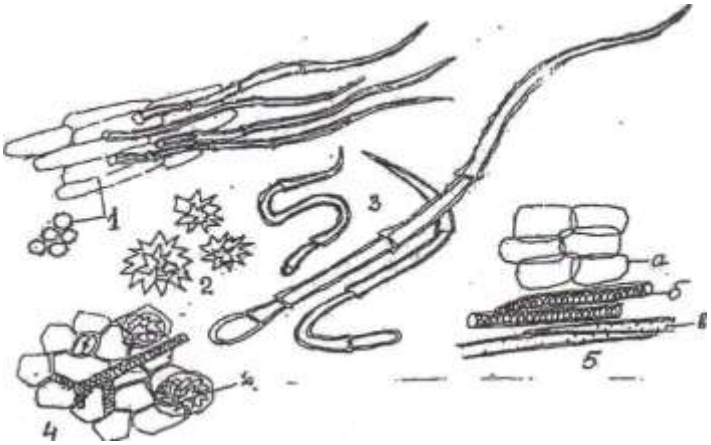


Fig. K. Powder of the herb erva woolly (max. x 280).

1 — flower elements; 2 — Druze; 3 — hairs; 4 — upper leaf epidermis; 5 — stem elements: a) core cells; b) vessels of the xylem; c) tracheid's.

Spectrophotometric study of the drug "Alerva". About 2 g (exact weight) of the drug is placed in a flask with a 150 ml slot, 30 ml of 90% alcohol containing 1% hydrochloric acid solution is added. The flask is attached to a reverse ball refrigerator and heated in a boiling water bath for 30 minutes. The flask is then cooled to room temperature and filtered through a paper filter into a 100 ml volumetric flask. The extraction is repeated again in the above manner, then another 1 About 2 g (exact weight) of the drug, placed in a flask with a 150 ml slot, 30 ml of 90% alcohol containing 1% hydrochloric acid solution is added. The flask is attached to a reverse ball refrigerator and heated in a boiling water bath for 30 minutes. The flask is then cooled to room temperature and filtered through a paper filter into a 100 ml volumetric flask. The extraction is repeated again in the above way, then 1 more time with 90% alcohol for 30 minutes. Extracts are filtered through the same filter into the same measuring flask, the filter is washed with 90% alcohol and the volume of the filtrate is brought to the mark with 90% alcohol (solution A) [7-9]
2 ml of solution A is placed in a measuring flask with a capacity of 25 ml, 1 ml of 1% aluminum chloride solution in 96% alcohol is added and the volume of the solution with 96% alcohol is brought to the mark. After 20 minutes, the optical density of the solution is measured on a spectrophotometer at a wavelength of 430 nm, in cuvettes with a layer thickness of 10 mm.
As a comparison solution, a solution consisting of 2 ml of solution A, brought to the mark with 96% alcohol in a measuring flask with a capacity of 25 ml, is used.
The content of the sum of flavonoids in terms of quercetin and absolutely - cyxoe raw materials as a percentage (X) is calculated by the formula:

$$X = \frac{D \times 25 \times 100 \times 100 \times 100}{764{,}6 \times m \times 2 \times (100 - W)},$$

where:
D is the optical density of the test solution;
764.6 is the specific absorption index of the quercetin complex; with aluminum chloride at a wavelength of 430 nm;
m is the weight of the sample of raw materials, in grams;
W is the moisture content of the raw material, as a percentage.
The content of the sum of flavonoids in terms of quercetin and absolutely cyxoe raw materials should be at least 0.1% [10].
Discussion of the results. As a result of the analysis of microscopic signs of raw materials of yantak Alhagi pseudalhagi, morphological and anatomical study of the aboveground parts of the studied yantak plant species, the presence of large veins in the mesophyll of the leaf and stem was established;
on the adaxial and abaxial surface of the leaf of the same cell layer of the epidermis, the cells of which differ in size and shape. They are regularly or irregularly elongated, with straight and either indirect or slightly wavy walls;
on both sides of the leaf there are unicellular, straight, unbranched, shearing hairs;
anisocytic (cruciferous type) stomata with three parietal cells surrounding it, and what is characteristic of this species are amphistomatic leaves;
in the parenchyma cells of numerous prismatic crystals of calcium oxalate, forming a crystal-bearing lining of blood vessels.
All these signs, established by microscopic examination of the crushed aboveground parts of the yantak plant, are characteristic of this species of Alhagi pseudalhagi and serve to diagnose it.
As a result of the analysis of microscopic signs of crushed raw materials of the herb erva woolly, morphological and anatomical examination of the aboveground parts of the studied species of the plant erva woolly, the presence of: sinuous cells of the epidermis of the leaf on the lower side, less sinuous or straight-walled epidermis cells on the upper sides, covered with a folded cuticle of epidermis cells, stomata located on both sides and surrounded by 3-4 cells was established epidermis (anomocytic type), on both sides of the leaf there are 3-7 cellular, simple, segmented hairs, mostly curved.

The cross-section revealed: dorsiventral structure of the leaf, 1-2 row palisade tissue, thick cuticle protruding in the form of tubercles, under which essential oils are localized in the form of essential oil spots, collateral type of conductive bundle of the main vein, phloem elements located on the upper side, xylem elements located on the lower side, located in the mesophyll of the leaf, in the spongy parenchyma, there are large druses in a row.
The powder of the crushed raw materials contains: fragments of leaf, flower and stem tissue, numerous segmented, curved multicellular hairs, large druses.

A spectrophotometric study of the alcohol extract from the Alerva preparation and the results of quantitative determination of the quercetin content by this method showed that its content in the liquid extract is at least 0.1%.

Conclusion:

Thus, as a result of microscopic examination of the Alerza preparation, morphological and anatomical signs of crushed aboveground parts of plants of the Alhagi pseudalhagi species and the herb herva woolly were established. All the established signs serve as diagnostic, are of taxonomic interest and are important characteristics for the validation of the method.

The results of the spectrophotometric study of the drug Alerva show that when analyzing multicomponent herbal preparations, it is advisable to use the UV spectrophotometry method, which is a modern physico-chemical analysis method that allows you to obtain reliable results on the analysis of the content of biologically active substances and to achieve validation of the analysis methods used.

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