

THE MORPHO-ANATOMIC COMPARATIVE STUDY OF TWO SPECIES IN THE MALVACEAE FAMILY

Ganea Mariana*, Ghitea Timea Claudia*, Groza Florina*, Pașca Bianca*, Gîtea Daniela*,
Pallag Annamaria*

*University of Oradea, Faculty of Medicine and Pharmacy, Department of Pharmacy, Oradea, P-ța 1
Decembrie, nr. 10, cod. 410073, jud. Bihor, e-mail: biancapasca28@yahoo.com

Abstract

This paper provides information on the species *Althaea officinalis* L. and *Malva sylvestris* L. from the spontaneous flora of Bihor County. Species analysis *Althaea officinalis* L. and *Malva sylvestris* L., began with the collection of samples and their macroscopic characterization of botanical identity for each species. To carry out the experimental part, they were harvested from the spontaneous flora of Bihor County, from different unpolluted areas. The plants were harvested during dry weather, during flowering, in May. The macroscopic study was performed according to FR. X., by establishing the morphological characters of the harvested species, observed with the naked eye, or with the magnifying glass, as well as those that can be determined by the perception of the smell and taste.

Key words: *Althaea officinalis*, *Malva sylvestris*, microscopic control, mucilages

INTRODUCTION

The Malvaceae family, known as the Nalbei family, comprises about 1500 species of grass and woody plants, of which the large nalba (*Althaea officinalis* L.), and the forest nalba (*Malva sylvestris* L.). Are spontaneous species growing in various ecosystems, used in pharmaceutical practice, due to their content in mucilages (Gîtea et al, 2011, Gîtea, 2015). Mucilages act on two planes, reduce inflammation and irritation of the entire digestive tract, reduce sensitivity to gastric acid, prevent diarrhea and reduce peristalsis, but also act on the respiratory system, decreasing tension and coughing and increasing the secretion of aqueous mucus.

Althaea officinalis L. and *Malva sylvestris* L. can be found on the market of food supplements in various pharmaceutical forms (Sîrbu et al, 2013). They mostly contain a combination of moth and other plants with complementary action, depending on the benefits sought. The medicinal plant product is represented by: *Althaeae officinalis folium*, *Althaeae officinalis radix*, *Malvae folium*, *Malvae radix*.

MATERIAL AND METHOD

Althaea officinalis L. and *Malva sylvestris* L. species from the spontaneous flora of Bihor County were identified and harvested from

different unpolluted areas. The plants were harvested during dry weather, during flowering, in May 2019. Macro and microscopic control was performed (Paşca B. et all, 2016, Pallag A. et all, 2014).

The microscopic control of the plant products was accompanied by a chemical control, which shows under the microscope, following color reactions, certain chemical constituents in the cells, in order to identify the plant products. According to FRX. the mucilages are identified as follows: To 20-30 mg sprayed vegetable product add 0.5 ml methylene blue solution (R); mucilages appear under a blue-violet microscope.

The dyes used were: the reagents used in the microchemical control as well as the Genevez reagent (Congo red + chrysidine) and malachite green. The research has identified the presence of mucilages in the root, stem and leaf (Şipoş, 2004).

RESULTS AND DISCUSSION

In the cross-section on the root can be observed under the microscope the bark of both species *Althaea officinalis* L. and *Malva sylvestris* Ls showed cells with a high content of mucilages, colored in blue in the presence of methylene blue, or in yellow-orange in the presence of Genevez's reagent.

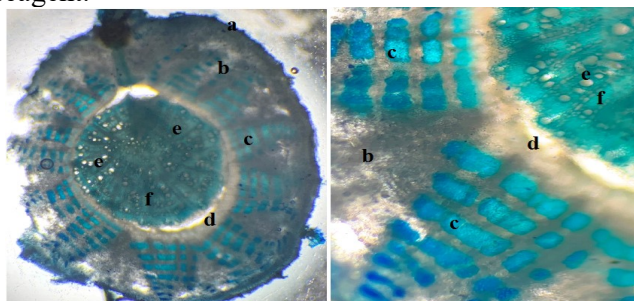


Fig. 1. *Althaea officinalis* L. - cross section through the root colored with methylene blue (ob.10x, 40x)(a = exoderm, b = bark, c = cortical parenchyma with large parenchymal cells rich in mucilages, d = endoderm, e = wood, f = free)

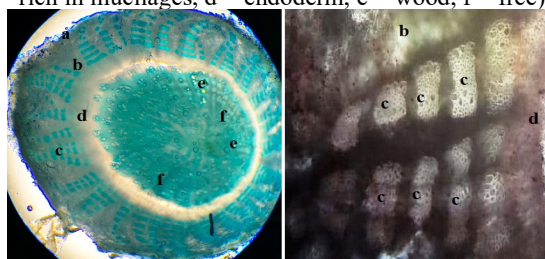


Fig. 2. *Malva sylvestris* L. - cross section through the root colored with methylene blue (ob.10x, 40x) (a = exoderm, b = bark, c = cortical parenchyma with large parenchymal cells rich in mucilages, d = endoderm, e = wood, f = free)

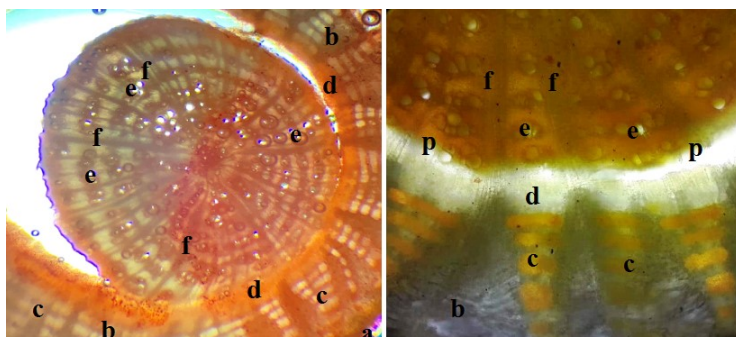


Fig. 3. *Malva sylvestris* L. - cross-section through root colored with chrysidine and Congo red, alternatively (ob.10x, 40x) (a = exoderm, b = bark, c = cortical parenchyma with large parenchymal cells rich in mucilages, d = endoderm, p = pericycle, e = wood, f = free)

The stem of both species of hawthorn *Althaea officinalis* L. and *Malva sylvestris* L. in cross-section has a circular outline, without major differentiations. The presence of simple filamentous tectorial pears in the species *Althaea officinalis* L.

The epidermis is made up of a single layer of cells, tightly joined together, between which are also stomatal cells. The cell walls are externally pumped, cutinised, lignified, cerified or mineralized by secondary wall modification.

The bark is located immediately below the epidermis, has parenchymal cells, with intercellular spaces, except for the first outer layer, which is slightly colenchymatized. The cells of the cortical parenchyma contain chlorophyll granules, which turn green, and the deeper layers show starch granules. The central star or cylinder comprises all tissues located inside the endoderm. In the stem is a single central cylinder. It has a peril, free-range conductive bundles, spinal cord and spinal cord.

The pericycle is located below the endoderm and outside the conducting bundles, consisting of one or more layers of cells with cellulose walls.

The conductive bundles represent the most important tissues of the central cylinder. The lumber bundles are collateral, made of woody conductive tissue, inside and Liberian, on the outside. The woody fabric of the bundles is made of wood vessels, parenchyma woody. Liberian tissue is made up of Liberian vessels or suction tubes, attachment cells and Liberian parenchyma.

The primary medullary rays are parenchymal cell cords that occupy the gap between the fascicles and make the connection between the marrow and the danger.

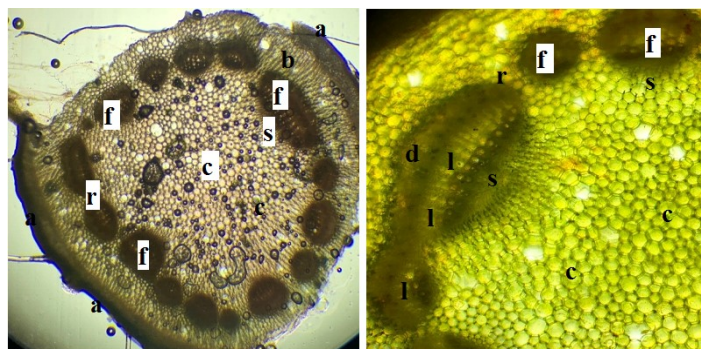


Fig. 4. *Althaea officinalis* L.- cross-section through colored strain with Genevez reagent (ob.10x, 40x)

(a = epidermis, b = bark, c = medullary cortical parenchyma, f = woody bundles, d = free-woody, s = sclerenchymal, r = medullary rays)

Althaea officinalis L. showed the presence of unicellular filamentous tectonic pears, grouped 2-6 in star shape on both epidermis. The same type of bristles are also found in *Malva sylvestris* L., but in a much smaller number. In the parenchyma there are numerous cells with mucilages.

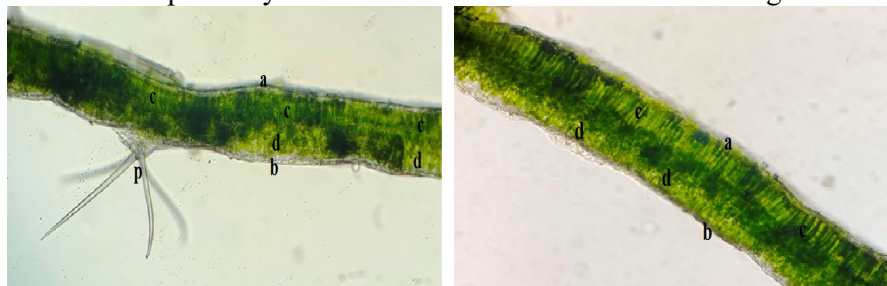


Fig. 5. *Althaea officinalis* L. si *Malva sylvestris* L - cross-section through the leaf (ob. 10x) (a = upper epidermis, b = lower epidermis, c = palisadic tissue, d = lacunar tissue, p = simple filamentous hairs)

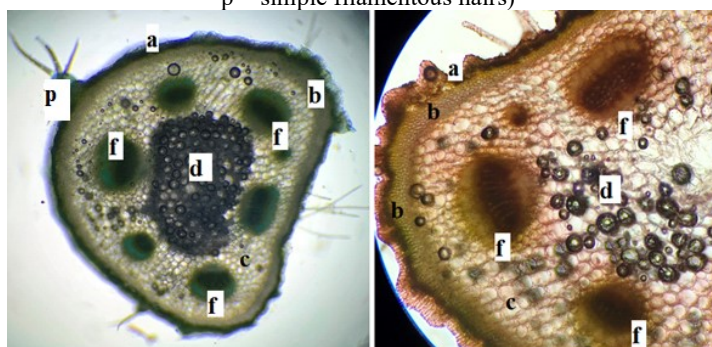


Fig. 6. *Malva sylvestris* L.- cross-section through petiole colored with methylene blue and Genevez reagent (ob. 10x, 40x)(a = epidermis, b = mechanical tissue of the colenchymal type, c = fundamental parenchyma, d = medullary cortical parenchyma, f = free-woody conductive bundle, p = simple perectors)

CONCLUSIONS

The microscopic study at the level of the vegetative organs was performed on cross sections, longitudinal, or by skinning and stained with Genevez reagent (Congo red + chrysidine), methylene blue, malachite green. The following anatomical structures were determined by optical microscopy: *Althaeae radix*, *Malvae radix*, *Althaeae herba*, *Malvae herba*, *Althaeae folium*, *Malvae folium*, *Malvae flos*, *Althaeae flos*. In the primary root structure of both species *Althaea officinalis* L. and *Malva sylvestris* L., cells with high mucilage content were highlighted, colored blue in the presence of methylene blue, or yellow-orange in the presence of Genevez's reagent. The stem of both hawthorn species *Althaea officinalis* L. and *Malva sylvestris* L. in cross-section has a circular outline, without major differentiations. The presence of simple filamentous tectorial pears in the species *Althaea officinalis* L. At the level of the broad-leaved leaves *Althaea officinalis* L. the presence of unicellular filamentous tectorial pears, grouped 2-6 in star shape on both epidermis, was highlighted. The same type of bristles are also found in *Malva sylvestris* L., but in a much smaller number. In the parenchyma there are numerous cells with mucilages. The correct elucidation of the anatomical structures are very important for the phytotherapy, for the more detailed knowledge of the plant products with therapeutic potential and establishing connections between the morphological particularities and the content in active principles.

REFERENCES

1. Gîtea D., Şipoş M., Tămaş M., Paşca B., 2011, Secretory structures at species of *Hypericum* genera from Bihor county, Romania. Note I. Vegetative organs, *Farmacia*, vol. 59,3, p. 424-431
2. Gîtea D., 2015, Specii de *Hypericum* în fitoterapie, Editura Universităţii din Oradea
3. Farmacopeea Română, ediția a X-a, Editura Medicală, Bucureşti, 2008
4. Paşca Manuela Bianca, Gîtea Daniela, Pallag Annamaria, Nemeth Sebastian, Ileş Ioana, 2016, Research regarding the capitalization of *Iris Pseudacorus* L. species, *Analele Universităţii din Oradea, Fascicula Protectia Mediului*, Vol. XXVII/B, Editura Universităţii din Oradea, p.135-140
5. Pallag A., Paşca B., Gîtea D., Bungău S., 2014, Following the botanical changes in some populations of *Equisetum Arvense* L. from Bihor county, *Analele Universităţii din Oradea, Fascicula: Fascicula Protectia Mediului*, Vol. XXIII/B, Ed. Univ. din Oradea, p. 721-726,
6. Paşca M. B., Pallag A. Gîtea D., Nemeth S., Gavriş C., 2016, Comparative histological analysis of some vegetal products obtained from *Plantago* L. Genus, *Analele Universităţii din Oradea, Fascicula Protectia Mediului*, Vol. XXVII/A, Editura Universităţii din Oradea, p. 85-92

7. Pașca M. B., Pallag A., Țiț D. M., Maghyar I., Gîtea D., 2015, Comparative study of flavones content in different extracts obtained from *Portulaca Oleracea* L., Analele Universității din Oradea, Fascicula: Ecotoxicologie, Zootehnie și Tehnologii de Industrie Alimentară Vol. XIV B, p.405-410.
8. Șipos M., 2004, Îndrumător pentru lucrările practice de citologie, Edit. Univ. Oradea, p. 16-40
9. Șipoș M., Gîtea D., 2013, Secretory structures in species of the *Hypericum* genus from Bihor county Note II. Flowers, Farmacia, vol. 62,3, p. 617-624,
10. Sârbu I., Ștefan N., Oprea A., 2013, Plante vasculare din România, Ed. Victor B Victor, București