

## STUDY OF MORPHOLOGY AND ANATOMY OF RHIZOMES WITH ROOTS OF GEUM ALEPPICUM (*GEUM ALEPPICUM JACQ.*)

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**Introduction.** *Geum aleppicum Jacq.* belongs to the *Rosaceae* family of the subfamily *Rosoideae*, grows on contaminated sites throughout the territory of Ukraine. It is used in traditional medicine as anti-inflammatory, antiemetic, choleric, analgesic, sedative, haemostatic and wound healing remedy. Previous chemical research of *Geum aleppicum Jacq.* proved that raw material of this plant contains polyphenols, polysaccharides, amino acids, fatty acids and other compounds, which have antimicrobial, anti-inflammatory and wound healing activity.

**Aim.** To study morphology and anatomy of rhizomes with roots of *Geum aleppicum Jacq.* in order to identify diagnostic features that can be used in developing methods for quality control of raw materials.

**Materials and methods.** Raw materials of *Geum aleppicum Jacq.* collected on the territory of the Kharkiv region in 2017-2018 were used for macro- and microscopic examination. Fresh, fixed and dry material was investigated. The investigation was conducted according to generally accepted methods. The research was carried out using a microscope МБР-1, МБУ-6 and BB-2610, with 800x200 and 400 times increase, micropreparates were photographed with the digital camera Canon PowerShot SX20 IS and Canon LH-DC50. Photos were processed using «Adobe Photoshop CS6 Extended».

**Results and discussion.** *Geum aleppicum Jacq.* is a plant with a thick, short rhizome. It is gemicryptophyte, mesophyte, mesotrophic. The stem is 40-80 cm tall, covered with rejected stiff hairs and leaves almost from the base. It gradually increases in diameter (from 3 to 6 mm) from top to base. It blooms in June and July.

Rhizome is thick, creeping, multi-headed, 5-10 cm long, 2-3 cm wide, hard, woody, with remnants of leaves, dark gray. Adventitious roots grow from the rhizome. They are 5-10 cm long and 0.5 cm wide. The color at a break varies from light brown to red. The rhizome has a beam structure on cross-section. It is covered with a dark brown periderm. There is thin-walled parenchyma of cortex under periderm. Mechanical tissue are absent. There are open bicollateral beams under the slightly expressed endoderm. External and internal phloem elements consists of thin-walled cells, and the border of the cambium is not always clearly expressed.

The wood refers to scattered vascular type. It consists of wide, rounded vessels which are circular and have 16.0-28.0  $\mu\text{m}$  in the diameter. Vessels are collected in small radial groups of 2-6. Spiral, porous, mesh or ladder vessels predominate. Radial transport of nutrients is carried out through wide core rays of the thin-walled parenchyma. The idioblast cells with red-brown secretion, idioblast cells with druses and starch grains with a diameter of 3.0-6.0  $\mu\text{m}$  are in cortex parenchyma, phloem, core beam and core, but the number of these inclusions is not constant. The roots have a secondary beam structure. There is a wide primary cortex under the periderm. The conductive elements of the phloem are large and rare sieve tubes and bast parenchyma. Mechanical elements are absent. The ring of cambium consists of 6-8 layers of cells. Secondary xylem is the largest part of the root. It is divided into three more or less identical parts by core rays. There is the primary xylem in the center of the root.

**Conclusions.** The obtained data indicate the possibility of using rhizomes with the roots of *Geum aleppicum Jacq.* as raw materials which contain tannins.