



PHARMACOGNOSTICAL STUDY OF ACHENES OF SOME PLANTS FROM ASTERACEAE FAMILY

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Abstract. In the present paper are represented morphological studies on determination of weight of 1000 achenes, and sieve analysis of fruits of some plants from Asteraceae family (*Arctium lappa* L., *Leuzea carthamoides* (Willd.) D.C., *Inula helenium* L., *Echinacea purpurea* Moench., *Calendula officinalis* L.). Lipid, alcohol-soluble and water-soluble complexes in fruits of *C. officinalis* were studied.

Key words: Asteraceae, morphology, sieve analysis, weight, achenes, lipid complex

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Introduction

Many plants from Asteraceae family are the source for various kinds of medicinal raw material, of which produce substances for drugs. These plants are cultivated increasingly to obtain the required number of high quality medicinal raw material in the Russian Federation. Some of them are not found in the flora of Russia, harvesting of other plants in the wild do not deliver the required number of medicinal raw material corresponding to regulatory documentation. Plants from the Asteraceae family propagate, excepting *Arnica foliosa* Nutt., sowing achenes.

The formation of the insurance fund of seed sown is the integral part of agricultural technology of cultivation in the event of death (adverse weather conditions, the mass death of seedlings from pests, etc.). However, quite often this fund remains unclaimed. It is known that Asteraceae fruits reserve nutrient such as fatty oils. Therefore, unclaimed achenes could be a source of receipt, medicinal raw material. For some plants, this oils are obtained and studied (Sylibi mariani achenes – drug “Natusil”). However, for the remaining Asteraceae fruits this work was not carried out, or it just begun (DEMIN 2010; VANDISHEV *et al.* 2009).

The aim of work is to study the outward

signs of some Asteraceae fruits as medicinal raw material, 1000 pieces mass determination, holding a sieve analysis, as well as the study of its lipid complex.

Material and methods

Achenes of *Arctium lappa* L., *Leuzea carthamoides* (Willd.) DC., *Inula helenium* L., *Echinacea purpurea* Moench. and *Calendula officinalis* L. have been studied. During these investigations binocular LOMO MCP-1, metal sieve ($\varnothing 200 \pm 2$ mm) with lid and tray, chloroform, and 95% ethanol were applied.

Results and discussion

We supplemented and corrected morphological description of some Asteraceae achenes compared to State Standart P 51096-97. For example, the pappus on the top of achenes is interpreted as a stamen filaments, whereas this residue of cup. We spent a sieve analysis of some Asteraceae achenes. Achenes of *A. lappa* passed through a sieve with a hole diameter of 5.0 mm – 56.2%, of which have passed through a sieve with a hole diameter of 3.0 mm – 54.0%, and 2.0 mm – 31.9%. Other fruit size is between 5 and 7 mm.

Sieve analysis of *L. carthamoides* achenes

showed that they are fairly uniform in size. Fruits that have passed through a sieve with hole diameter of 3 mm was 8.77%, the other is in the range between 3 and 5 mm. Sieve analysis of *I. helenium* achenes showed that almost all of them pass through a sieve with hole diameter of 2.0 mm (99.79%). Sieve with a hole diameter of 1.0 mm skips 97.18% and 0.8 mm – 76.47% achenes. Sieve analysis of *E. purpurea* achenes showed that 96.1% achenes passed through a sieve with hole diameter of 3.0 mm, 56.8% – through a sieve with hole diameter of 2.0 mm, the other fruits were in the range between 2 and 1 mm.

Fruits of *C. officinalis* are characterized by heterocarpy. Present achenes have varying degree of arcuate (sickle-shaped, arched, curved, hook) with spikes or wing-like outgrowths. Sickle achenes up to 3 cm, arched – up to 1.8 cm, hook-like – up to 1 cm. Spikes are outgrowths of the middle part exokarp. They are located on the convex side of the fetus in two rows along its dorsal part. There are sickle fruits without spines, which have on the sides of the dorsal wing-like outgrowths of exocarpium. Ventral side of fruit is pubescent. Sieve analysis of *C. officinalis* fruits: 77.92% of achenes passed through a sieve with hole diameter of 7.0 mm, 44.63% – through the 5.0 mm, 2.73% – through the 3.0 mm.

Weight of 1000 achenes is: *A. lappa* $9,5 \pm 0,3$ g, *L. carthamoides* $14,8 \pm 3,0$ g, *I. helenium* $2,0 \pm 0,2$ g, *E. purpurea* $3,6 \pm 0,03$ g, *C. officinalis* $20.5 \pm 2,1$ g.

We have obtained lipid complex from *C. officinalis* achenes. The dry residual was 14%, ethanol-soluble complex (95%) represents 1.8% and water-soluble complex – 1.1%.

Conclusions

The external features of the fruits of some representatives from Asteraceae family (*A. lappa*, *L. carthamoides*, *I. helenium*, *E. purpurea*, *C. officinalis*) were described or clarified. They were analysed in the view of using as possible medicinal raw material – source of fatty oils. Sieve analysis was carried out to determine the mass of 1000 achenes. Lipid, ethanol and water complexes were obtained.

References

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