

Study of the expectorant activity of the autumn Kulbaba herb  
R.A. Bubenchikov, N.N. Goncharov  
(SBEE HPE "Kursk State Medical University" of the Ministry of Health  
Russia, Kursk)

Study of the expectorant activity of herb *Leontodon autumnalis* L.  
RA Bubenchicov, NN Goncharov  
Kursk State Medical University (Kursk, Russia)

#### SUMMARY

The article provides data on the study of the expectorant activity of the infusion and the water-soluble polysaccharide complex of the autumn culbaba herb. It was experimentally proved that the infusion and water-soluble polysaccharides of the studied plant increase the motor activity of the ciliated epithelium of frogs, therefore, have expectorant properties.

Key words: autumn kulbaba, water-soluble polysaccharide complex, expectorant activity.

#### RESUME

The article presents data on the study of expectorant activity of infusion and watersoluble polysaccharide complex of herb *Leontodon autumnalis* L. It has been experimentally proved that the infusion and water-soluble polysaccharides of studied plants increases motor activity of ciliated epithelium of the frogs, therefore, has expectorant properties.

Keywords: *Leontodon autumnalis* L., infusion soluble polysaccharide complex, expectorant activity.

#### INTRODUCTION

Acute and chronic diseases of the respiratory system occupy a leading place in the structure of the general morbidity of the population of any age group. Among the symptoms of respiratory diseases of the lower and upper respiratory tract, cough ranks first [6]. The pharmaceutical market today offers a rich arsenal of drugs of various origins. Herbal preparations have long established themselves as effective and safe means of removing phlegm. At the same time, a number of poorly studied plants are widely used in folk medicine as expectorants. One of these plants is the autumn culbaba.

The purpose of our work was to study the expectorant activity infusion and water-soluble polysaccharide complex of autumn culbaba herb.

#### Materials and methods

The object of the study was the air-dry crushed grass of the autumn culbaba (*Leontodon autumnalis* L.), harvested in 2014 on the territory

Kursk region during the period of mass flowering of plants.

For pharmacological studies, an infusion was used, which was prepared in accordance with the methodology of the State Pharmacopoeia of the XI edition [1]. To isolate a water-soluble polysaccharide complex, air-dry crushed raw materials were pretreated with 70% ethyl alcohol to remove polyphenolic compounds. A water-soluble polysaccharide complex (WSPC) was isolated from the meal remaining after the removal of polyphenolic compounds. For this, the air-dry meal was extracted with water in a ratio of 1:20 to the mass of raw materials when heated to 95 ° C for 1 hour, the re-extraction of polysaccharides was carried out twice with water in a ratio of 1:10. The plant material was separated by centrifugation and the combined extracts were evaporated to 1/5 of the original volume. Polysaccharides were precipitated with a triple volume of ethyl alcohol 96% at room temperature. The formed dense precipitate of polysaccharides was separated, washed with ethyl alcohol 70%, acetone. The obtained WSPs were lyophilized [2].

The experiments were carried out in accordance with the established documents "On the approval of the rules of laboratory practice" [4]. To determine acute toxicity, the method of Shtabsky B.M. was used. The studies were carried out on outbred white mice of both sexes, weighing 18.0–20.0 g. 2 to 1 ml, and polysaccharides in doses from 100 mg / kg to 300 mg / kg. After the introduction of the studied infusion and the polysaccharide complex, each group of animals (at least 6 animals) was placed in an isolated cage at a standard temperature and food regime and monitored for 24 hours [5].

To study the expectorant effect, we used a model for studying the motor function of the ciliated epithelium of the frog esophagus according to the method of V.V. Gatsura. Experimental work was performed on autumn frogs *Rana Temporarea*. The frog was fixed on the cortical plate with its belly up. The test infusion and an aqueous solution of the polysaccharide complex 1% in an amount of 0.1 ml were applied to the tip of the tongue. To register the movement of the cilia, a 15 mm silk thread was used, which was placed at the base of the tongue 30 seconds after the application of the studied phytopreparations. The stopwatch was used to observe the time during which the thread was swallowed. The time spent on moving the thread by 10 mm without drugs (control) and after applying the studied infusion or polysaccharide complex was recorded [3]. Taking into account a significant scatter of the initial velocities of movement of the ciliated epithelium from one animal to another, we calculated the acceleration coefficient (CA) as the ratio of the velocity obtained after the application of the studied infusion and the polysaccharide complex to the initial one. A decrease in this coefficient indicates an increase in the motor activity of the ciliated epithelium [3].

## Results and discussion

### Study of acute toxicity of infusion and water-soluble polysaccharides

---

herb kulbaba autumn showed that in the course of the experiment there was an inhibition of the motor activity of animals, lethargy, lethargy, and these phenomena intensified with an increase in the dose of introduced phytopreparations. However, by the end of the day, the behavior of the animals did not differ from the intact ones. LD<sub>50</sub> in the experiments it was not established, because when the maximum allowable volume of the administered extraction dose was introduced, the death of the animals was not observed. Based on the available data, it can be said that the studied infusion and polysaccharide complex according to the hygienic classification of poisons by E.A. Luzhnikov, are considered low-toxic substances with LD<sub>50</sub> 1500 mg / kg. The study of the expectorant activity of the infusion and the water-soluble polysaccharide complex of the autumn culbaba herb revealed that these phytopreparations increase the motor activity of the frog's ciliated epithelium, therefore, have expectorant properties (Table 1).

The research results are presented in table. 1, indicate that the infusion and water-soluble polysaccharide complex of autumn culbaba have a pronounced expectorant activity.

Table 1

Influence of infusion and VRPS of autumn sulbaba on locomotor activity  
frog ciliated epithelium

Лекарственная форма	Коэф- фициент ускорения	Увеличение двигательной активности, %
Настой кульбабы осенней	$0,60 \pm 0,03$	$40,16 \pm 3,24^*$
ВРПС кульбабы осенней	$0,51 \pm 0,03$	$49,2 \pm 2,62^*$

\* – различия по сравнению с контролем статистически достоверны при  $P < 0,05$ ,  $n = 6$  – количество лягушек в группе.

#### conclusions

It has been established that the infusion and the water-soluble polysaccharide complex of the autumn culbaba herb are low-toxic substances with an LD<sub>50</sub> of 1500 mg / kg. The presence of the expectorant effect of the investigated infusion and the water-soluble polysaccharide complex has been proven, which allows them to be used as independent expectorant drugs, as well as promising components for combined expectorant drugs. The most pronounced expectorant effect is observed in the water-soluble polysaccharide complex of the autumn culbaba herb. The increase in the motor activity of the ciliated epithelium of the frog with their introduction is  $49.2 \pm 2.62\%$ .

#### Literature

1. State Pharmacopoeia of the USSR: Vol. 2. General methods of analysis. Medicinal herbal raw materials. / MH USSR, -11th ed., Add. - M.: Medicine, 1990. -- 400 p.

2. Bubenchikova V.N., Starchak Yu.L. Study of expectorant activity plants of the thyme genus // Medical Bulletin of Bashkortostan. - 2013. - No. 5. - P.78–80.

3. Bubenchikov R.A., Kondratova Yu.A., Novikov O.O. Examining violet herb Don (*Viola yanaïtica* Grosset.) and drooping sage (*Salvia nutans* L.) herbs in search of expectorants of plant origin // Scientific Bulletin of Belgorod State University. Medicine series. Pharmacy. - Belgorod, 2011. - No. 4 (99), Issue 13/2. - pp. 138–140.

4. Order No. 708 n of August 23, 2010 "On the approval of the rules laboratory practice".

5. Guidelines for the experimental (preclinical) study of new pharmacological substances / Under. by the general edition of Corresponding Member of the Russian Academy of Medical Sciences, prof. RU. Khabrieva. - M.: JSC Publishing House Medicine, 2005. - 832 p. : ill.

6. Yakupova R. Sh., Skachkova M.A., Choloyan S.B. Efficiency mark combined drug for cough in the treatment of acute respiratory diseases in children // Consilium medicum. Pediatrics. - 2011. - No. 3. - P.54–56.

Author's address

D. farm. n. Bubenchikov R.A., Assistant, Department of Pharmacognosy and Botany.  
fg.ksmu@mail.ru

---

Bubenchikov, R.A. Study of the expectorant activity of the autumn Kulbaba grass / R.A. Bubenchikov, N.N. Goncharov // Traditional medicine. - 2014. - No. 4 (39). - S.23-25.

[To favorites](#)