Table 3 – Indicators of uric acid concentration in hemolymph of *Lymnaea stagnalis* ($M \pm m$)

Clam collection area	Season	
	Spring	Autumn
Vitebsk district	74,47±1,48[1]	25,46±0,64
Dubrovsky district	77,61±1,02[1]	35,31±0,49
Ushachsky district	72,58±1,30[1]	28,75±0,57
Shumilinsky district	74,82±1,34[1]	30,36±0,76
Gomel district	67,01±1,49	60,49±1,23
Mozyr district	78,36±1,47[1]	62,14±1,15
Rogachevsky district	67,28±0,66[1]	58,09±1,07

Note – [1]p <0,05 compared with the autumn period of collection of mollusks.

Conclusion. Thus, freshwater pulmonary mollusks can be used as accessible research objects for school students. When carrying out such work, students in practice practice the techniques and principles of working with living objects. This kind of activity contributes to the development of students' interest in studying the ecological state of the environment.

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DETERMINATION OF THE CONTENT AND STABILITY OF PHENOLIC ACIDS IN THE EXTRACTS FROM THE LEAVES OF HORSERADISH

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As part of the implementation Of the strategy in the field of BioIndustry, the composition of wild plants, one of which is garden horseradish *(Armoracia rusticana)*, is widely studied. This plant is widely known and used for about 700 years. On the territory of the CIS there are 4 species of horseradish, one of them in the territory of the Republic of Belarus *(Armoracia rusticana)* [1–4].

The underground part of horseradish is widely used in folk medicine. The juice of the roots of this plant has pronounced antibacterial properties due to phenolic acids. Freshly prepared extracts from horseradish roots increase the production of hydrochloric acid in the stomach, increase appetite and enhance motility of the gastrointestinal tract [2–5].

When harvesting the roots of the aboveground part of the plant is discarded and widely used, except for cooking, has not yet found. However, complete

processing of the entire plant is cost-effective and waste-free. The chemical composition and properties of the above-ground part of this plant, in contrast to the underground, are poorly studied; the information in the literature is presented in small volumes and is not generalized. Therefore, the study of the chemical composition and possible prospects for the use of the above-ground part of horseradish is an important and urgent task [5].

The aim: to study the content of phenolic acids in alcohol extracts obtained from horseradish leaves.

Material and methods. The object of the study was the leaves of horseradish collected in autumn 2019 on the territory of Braslav region. Quantitative determination of the sum of phenolic compounds was carried out by the following method. 1 g of crushed leaves placed in a round-bottomed flask, add 50 cm^3 of ethyl alcohol 70-90%, extracted in a boiling water bath for 2 hours. Cool, filter in a volumetric flask with a capacity of 100 cm^3, bring the volume of the solution to the mark with ethyl alcohol.

The optical density of the resulting solution is measured on a spectrophotometer at a wavelength of 290 nm, using 96% ethyl alcohol as a comparison solution.

The content of phenolic acids in percentage (X) calculated by the formula:

$$x = \frac{D \times V1 \times 100 \times 100}{P \times V2 \times (m(100 - W))}$$

where D is optical density of test solution at a wavelength of 290 nm; V1– volume of test solution, in ml; V2– volume of the aliquot of test solution, in millilitres;m is the weight of raw material in grams; W– loss in weight at drying of raw material, in percent; R – the rate of absorption FROM solution at a wavelength of 290 nm = 510 for Gallic acid, 464 – to coffee acids, 616 – in terms of tsinarin at a wavelength of 325 nm, 470 – in terms of chlorogenic acid in ethyl alcohol 60% at 328 nm [6].

Findings and their discussion. Phenolic acids are found in all parts of almost all flowering plants. Their role in the life of plants is huge, and the functions are diverse. Compounds of this class are an important intermediate in the exchange of amino acids containing aromatic rings. Also, phenolic acids have protective properties: their production in plants is enhanced in the presence of damage, for example, cracks in the bark, fractures on herbaceous stems, leaf damage by insects with gnawing mouth apparatus. Due to the antibacterial action of such compounds, the number of microorganisms in the damaged area of the plant is reduced.

The results of the study are presented in the table:

Table – Content of the sum of phenolic compounds in extracts from the leaves of in the leaves of *Armoracia rusticana*

Extraction	Content of the sum of phenolic compounds, X %
Fresh extraction	3,54±0,01
Week-long extracton	3,70±0,01*

Note: * – $p < 0.05$ compared to the fresh extraction

As can be seen from the table, the content of the sum of phenolic compounds is significantly higher in week-long extracton extracts than in fresh extracts by 1,04 times. This indicates the instability of phenolic acids and their transformation into compounds of other classes or condensation reactions, when compounds with a more complex structure are formed.

You can increase the stability of extracts by adding preservatives, such as citric acid or its salts. The use of citric acid in pure form in extracts for internal use is impractical because of its negative effect on the mucous membranes of the gastrointestinal tract. In extracts for external use, the use of citric acid as a preservative is possible. In addition to antibacterial and anti-inflammatory properties, such extracts will acquire additional actions: keratolytic and whitening. The resulting extracts can be part of cosmetics to lighten pigmentation on the skin and various chemical peels.

Conclusion. Alcohol extracts obtained from the leaves of horseradish, which grows on the territory of Belarus, are inexpensive and affordable. Phenolic acids contained in extracts have an antibacterial effect on the skin and mucous membranes. It is recommended to introduce freshly prepared extracts into the composition of medicines and cosmetics, as the content of the studied substances in them is higher. To increase the stability of the extracts, it is possible to use preservatives, the most available of which are citric acid and its salts.

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