

Table 1
The results of studying the parameters affecting the extraction process from the collection "Diabderm"

Learned parameters	Results			
	Appearance	Dry residue,%	The amount of flavonoids,%	Essential oil content,%
Grinding degree of raw materials, mm				
2,0	Dark brown liquid with a specific odor	2,4	1,100	0,58
3,0		2,6	1,600	0,66
4,0		2,9	1,750	0,67
5,0		2,3	1,005	0,68
Extractant concentration (%)				
40	Dark brown liquid with a specific odor	2,75	1,050	0,58
70		2,95	2,770	0,67
90		2,05	1,660	0,68
The ratio of raw materials and extracta (70% ethyl alcohol)				
1:1	Dark brown liquid, with a specific odor	4,6	1,786	0,68
1:2		3,0	0,724	0,60
Extraction time, h				
1	Dark brown liquid, with a specific odor	1,25	0,890	0,58
4		3,15	1,870	0,66
6		2,98	2,860	0,68

Were studied the numerical characteristics of the liquid extract "Diabderm": the content of dry residue (not less than 5%), the concentration of ethyl alcohol (not less than 28-30%). the content of the sum of flavonoids in terms of rutin (not less than 0.850%) and the content of essential oils (not less than $0.66 \pm 0.2\%$).

Conclusions. The technology of a liquid extract based on the anti-inflammatory collection "Diabderm", intended for external use, has been developed, and its numerical characteristics have also been studied.

PHYTOCHEMICAL RESEARCH IN LYTHRUM SALICARIA L ELAGOTANINS

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Introduction. Purple loosestrife (*Lythrum salicaria* L.) is a perennial herbaceous plant of the *Lythraceae* family (*Lythraceae* L.), grows throughout Ukraine in deciduous forests, alders, swamps, along the banks of still waters. It is a melliferous, medicinal, tanning, dyeing and decorative plant. In traditional European medicine it is used as a strong astringent, haemostatic remedy for diarrhoea, bleeding and hemorrhoids. In folk medicine, the herb tincture is used externally as a hemostatic and

wound healing remedy. It is known that tannins, which cause the use of the plant, are contained in the roots (3-4%), leaves and flowers (11-17%), in the stem (2.5-6%). In Ukraine the plant is not official, but the monograph *Lythri herba* is included into the European Pharmacopoeia. The European Pharmacopoeia regulates the content of tannins in raw materials - not less than 5% in terms of pyrogallol. However, the identification of C is carried out by chromatographic detection of rutin, hyperoside, vitexin and chlorogenic acid, which are not related to tannins.

Purpose of the research. The composition establishment of tannins of *Lythrum salicaria* for further use in the raw materials standartization.

Materials and methods. The herb *Lythrum salicaria* has been harvested in June 2020 on the territory of Svetokshin Voivodeship, Poland. The extract has been obtained by raw material extraction with water in an ultrasonic bath during 30 min at a temperature of 40°C. It has been purified by column chromatography. The acetone has been evaporated with the help of a rotary evaporator. The extracts were then frozen and freeze-dried. Then, a few mg of each extract has been taken and dissolved in 1 ml of distilled water. The compounds purification has been performed by preparative HPLC.

HPLC-DAD-MS analysis of the obtained extracts has been performed by Ultimate 3000 RS system using (Dionex, Sunnyvale, California, USA) in combination with an Amazon SL ion trap mass spectrometer (Bruker Daltonik, Bremen, Germany). The separation has been performed on a Kinetex XB-C18 column (150 mm × 2.1 mm × 1.7 μm, Torrance, California, USA). The column has been eluted with a 0.1% solution of formic acid in deionized water (A) and a 0.1% solution of formic acid in acetonitrile (B). The gradient program for D4 has been used: 0 min - 0% B, 60 min - 100% B; for D6_BIS: 0 min - 1% B, 40 min - 17.7% B; for D3 + D3_BIS: 0 min - 1% B, 20 min - 9.3% B. The flow rate was 0.2 ml / min, the column temperature 25 ° C.

The molecular formulas of substances have been determined by ESI - TOF – MS analysis. The eluate has been injected directly into the ESI source of the mass spectrometer. The parameters of the ESI source were: nebulizer pressure 40 lbf / in²; dry gas consumption 9 l / min; evaporation dryness temperature 300 ° C; and a capillary voltage of 4.5 kV. The compounds have been analyzed in negative and positive ion modes. The MS / MS mode was active, and the most common ion in the recorded spectrum was subjected to fragmentation. The signals obtained in the MS / MS spectrum have been used for further fragmentation, when it is possible, in Smart Frag mode.

The UV spectra of the detected compounds have been monitored in the range from 190 to 450 nm with the help of DAD device. The structure of monomeric elagotanins has been determined in comparison with spectroscopic data, presented in the scientific literature. The structure of dimeric elagotanins has been derived on the basis of carbon glucose signals of isolated monomers, based on literature data.

The research was carried out at the department Parmacognosy and molecular basis of phytotherapy, Medical University of Warsaw, Warsaw, Poland, as a part of the three-month internship.

Obtained results. During the investigation, 14 substances have been detected in herb purple loosestrife and five main C-glucosides of elagotanins have been isolated by column chromatography: vescalagin and castalagin monomers, A, B, C salicarinin dimers.

Conclusions. The detected elagotanins can be used as marker substances in the species chemical identification, and in the further standardization of the herb purple loosestrife and the development of a monograph on it.