FF-18-01

Phenolic compounds of the liquid extract of lady's bedstraw herb (*Galium verum* L.)

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Background. Lady's bedstraw (*Galium verum* L.) of *Rubiaceae* Juss. family is one of the cosmopolitan plants widely distributed in the temperate zone of Europe, Asia and North America. In Ukrainian folk medicine *Galii veri* herba has long been used as an antibacterial, haemostatic, choleretic or immunostimulant agent due to, as has been shown, to a considerable content of polyphenols [2].

The aim of this research was to determine qualitative and quantitative composition of various phenolic compounds in an extract from *Galium verum* herb growing in Ukraine's natural habitats with the use of the HPLC method.

Materials and methods. A three-fold extraction by 60 % ethanol (30 min each) was carried out at a general ratio of the plant material : solvent of 1 : 10 on heating. The three extracts were combined, concentrated on a vacuum rotary evaporator up to the ratio of the plant material to finished product of 1 : 1. The content of phenolic compounds was studied by the method of high-performance liquid chromatography (HPLC) on a Shimadzu LC20 Prominence liquid chromatograph in the modular system equipped with the 4-channel pump LC20AD, the column thermostat CTO20A, the automatic sampler SIL20A, the diode array detector SPDM20A and the ChemStation LC20 [3]. The chromatographic conditions were as follows: the Phenomenex Luna C18(2) chromatographic column of 250 MM x 4.6 mm in size of and the particle size of 5 μ m; the column temperature of 35 °C; the detection wavelength of 330 nm (for hydroxycinnamic acids, glycosides of flavonoids), 370 nm (for aglycones of flavonoids), 280 nm (for tannins); the flow rate of the mobile phase at 1 ml/min and the injection volume of 5 μ l. The mobile phase consisted of eluent A of 0.1 % solution of trifluoroacetic acid in water and eluent B of 0.1 % solution of trifluoroacetic acid in acetonitrile. The elution programme was fixed as follows: 5 % B at 0-5 min, 5 \rightarrow 25 % B at 5-35 min, 25 % B at 35-40 min, 25 \rightarrow 50 % B at 40-60 min, 50 \rightarrow 80 % B at 60-65 min, 80 % B at 65-70 min, and 5 % B at 70-85 min. Identification of the components was carried out by the retention time and compliance of the UV spectra with reference substances.

Results. In the chromatographic study of the extract from Lady's bedstraw herb, reliably identified were 11 compounds of phenolic nature, including 5 hydroxycinnamic acids, namely caffeic, chlorogenic, neochlorogenic, 3,5- and 4,5-dicaffeoylquinic acids; and 6 flavonoids, namely catechin, quercetin, quercitrin, isoquercitrin, rutin and hyperoside, with rutin (4.18 mg/ml) and chlorogenic acid (2.53 mg/ml) being predominant compounds.

In our previous research in the phenolic compounds of a dry extract of *Galium verum* by the HPLC method with the use of different equipment and chromatographic conditions, chlorogenic acid, 3,5- and 4,5- dicaffeoylquinic acids, rutin, apigenine-7-O-rutinoside, isoramnetine-3-O-glucoside and quercetin were identified, with chlorogenic acid (3,69 %) and rutin (2,61 %) being predominant compounds [1].

Conclusion. The results obtained confirm the fact that despite different conditions of extraction, different equipment and techniques of HPLC analysis and, hence, differring results, the predominant compounds in ethanolic liquid extract of Lady's bedstraw herb are rutin and chlorogenic acid.

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Растительные ресурсы СССР: Цветковые растения, их химический состав, использование; Семейства Caprifoliaceae – Plantaginaceae / отв. ред. ПД Соколов. Л. : Наука, 1990; 328.

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