

Phytochemical study of the aerial part of *Filipendula vulgaris* Moench  
flora of Siberia

I.V. Shilova

(Federal State Budgetary Scientific Institution "Research Institute of  
Pharmacology and Regenerative Medicine named after  
E. D. Goldberg ", Tomsk)

Phytochemical research overground part *Filipendula vulgaris* Moench flora of  
Siberia

IV Shilova

Laboratory phytopharmacology Institute of Pharmacology Research and Regenerative  
Medicine named after ED Goldberg (Tomsk, Russia)

SUMMARY

Purpose: detection and quantitative determination of biologically active substances, study of the elemental composition of the aboveground part of the meadowsweet of the common flora of Siberia. Research methods: chromatographic, spectrophotometry, titrimetry, neutron activation analysis. Results: the main groups of biologically active substances were identified, their composition was studied and the quantitative content was determined. A variety of phenolic and triterpene compounds has been shown. Found 26 elements, of which eight are essential or conditionally essential. Conclusions: the results indicate the prospects of using meadowsweet of the common flora of Siberia as a source of various phenolic and triterpene compounds, macro- and microelements, including essential ones.

Key words: phenolic, triterpene compounds, elemental composition, neutron activation analysis.

RESUME

Purpose: detection and quantification of biologically active substances, the study of the elements content of an overground part of *Filipendula vulgaris* Moench flora of Siberia. Methods: chromatography, spectrophotometry, titration, neutron activation analysis. Results: the main group of biologically active substances was identified, their composition and quantified content was studied. The variety of phenolic and triterpene compounds was shown. 26 elements, of which eight were essential or conditionally essential were found. Conclusions: the results showed *Filipendula vulgaris* Moench flora of Siberia as a source of various phenolic and triterpene compounds, macro- and trace elements including essential.

Keywords: phenolics, triterpene compounds, elements content, neutron activation analysis.

Common meadowsweet *Filipendula vulgaris* Moench of the Rosaceae family grows in the steppe and forest-steppe zones in the European part of Russia, the Caucasus, and Siberia. The plant is used in folk medicine as an astringent, anti-inflammatory, wound healing antibacterial,

antifungal, diuretic, tonic and hemostatic agent. Rhizomes and plant roots (FS 42-49-72) are included in the collection of M.N. Zdrenko, and their aqueous extract exhibits hepatoprotective, immunotropic activity, infusion of flowers - cardioprotective and analgesic action [1, 2]. It has been shown experimentally that water and water-ethanol extracts of the aerial part of the plant exhibit nootropic, antihypoxic, anxiolytic, and adaptogenic activities [3–5].

The purpose of this work was to identify the main groups of biologically active substances, the detection of their representatives, the assessment of the quantitative content of the main groups and the study of the elemental composition of the aboveground part of the meadowsweet of the common flora of Siberia.

The aboveground part of the plant was collected in the flowering phase - the beginning of fruiting in the vicinity of the village of Anikino, Tomsk District, Tomsk Region. During the study of individual classes of natural compounds of the aboveground part of the plant, the generally accepted methods and techniques of phytochemical analysis were used [6, 7]. Studies of the elemental composition of the aboveground part of the meadowsweet were carried out using a highly sensitive neutron activation analysis. For this, an aqueous extract of the plant was previously obtained, since during extraction with the specified solvent, the elements present in the plant raw material are most fully extracted, and the resulting extract exhibits pronounced pharmacological properties [5].

A phytochemical study of the aerial part of the meadowsweet revealed the presence of simple phenols (saligenin, salicin), flavonoids ( $1.72 \pm 0.09$ ; quercetin, kaempferol, apigenin, luteolin, taxifolin, isoquercitrin, avicularin, spireoside, rutin), coumarins ( $0.54 \pm 0.10$ ; coumarin, umbelliferone, esculetin, fraksetin), phenol carboxylic acids ( $4.90 \pm 0.47$ ; gentisic, vanillic, gallic, p-coumaric, coffee, chlorogenic, ferulic), tannins ( $3.23 \pm 0.36$ ; predominantly hydrolysable), triterpenic acids (ursolic, oleanolic), triterpene saponins, sterols, water-soluble polysaccharides (consisting of D-glucose, D-galactose, D-glucuronic acid), carotenoids and amino acids (lysine, threonine).

When an aqueous extract of meadowsweet was burned, 23.31% ash was obtained (in terms of absolute dry extract). The study showed the presence of 26 elements in the extract, of which two are macronutrients, seven are microelements and 17 are ultramicroelements. The eight elements found in the extract are presented as essential or conditionally essential. The main part of the ash residue of the extract is made up of macroelements (calcium, sodium), as well as micro- and ultramicroelements, iron, zinc, bromine, barium, strontium, rubidium, chromium, apparently specific for this plant. The plant's aqueous extract contains a greater amount than the average content in plant ash [8] of bromine, barium, strontium, rubidium, antimony, hafnium and tantalum.

Thus, the main groups of biologically active substances have been identified, their composition has been studied and the quantitative content in the aerial part of the meadowsweet has been determined, while a wide variety of phenolic and

triterpene compounds. The results of the study of the elemental composition indicate the possibility of using meadowsweet as a source of various macro- and microelements, including essential ones.

#### LITERATURE

1. Popescu M.-L., Istudor V., Parvu C. et al. Research of Filipendulae hexapetalae Flores products // Farmacia (Romania). - 2002. - Vol. 50, no. 2. - P.34–38.
2. Sukhomlinov Yu.A., Pokrovsky M.V., Konoplya A.I. et al. Research Influence of dihydroquercetin and infusion of six-petal meadowsweet flowers on the functional state of the rat myocardium under the conditions of modeling emotional-immobilization stress // Bulletin of Voronezh State University. Series: Chemistry. Biology. Pharmacy. - 2005. - No. 2. - P.209-213.
3. RF patent 2394588. Anxiolytic agent // Bulletin of inventions. 20.07.10.
4. Shilova I.V., Suslov N.I. Nootropic Properties of Aerial Part Extract meadowsweet // Bulletin of Pharmacy (Belarus). - 2014. - T. 64, No. 2. - P.84–89.
5. Shilova I.V., Suslov N.I. Nootropic action of meadowsweet extracts ordinary // Bulletin of Experimental Biology and Medicine. - 2014. - T. 158, No. 11. - P. 609–613.
6. Chemical analysis of medicinal plants / Ed. N.I. Grinkevich, L.N. Safronich. - M.: Higher school, 1983. -- 176 p.
7. Herbal Medicines / Ed. N.P. Maksyutina. - Kiev: I am healthy, 1985. - 280 p.
8. Tkach S.M. Some general regularities in the content of chemical elements in plant ash // Biogeochemical searches for ore deposits. - Ulan-Ude: Publishing house of the Siberian Branch of the USSR Academy of Sciences, 1969. - pp. 83–90.

Author's address

D. farm. Shilova I.V., Senior Researcher.  
inessashilova@mail.ru

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