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The quantitative content of the phenolic compounds in the Stellaria media herb

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Abstract
To quantify the content of phenolic compounds in different series of Stellaria media herb. The content of the total amount of oxidizable phenols is not less than 6.5%, the total amount of hydroxycinnamic acids – not less than 1.5%, the total amount of flavonoids – not less than 1.2%, the total amount of catechins – not less than 0.6% with reference to the dry raw material. The standardization parameters for the Stellaria media herb have been determined on the basis of the research conducted. The results were used for developing the project of quality control methods «Stellaria herb» and «Stellaria tincture».

Keywords: Phenolic compounds, chickweed herb, quantitative content

1. Introduction
Search for new sources of medicinal raw material and study of plant species, which are traditionally used in folk medicine and in other spheres of human activity, - is an actual task for modern pharmacy. In this aspect our attention has been drawn by the plants of caryophyllaceous family (Caryophyllaceae Juss.) genus of Stellaria L. The most common species is Stellaria media, often called common chickweed, which is annual or biennial herbaceous plant [1, 2].
Stellaria media is believed to improvecardiac activity of heart, reduce sensation of pain, stop bleeding, heal festering wounds and resolve tumors of various origin, reveal anti-inflammatory, antiseptic and antiscorbutic effect. Infusion of the herb or its fresh juiceis used for treating diseases of liver, gallbladder, lungs as well as hemorrhoids, thyrotoxicosis. A strong extractis use dexternallyin treatment of skin diseases, in the form of baths it is used for legs swelling and nerve excitation [3, 4, 5]. Surkova A.V. revealed radioprotective and immunotropic properties of the plant, showed its favorable influence on blood formation and survival rates of animals which have been exposed to radiation doses that causebone and brainform of experimental acute radiation disease [6].
The study of the chemical composition of the Stellaria media herb has shown that the plant contains such groups of BAS as carbohydrates, organic and fatty acids, amino acids, vitamins, phenolic compounds, which prove to show a wide range of biological activity. The data about the content of such groups of compounds of Stellaria media, found in scientific literature, are not full and sometimes ambiguous.
The aim of the research is to determine the quantitative content of phenolic compounds found in the Stellaria media herb.

2. Materials and Methods
The object of the study was the Stellaria media herb collected during the mass of vegetation period: sample 1 (Vinnitsia region, Kryzhopil district, Haryachkivka village), sample 2 (Ivano – Frankivsk region, Nadvirna district, Yaremche town), sample 3 (Kharkiv region, Kharkiv district, Lyptsi village), sample 4 (Chernivtsi region, Kitsman district, Berehomet village), sample 5 (Khmelnytskyi region, Dunaivtsi district, Dunaivtsi town).
The total amount of oxidizable phenols was determined using the method described in the State Pharmacopeia of the USSR, the XI-th ed. [7]. The quantitative content the total amount of hydroxycinnamic acids in the Stellaria media herb was determined by the spectrophotometric method calculated with reference to chlorogenic acid. The content of the total amount of flavonoid glycosides was determined using the method described in literature [8]. For the quantitative determination of the amount content of catechins we used spectrophotometric method, based on the ability of catechins to form colored products with sulfuric acid calculated with reference to (+) - catechin.

3. Results and Discussion

The data obtained are generalized in the Table 1.

The content of the total amount of oxidizable phenols was not less than 6.5% calculated with reference to the absolutely dry plant raw material independently from different places of gathering. The highest content of this group of BAS was determined in the material of sample 3 – 6.99 ±0.05%,which was only 1.07 times higher than it was in material of sample 1 (the lowest value – 6.54±0.06%).

According to the data obtained the content of the total amount of hydroxycinnamic acids in all samples of the raw material was not less than 1.5%. The variability of this value was insignificant. The highest content was determined in the Stellaria media herb of sample 2 (1.89 ±0.07%). The lowest content of this group of BAS (1.25 times lower than the highest value) was found in raw material of sample 3 (1.51 ±0.08%).

Table 1: Results of the quantitative determination of the main phenolic compounds in the Stellaria media herb (m=5, P≥0.95,% calculated with reference to the dry raw material)

No of the sample	Quantitative content of X +ΔX			
	oxidizable phenols	hydroxycinnamic acids	flavonoids	catechins
1	6,54 ± 0,06	1,75 ± 0,08	1,38 ± 0,05	0,90 ± 0,03
2	6,89 ± 0,04	1,89 ± 0,07	1,23 ± 0,05	0,79 ± 0,07
3	6,99 ± 0,05	1,51 ± 0,08	1,40 ± 0,04	0,67 ± 0,04
4	6,77 ± 0,04	1,63 ± 0,05	1,23 ± 0,04	0,72 ± 0,06
5	6,56 ±0,04	1,71 ±0,05	1,22 ±0,03	0,74 ± 0,05

The quantitative content of the total amount of flavonoids was not less than 1.2% in all samples of the raw material. The results varied 1.15 times depending on the place of collection of the raw material: from 1.22 ±0.03% (sample 5) up to 1.40 ±0.04% (sample 3).

The quantitative content of the total amount of catechins was not less than 0.6% in all samples of the raw material. The highest content was determined in the Stellaria media herb of sample 1 – 0.90 ± 0.03%, the lowest content was in sample 3 – 0.67 ± 0.04%.

4. Conclusions

1. The quantitative content of phenolic compounds had been determined in different series of Stellaria media herb from several places of gathering: the total amount of oxidizable phenols, the total amount of hydroxycinnamic acids, the total amount of flavonoids, and the total amount of catechins. The lower content values of the main groups of BAS have been found. The content of the total amount of oxidizable phenols is not less than 6.5%, the total amount of hydroxycinnamic acids – not less than 1.5%, the total amount of flavonoids – not less than 1.2%, the total amount of catechins – not less than 0.6% with reference to the dry raw material.
2. The standardization parameters for the Stellaria media herb have been determined on the basis of the research conducted. The results were used for developing the project of quality control methods «Stellaria herb» and «Stellaria tincture».

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