

DETERMINATION OF FLAVANOIDS IN THE RAW MATERIALS OF THE ENDEMIC MEDICINAL PLANT WORMORUM ARTEMISIA CINIFORMIC*

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Summary

*The article deals with sufficient natural resources, studies of the characteristics of bioecological and organic compounds of medicinal plants and their regular use, scientific analysis of the possibilities of using their phytochemicals in various sectors of the country's national economy, as well as in medicine and the pharmaceutical industry. Quantitative determination of flavonoids from the endemic medicinal plant of the Kopetdag *Artemisia ciniformis* Krasch. et M. Pop. ex Poljak.*

Keywords: Kopetdag, endemic, medicinal plant materials, wormwood, flavonoids, phenol.

Importance of work. Considering the sufficient natural resources, the study of the features of bioecological and organic compounds of medicinal plants and the systematic use of our natural resources is one of the most important objectives. The use of their phyto researched plants in various sectors of the national economy of the country: chemical, pharmaceutical, textile and food industry is one of the priority areas. Therefore, the qualitative and quantitative determination of BIM in the composition of cypress pollen (*Artemisia ciniformis* Krasch. et M. Pop. ex Poljak.), an endemic medicinal plant of the Kopetdag, justifies the relevance of the work (Акмурадов, Гадамов, Бердиев, Шаймов, 2022; Акмурадов, 2016; Никитин, Гельдиханов, 1988). In the first volume of the multi-volume book by our Arkadag «Medicinal Plants of Turkmenistan» there is scientific information about the soil. Medicinal plants containing flavonoids dominate among these groups (Бердымухамедов, 2009).

Flavonoids are one of the largest groups of natural, biologically active phenolic compounds characterized by structural diversity, and today this group includes about 8000 compounds. When they are translated from the Latin «*flavus*», which means «*yellow*», it turned out that the first flavonoids obtained from plants had a yellow color, and eventually most of them became colorless (Алексеева, 2013).

Bioflavonoids are a group of phenolic compounds of plant origin, which are capillarizable (having P-vitamin activity) compounds of the general diphenylpropane structure. Achievements in the treatment and prevention of diseases with the help of P-vitamin preparations have attracted the attention of many scientists who are engaged in the development of new sources and technologies for obtaining P-vitamins.

One of the main goals is the development of methods for qualitative and quantitative determination of bioflavonoids in order to optimize extracts of medicinal plant raw materials and standardize medicines prepared on their basis.

Interest in flavonoids as antioxidant agents arose in the mid-1990s and was largely associated with the emergence of such a dietary phenomenon as the «French paradox», which subsequently spread to the population of other Mediterranean countries (Burr, 1995). Several studies have shown that dietary patterns are associated with relatively lower rates of cardiovascular disease and longer life expectancy, despite the prevalence of high-fat diets, low physical activity, and other studied

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behavioral patterns among residents of these countries. The study of the diet of the population of this country showed the presence of a large number of various flavonoid compounds in food products, mainly in vegetables (De Lange, Verhoef, Gorter, 2007; Galinski, Zwicker, Kennedy, 2016; Oyvind, Andersen, Kenneth, 2006; Prochazkova, Boušova, Wilhelmová, 2011; Puppo, 1992).

Medicinal plants containing flavonoids are used in medical practice as an expectorant, for antioxidant action and prevention or suppression of neoplastic diseases, vasoconstrictor, liver and gastrointestinal tract protection, and as brain and heart activity regulator, angioprotector. Diuretics are widely used as anticonvulsants (Oyvind, Andersen, Kenneth, 2006; Корулькин, Абилов, Музыкакина, Толстикова, 2007; Куркин, 2009; Куркин, Правдивцева, 2008). Reviews of scientific articles and monographs published in recent years provide information on the anti-inflammatory effect of flavonoids (Азарова, Галактионова, 2012).

A number of foreign scientists indicated that flavonoids together with terpenoids are responsible for the medicinal properties of *A. scoparia*, *A. kemrudica*, *A. turcomanica*, *A. Deserta*, *A. santolinifolia*, *A. vulgaris*, *A. gmelinii*, *A. laciniata*, *A. frigida*. This is evidenced by the conducted scientific research. Kaempferol, quercetin, luteolin, rutin, isorhamnetin, flavonoids, as well as naringenin and hispidulin were analyzed in their surface part of *A. Campestris* and it was found that *A. frigida* can be a source of methyl ester tricetin and quercetin.

Phenolic compounds are either colorless crystals or rare liquids, mostly amorphous substances, soluble in organic solvents. It is believed that the main constituents of polyphenols form quinoid compounds, which undergo oxidation, especially in an alkaline environment, under the effect of oxygen in the air. Phenol can form colored complexes with heavy metal ions. This is characteristic of average dihydroxy products. They participate in compatible reactions with diazonium compounds. On this basis, various colored dyes are formed, which are often used in analytical procedures. In addition to reactions common to all phenols, there are group-specific and characteristic reactions.

Purpose of work. Quantitative analysis of flavonoids with BAD in the surface raw material of the cytvaroid – endemic of the species Kopetdag and its expression in percentages by routine calculation.

Material and method. The endemic medicinal plant of Kopetdag is a crushed raw material collected in the autumn months. Raw materials were collected in the foothills of the Central Kopetdag, and Gjaversdag according to the general method and dried in suitable conditions (Акмурадов, 2016; Алексеева, 2013). The content of flavonoids in raw materials was determined by calculating rutin (rutin CO solution) according to a specially developed method described in the article «General Pharmacology» (Государственная фармакопея Российской Федерации, 2018).

In a volumetric flask with a capacity of 25 ml, pour 2 ml of Rutin CO solution, mix dropwise with 4 ml of 2% alcohol solution of $AlCl_3$ and 1 drop of 30% acetic acid and make up to the mark with 96% alcohol solution. This solution is rutin BCO.

1.0 g (exact mass) of the prepared sample of the analytical raw material is placed in a flask with a capacity of 250 ml with a smooth neck and 60 ml of 70% alcohol solution is added. Heat the reflux flask in a water bath for 30 minutes in boiling water while shaking so that the raw material does not stick to the inner wall of the flask. Filter the hot extract into a 100 ml volumetric flask using a filter bag. Wash the filter paper with 40 ml of 70% alcohol and bring it up to the mark (test solution A).

Place 2.0 ml of test solution A in a 25 ml volumetric flask, add 4 ml of 2% alcohol solution $AlCl_3$, add 1 drop of 30% acetic acid and mix up to the mark with alcohol (test solution B).

The optical density of solution B was measured on a spectrophotometer at a wavelength of 410 in a 10 mm thick cuvette using solution A, as well as standard solution A CO for comparison solutions.

The amount of flavonoids in constant (absolute) dry raw materials is calculated in to the rate and expressed in percentages according to the formula:

$$x = \frac{A \cdot a_0 \cdot 2 \cdot 100 \cdot 25 \cdot P \cdot 100}{A_0 \cdot 100 \cdot 25 \cdot a \cdot 2 \cdot 100 \cdot (100 - W)} \cdot 100$$

- A – optical density of the studied solution B;
A₀ – B is the optical density of the CO-rutin solution;
a – raw material mass, d;
a₀ – the mass of CO rutin, d;
P – CO is the main substance stored in rutin;
W – raw material moisture content in %.

CONCLUSION

Quantitative analysis of flavonoids in surface raw materials of the endemic medicinal plant of the Kopetdag. At routine calculation, it turned out to be 1,50.

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