

Quantitative determination of tannin content in medicinal plants

The group of tannins includes substances of plant origin, which are complex organic compounds that are derivatives of polyatomic phenols with a variety of chemical structures, ranging from the simplest derivatives of polyphenols to more complex high-molecular derivatives. Tannins have an astringent, anti-inflammatory and hemostatic effect, therefore, the search for new plant sources of tannins, as well as the development and modification of methods for their quantitative determination in medicinal plant raw materials is very relevant.

There are a lot of methods for quantitative determination of tannins content.

Gravimetric methods are based on the ability of tannins to be quantitatively precipitated by gelatin, heavy metal salts or defatted leather powder. Literature sources also contain data on the possibility of using casein instead of leather powder in the method of quantitative determination of tannins [1].

Permanganometric titration is the Leventhal method included in the [2], modified by A.L.Kursanov, based on the ability of tannins to oxidize in a medium acidified with sulfuric acid with the addition of indigo-sulfonic acid as an indicator. The method is sufficiently simple. However, the method has a large number of disadvantages, such as overestimation of the results of determinations (along with tannins oxidation of other groups of biologically active substances occurs); unacceptability of using a single conversion factor for plant materials containing a tannin-catechin mixture (shown that, depending on the objects under study, it can range from 0.00416 to 0.00735). Leventhal's method should be considered approximate and possible for semi-quantitative determination.

Spectrophotometric methods are based on measuring the optical density of the extraction after the formation of colored products obtained by the interaction of tannins contained in the extraction with various reagents [3].

The use of a high performance liquid chromatography (HPLC) method for the analysis of tannins content is the most optimal, since the method allows simultaneous identification of compounds and their quantitative determination in the initial plant raw materials and preparations. The HPLC method is included in the monographs of the US Pharmacopoeia for medicinal plant raw materials containing tannins [4].

1. *Самылина И.А., Антонова Н.П., Рудакова И.П.* Исследования по разработке фармакопейного метода определения содержания дубильных веществ в лекарственном растительном сырье // *Фармация.* — 2009. — № 6. — С.3–6.
2. *Государственная фармакопея.* Вып. 1. — XI изд. — М., 1987. — С.286–287.

3. Державна Фармакопея України. — 2-ге вид. — Харків: Державне підприємство “Український науковий фармакопейний центр якості лікарських засобів”, 2015. — 1. — 1128 с.
4. United States Pharmacopeia, (USP 29). — 2005. — Vol. 45, № 7. — P.2695–2700.