The study of tannins Astragalus albicaulis (Astragalus albicaulis) DC)

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The research of the tannins inAstragalus albicaulis DC

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RESUME

It was revealed for the first time with the help of qualitative reactions that there were mainly condensed tannins in the grass Astragalus albicaulis. It was determined with the Permanganatometric method, that their quantitative content is 3.58 ± 0.12%.

keywords:Astragalus albicaulis DC, tannins, permanganatometry method.

SUMMARY

For the first time, with the help of qualitative reactions, the presence of predominantly condensed tannins in the herb of astragalus white stem was established. By the permanganometric method according to the method of the SP XIII edition, it was determined that their quantitative content is 3.58 ± 0.12%.

Key words: astragalus white stem, tannins, method permanganatometry.

INTRODUCTION

Plants of the Astragalus genus are widely used in folk medicine as anti-inflammatory, diuretic, lipid-lowering agents, and in diseases of the cardiovascular system. However, only astragalus woolly-flowered has found application in official medicine. Other species of this genus have not been studied enough. In particular, Astragalus alba has long been used in folk medicine as an anti-inflammatory agent for the treatment of women's diseases [2]. The plant is widely distributed in the European part of Russia (Belgorod, Voronezh, Kursk, Lipetsk, Samara, Saratov regions) [4], Western Siberia, and the Caucasus [6]. However, its chemical composition is practically not studied. All this indicates the relevance of the study of Astragalus alba with the aim of introducing a new type of medicinal plant material into official medicine.

The aim of the study is to study the tannins of the herb astragalus white stem.

MATERIALS AND METHODS

The object of the study was the dry air-shredded grass of Astragalus white stem, harvested in 2016 in the Kursk region during the period of mass flowering of the plant.

Tannins form colored complexes with salts of heavy metals, enter into coupling reactions with diazonium compounds, give precipitates with macromolecular substances [3], which is used for their qualitative determination. Tannins in the water extract from the herb Astragalus whitestem were identified by us using the following qualitative reactions:

- with equal amounts of freshly prepared gelatin solution 1% and hydrochloric acid solution 10%;
- with a solution of formaldehyde 40% and hydrochloric acid concentrated;
- with a solution of bromine water 0.5%;
- with a solution of an average salt of lead acetate 10%;
- with a solution of iron-ammonium alum 1% [3].

Currently, various methods are used for determining the content of tannins in medicinal plant materials: permanganatometry, spectrophotometry, complexometry, colorimetry, weight method, and a number of others [5]. Determination of the quantitative content of tannins in the herb Astragalus whitestem was carried out by us by the permanganometric method according to the methodology of the Global Fund of the XIII edition [1].

To do this, about 2.0 (accurately weighed) herbs Astragalus whitestem, crushed and sifted through a sieve with holes of 3 mm, were placed in a conical flask with a capacity of 500 ml, poured 250 ml of purified water heated to boiling and boiled under reflux on an electric stove with closed spiral for 30 minutes with occasional stirring. The resulting extract was cooled to room temperature and filtered into a volumetric flask with a capacity of 250 ml, the volume of the solution was adjusted to the mark with purified water and stirred. 25 ml of the resulting aqueous extract was placed in a 1000 ml conical flask, 500 ml of purified water, 25 ml of indigo sulfonic acid solution were added and titrated with constant stirring with 0.02 M potassium permanganate solution until golden yellow color.

In parallel, a control experiment was carried out: 525 ml of purified water, 25 ml of indigo sulfonic acid solution were placed in a conical flask with a capacity of 1000 ml, and titrated with constant stirring with 0.02 M potassium permanganate solution until golden yellow color [1].

The content of the sum of tannins in terms of tannin in absolutely dry raw materials in percent (X) was calculated by the formula:

$$X = \frac{(V - V_1) \times 0,004157 \times 250 \times 100 \times 100}{a \times 25 \times (100 - W)} \quad (1),$$

where:

V is the volume of 0.02 M solution of potassium permanganate used for

titration of water extract, ml;

$V_{one}$is the volume of 0.02 M potassium permanganate solution used for titration in the control experiment, ml;

a - raw material sample, g;

0.004157 - the amount of tannins corresponding to 1 ml of a 0.02 M solution of potassium permanganate (in terms of tannin), g;

W is the moisture content of plant raw materials, %;

250 – total volume of water extraction, ml;

5 – volume of water extract taken for titration, ml.

RESULTS AND ITS DISCUSSION

The qualitative reactions carried out by us indicate the presence of tannins in the herb Astragalus white stem. The precipitation of an amorphous precipitate, soluble in an excess of the reagent, when a freshly prepared 1% gelatin solution and a 10% hydrochloric acid solution are added to an aqueous extract from the herb of the studied plant indicates the presence of tannins. When a 40% formaldehyde solution and concentrated hydrochloric acid are added to the test extract, a red-brown precipitate is formed, which indicates the presence of condensed tannins. The formation of an orange precipitate when a 0.5% bromine water solution is added to an aqueous extract and the appearance of a dark green color when a 1% iron-ammonium alum solution is added confirms

Quantitative determination of tannins, carried out by the method of permanganatometry, made it possible to establish that their content in the herb Astragalus whitestem is 3.58 ± 0.12%.

CONCLUSIONS

For the first time, the presence of predominantly condensed tannins was found in the herb Astragalus whitestem. It has been established that their quantitative content is 3.58 ± 0.12%.

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