



Tanning Agents of Herb Lofanta Anis (Lophanthus Anisatus Benth.)

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ANNOTATION: The article is devoted to the tanning agents of herb Lofanta anis (*Lophanthus anisatus* Benth.) which is used for colds, respiratory and skin diseases, as an anti-inflammatory, antiviral, antimicrobial and expectorant. The medicinal plant raw material preparation Lophant aniseed—*Lophanthus anisatus* Benth, which has high effectiveness and low side effects on human health, based on the medicinal plants in the pharmaceutical industry of Uzbekistan.

KEYWORDS: anise lofant, budding, indigo sulfonic acid, mass flowering, phase, permanganatometry, tannins.

INTRODUCTION

As the population's demand for medicinal plants increases day by day, the natural reserves of herbs in nature are decreasing, and their distribution areas are decreasing sharply. Therefore, the introduction, study, reproduction, cultivation, rational use of raw materials and protection of plants with medicinal properties, whose species are decreasing in nature, are among the urgent problems of the present time. Nowadays pharmaceutical industry's one of the topical issues is the creation of modern, harmless and highly effective medicines from medicinal plant materials. Anise lofant—*Lophanthus anisatus* Benth. (Lamiaceae family) perennial herbaceous plant, the height of which reaches 1.5 m, the stem is erect, ribbed; the leaves are opposite, simple, lanceolate, with jagged edges, the flowers are dark pink, two-lipped, form dense spike-shaped inflorescences on the tops of the stems. Spring regrowth of plants begins in late February—early March, budding—in late May, mass flowering lasts from June to late August. In the wild, anise lofant grows in Central Asia and the Far East, in the west of the USA and Canada. Anise lofant (*Lophanthus anisatus*) or fennel multi-grate (*Agastache foeniculum*) belongs to the Lamiales family, in which, in addition to it, there are many other spicy herbs, shrubs and subshrubs: marjoram, sage, lavender, and so on. Botanists distinguish about 25 varieties of lofant, slightly different from each other. Small lofant plantations are cultivated in Moldova and in the Crimea. Anise lofant (*Lophanthus anisatus* Benth.), Lamiaceae family, is a perennial herbaceous plant up to 1.5 m high.

In folk and scientific medicine, *Lophanthus anisatus* Benth herb is used for colds and coughs (antifungal agent), respiratory and skin diseases, as well as an anti-inflammatory, antiviral, antimicrobial and expectorant and antimicrobial agent. It is also recommended for inflammatory processes of the gastrointestinal tract, diseases of the liver and urinary tract, and the extract has a high antioxidant effect [1]. Externally, the plant is used for dermatitis of fungal origin, seborrhea, to strengthen and grow hair [13]. Many studies have confirmed antimicrobial and fungicidal activities, as well as the antioxidant effect of anise lofant [4, 10, 11]. Often *Lophanthus anisatus* Benth grown as honey and ornamental crops [2, 3]. It has been established that anise lofant contains essential oil, flavonoids, tannins, triterpene acids, organic acids, and ascorbic acid [4–8]. Anise lofant is an unexplored plant species for Uzbekistan. In this regard, in order to introduce a new type of domestic plant source into healthcare practice, it is necessary to study its chemical composition.

AIM OF THE RESEARCH

Quantitative determination of tannins in the herb of anise lofant (*Lophanthus anisatus* Benth.) which is cultivated in Uzbekistan.

MATERIALS AND METHODS

The above-ground part of the remedy plant of *Lophanthus anisatus* Benth., which is grown in the Botanical Garden named after F.I. Rusanova Academy of Sciences of the Republic of Uzbekistan (2021).



Medicinal plant materials were collected in the phase of budding and flowering, dried in the shade. Dry herbal raw materials were stored in hermetically sealed light-tight jars in a dry, cool, dark place. Qualitative and quantitative determination of tannins was determined by the method of SP XI [9].

There were carried out a qualitative reaction, an aqueous solution (1:10) was used and the following reactions: precipitation (1% gelatin solution, 1% quinine sulfate, lead acetate solution) and staining (sodium nitrogen salt solution and Stiasny). The result is presented in Table 1.

The quantitative determination of tannins was carried out in accordance with SP XI: about 2 g (accurately weighed) of crushed raw materials of anise lofant, sifted through a sieve with holes of 3 mm, were placed in a 500 ml conical flask, poured with 250 ml of water heated to boiling point and boiled with reflux condenser on an electric stove with a closed spiral for 30 minutes with occasional stirring. The resulting extract was cooled to room temperature and filtered through cotton wool into a volumetric flask with a capacity of 250 ml so that the particles of the raw material did not fall into the flask, the volume of the solution was brought up to the mark with water and mixed. 25.0 ml of the resulting aqueous extract was placed in a 1000 ml conical flask, 500 ml of water, 25 ml of indigo sulfonic acid solution were added and titrated with constant stirring of potassium permanganate with a solution of 0.02 M until a golden yellow color was obtained. At the same time, a control experiment was carried out: 500 ml of water, 25 ml of indigo sulfonic acid solution were placed in a 1000 ml conical flask and titrated with constant stirring of potassium permanganate with a solution of 0.02 M until a golden yellow color was obtained. 1 ml of potassium permanganate solution of 0.02 M corresponds to 0.004157 g of tanning agents in conversion of tannin. The content of the sum of tanning agents in conversion of tannin in absolutely dry raw materials in percent (X) was calculated by the formula:

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

V – is the volume of potassium permanganate solution of 0.02 M used for titration of aqueous extract, ml;

V₁ – is the volume of potassium permanganate solution of 0.02 M used for titration in the control experiment, ml;

0.004157 – is the amount of tanning agents corresponding to 1 ml of potassium permanganate solution 0.02 M (in terms of tannin), g;

a – sample of raw materials g;

W – humidity of medicinal plant materials;

250 – total volume of water extraction, ml;

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

RESULTS

The results of determining the content of tanning agents in the anise herb (*Lophanthus anisatus* Benth.) in different phases of the plant vegetation are shown in the Figure 1, the qualitative reactions and metrological characteristics of the technique are given in tables 1 and 2.

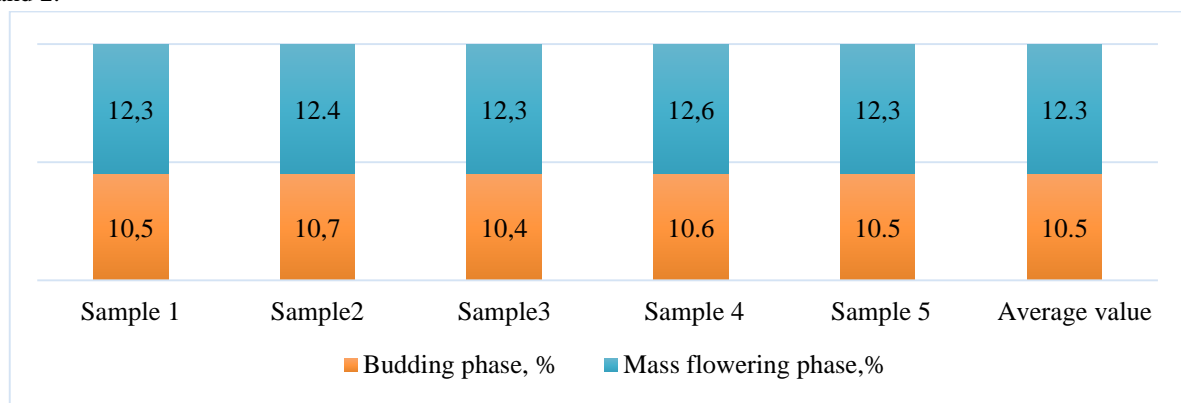


Fig. 1. Results of determining the content of tannin agents in the herb of anise lofant (*Lophanthus anisatus* Benth.)

**Table 1.** The final table based on the results of qualitative reactions

Quality reaction	Analysis results	
	Precipitation reaction	Staining reaction
With a solution of acetone	Lead yellow precipitate	–
1% gelatin solution	Turbidity disappears when excess gelatin is added	–
1% solution of quinine sulfate	Amorphous precipitate	–
Stiasny reaction	–	Purple precipitate
Sodium nitrogen salt and 0.1 m solution of salic acid	–	A brown precipitate

Table 2. Metrological characteristics of the method for the quantitative determination of tannin agents in the herb of Anise lofant

Vegetation phase	x	\bar{x}	S^2	S	$t(pt)$	Δx	$\Delta \bar{x}$	$E^{\%}$	$E^{\%}$
Mass flowering	12,31 2,412 ,312, 612,3	12,3	0,025	0,1581	2,78	0,44	0,20	3,57	1,62
Budding	10,51 0,710 ,410, 510,6	10,5	0,015	0,122	2,78	0,339	0,152	3,22	1,44

As can be seen from Table 1, the maximum amount of tannin agents is observed in the mass flowering phase (12.3%), and in the budding phase it is much less (10.5%). Given the data is obtained, it should be noted that the collection of the studied raw materials is recommended to be carried out in the phase of mass flowering.

CONCLUSION

There were for the first time studied the quantitative content of tannin agents in the herb of aniseed lofant which is grown in Uzbekistan. The results showed that the maximum amount of tannin agents accumulates in the mass flowering phase (12.3%).

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