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STUDY OF NUTRITION INDICATORS OF MEDICINAL LYCIUM BARBARUM L. FRUITS

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Abstract: This article presents the results of a study of the quantitative parameters of the fruits of the Tibetan barberry, Lycium barbarum L. Their moisture content, ash, foreign impurities and the amount of bioactive substances were determined. The studied quantitative parameters allow the development of regulatory documents for determining the quality of medicinal plant raw materials.

Key words: goji fruit, bioactive substances, ash, fruit moisture, plant raw materials, regulatory documents.

The Tibetan barberry (Goji) plant is rich in various chemical compounds and has been traditionally used in Chinese folk medicine. Currently, there are no regulatory documents (RD) for Goji berries in the State Pharmacopoeia of the Republic of Uzbekistan. Therefore, the development of pharmacognostic methods and standardization of this promising plant raw material is one of the urgent tasks [1].

Goji cultivation has been started in Uzbekistan for 4 years, and the plant is considered medicinal when grown as a bush in a clean climate, water, and without the use of chemicals. The products obtained include fruit juice, fruit core, flowering branches, leaves, roots, and seed oils, all of which are used to prepare infusions, syrups, and tinctures. The fruit harvest in June and July is sweeter, while the harvest in October and November has a lower juice content and higher moisture content, and is more suitable for the preparation of diabetic products. It is somewhat more difficult to separate sublimation liquid from them.

Goji berries are the most valuable and useful fruit in the world, growing wild in the Tibetan mountains of China. Goji berries are called "Cancer Cure", "Natural Viagra", "Anti-depressant Fruit", "Life-Prolonging Fruit", "The First Brain Refresher", "The Fruit of Happiness". It is used in Laos, China, and Tibet as a remedy for improving the functioning of the heart, liver, and glands, and as a means of changing the body's frequency by reducing molecular degeneration, that is, prolonging life. The fruit is considered a power booster and is a real treasure trove of minerals and medicinal substances. Goji berries contain 500 times more vitamin C than lemons. The fruit contains polysaccharides with unique healing properties. In addition, it is the only natural product that contains the element germanium, which fights cancer, and is a powerful natural antioxidant. Goji berries also contain oxygen flavonoids. These compounds help the body get rid of excess fat in the liver.

American pharmacist, nutritionist, and scientist Dr. Earl Mindell spent 9 years of his life studying this plant, and in his scientific work, he identifies 33 benefits of consuming the fruits of the Goji plant:

-The fruit is rich in zeaxanthin, which protects the retina;

-Strengthens memory;

-Improves metabolism;

-Improves skin condition;

-Increases immunity;

-Destroys adenoids in case of colds and flu;

-Strengthens kidneys and stomach

-Improves lung function;

-Increases hemoglobin in case of anemia;

-Provides calcium to bones and strengthens teeth and joints;

-Slows down the aging process;

-Quickly restores strength;

-Reduces blood sugar levels;

-Increases heart function and prevents heart diseases;

-Increases the amount of the most necessary hormone melatonin;

-Fights Alzheimer's disease and improves memory, prevents disease;

-Improves sleep;

- It has properties to get rid of excess weight and fat.

The aim of the study is to determine the quality parameters of the raw material and the amount of bioactive substances for the standardization of Goji berries (Lycium barbarum L.).

Materials and research methods.

The object of the study is medicinal Goji berries harvested in September 2023 in the territory of Uzbekistan. The berries are harvested when ripe and dried in direct sunlight until the peel dries [2]. Goji berries are red, oblong-ovate, 8-18 mm long (Fig. 1).

Picture 1. Medicinal goji berries. (Lycium barbarum L.)

Primary processing of the product is based on eliminating the shortcomings made during preparation, that is, cleaning the product from defective parts, remaining impurities, and drying the product. In this case, various processes are carried out depending on the type of product

being prepared. During primary processing of fruits, fruit bunches, flower parts, branches and leaf parts, unripe fruits, and fruit parts damaged by insects were cleaned. The medicinal plant product was dried until it reached a "dry state", and then brought to a state that fully meets the requirements of the regulatory document. At the same time, a batch of the same weight and quality was formed for the type of product being tested. The studies were conducted by taking samples from 3 batches of the tested raw material. Moisture is understood as the loss of hygroscopic moisture and volatile substances in medicinal plant raw materials and medicinal preparations when dried to constant weight or by another method described in regulatory documents. Goji berries were crushed, 3-5± 0.01 g were taken from each sample, weighed on an analytical balance. They were placed in a box previously dried to constant weight and placed on a drying rack at 100 - 105 ° C. The drying process was carried out on the remaining samples at the same temperature. The moisture content of goji berries was determined in accordance with the publication of the State Pharmacopoeia of the Republic of Uzbekistan [3].

To determine the moisture content, the plant raw material was dried to constant weight. The total ash and ash insoluble in hydrochloric acid solution (HCl=10%) of goji berries were determined according to the instructions in section UzRDF.2.8.1 [4]. The determination of ash is based on the combustion of the raw material and then reaching a constant weight. The determination of the amount of foreign impurities in the composition of the medicinal plant raw material was carried out according to UzRDF.2.8.2 [5]. The determination of the amount of bioactive substances was carried out according to the procedure UzRDF.2.8.6 [6]. Their content was expressed quantitatively as a dry residue (percentage). To determine the bioactive substances, approximately 1.0 g (accurate weight) of crushed medicinal plant raw material was placed in a 250 ml conical flask, 50 ml of solvent was added and left for 1 hour. The flask was connected to an inverted condenser and heated for two hours (Figure 2). The experiments were conducted in the Laboratory of Biological Preparations of the Research Institute of Vaccines and Serums.

The substances in the flask were filtered through dry filter paper into a separate 200 ml flask. 25.0 ml of the resulting filtrate was taken into the flask and evaporated. The amount of bioactive substances was calculated relative to the absolute dry plant raw material (%). Various extractants were used to determine the bioactive substances, including purified water, 40%, 70%, 96% ethyl alcohol and ether. The moisture content of goji berries was determined to be from 5.0% to 7.4%. Based on this, it can be determined that the moisture content of Lycium barbarum L. berries should not exceed the standard 10%. The total ash content was from 2.61% to 2.76%, and the ash insoluble in HCl was from 2.65% to 2.76%. Thus, the following norms were established for these indicators: total ash content - not more than 5%; The ash content insoluble in 10% hydrochloric acid should not exceed 3%. The amount of foreign matter was low. The results are presented in Table 1.

Figure 2. The process of isolating bioactive substances.

Table 1

Quantitative parameters of goji berries (n=3)

№	**Numerical indicators**	**Quantity, %**	**Proposed standard**
1	Humidity	5,5705-7,3777	Not more than 10%
2	Common ash	2,7153-2,8623	Not more than 5%
3	Ash insoluble in 10% hydrochloric acid	2,6794-2,7504	Not more than 3.0%
4	Parts of raw materials that have lost their natural color (yellow, blackened)	2,843	Not more than 5%
5	Other parts of the plant that do not correspond to the description of the specified raw material (root, fruit)	0,0747	Not more than 0.5%
6	Organic foreign substances	0	Not more than 0.5%
7	Mineral foreign substances (sand, stone and ...)	0	Not more than 0.5%

The water-extracted substances were 52.56%, 70% ethyl alcohol-extracted substances were 35.87%, 96% ethyl alcohol-extracted substances were 41.92%, and 40% ethyl alcohol-extracted substances were 59.48%, which is the maximum amount of bioactive substances isolated from the ACA. The yield of bioactive substances extracted from the fruits in petroleum ether was about 0.50% - 0.64%. The results are presented in Figure 3.

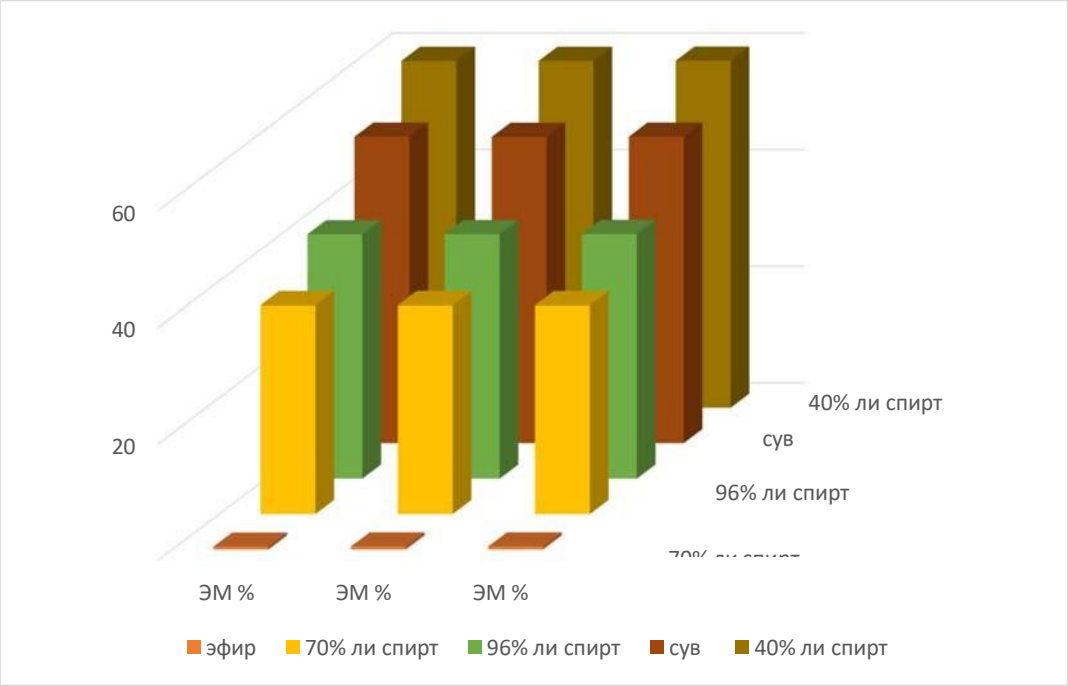

Figure 3. Quantification of bioactive compounds in various natural solvents (n=3).

Conclusion: Studies were conducted on the quantitative parameters of bioactive compounds in goji berries, establishing standards for the moisture content of the raw material, total ash, ash insoluble in HCl, and bioactive compounds isolated using various solvents. The results obtained allow standardization of plant raw materials for the development of regulatory documents.

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