



Quality Assessment of Sedative Medicinal Plants and Their Remedies

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ARTICLE INFO	ABSTRACT
Published Online: 16 March 2022 Corresponding Author: Zaynab Enverovna Sidametova	In this article authors presented results of the investigation which explored numerical indicators of the liquid extract of "Flegmen" that obtained in sedative collection. The contents of moisture, ash, impurities were established in the lab. Numerical indicators made it available to create high quality medicinal plant collection, as well as quality control in order to use it to obtain new liquid preparations.
KEYWORDS: medicinal plant, motherwort Turkestan, Regel's zopnik, licorice, peppermint, collection, liquid extract.	

INTRODUCTION

Medicinal plants and their total preparations, being chemically multicomponent preparations, can exhibit a wide pharmacological effect in terms of treatment [11,12]. In the case of the use of medicinal plants in the form of collections, the composition of medicinal preparations obtained from this collection will greatly increase and complicate their analysis. In this regard, it is relevant to determine the main biologically active components of medicinal plants that are part of the sedative collection, in order to identify the mechanism of action and establish their authenticity, as well as their good quality [8].

The experience of using multicomponent herbal medicines in folk and traditional medicine from around the world shows that one biologically active substance or several purified fractions isolated from a plant in its pure form act in a completely different way than herbal preparations, which contain almost all groups of biologically active substances included in the composition of this plant, and in more or less natural proportions [10]. Moreover, if the former have a relatively small therapeutic range of action and high toxicity, then the native complex of a traditional drug potentially has a wide spectrum of action. It affects not only the affected organ, but also almost all adjacent systems of the body, while it has a detoxifying effect, increasing the resistance of the patient's body to the influence of negative factors. Based on this, at present, in the development of drugs of natural origin, there is a return to the use of medicinal plants in general and complex preparations from them [8].

The purpose of this research is to determine the numerical indicators of medicinal plants included in the collection in order to obtain a liquid extract to establish its

authenticity, as well as its good quality.

MATERIALS AND METHODS

Served air-dry chopped grass motherwort Turkestan and Regel's zopnik, licorice roots harvested in the Tashkent region in 2021, during the period of mass flowering of plants, as well as a cultivated medicinal plant-peppermint leaves.

Use of new sedative plants such as Turkestan motherwort and gopnik Regel, and the use of these medicinal plants in the form of fees is relevant, the demand for which is increasing every year [11,12,13].

EXPERIMENTAL PART

We know that there are a number of main reasons that determine the ever-growing demand for medicinal plant raw materials and preparations based on them:

- relative safety of action;
- the chemical nature of medicinal plants allows preparations based on them to be easily included in human biochemical processes, providing a multilateral, mild effect even with prolonged use;
- a small number of side effects;
- the possibility of a rational combination of medicinal plants among themselves and with synthetic agents;
- affordability;
- the favorable attitude of consumers to medicines from plant materials, which was formed thanks to centuries-old traditions and vast experience of traditional medicine [8].

Soothing collection, consisting of motherwort Turkestan and Regel's zopnik, licorice root and peppermint was selected on the basis of a pharmacological screening test

for sedative effects. From the composition of the collection, it is clear that the medicinal plants included in the composition of the collection grow in Uzbekistan and have a sufficient natural supply of raw materials.

Turkestan motherwort grows on rocky and shallow-earth slopes in the middle mountain belt, distributed in Central Asia (Tien Shan, Pamir-Alai). Within Uzbekistan, it occurs in Tashkent, Samarkand and Surkhandarya regions [9,10].

Medicinal raw materials of motherwort Turkestan and Regel's zopnik for compiling the collection was collected in the Tashkent region in 2021.

Motherwort medicinal herb consists of the upper parts of the stems with flowers and leaves. The stem is tetrahedral, hollow, up to 0.6 cm thick. The leaves are opposite, glabrous or appressed shortly hairy, the edges are serrate. Bracts subulate, downy, shorter than calyx. The calyx is tubular - campanulate, shortly fluffy, with triangular, narrowed into a spine, bent teeth at fruits. Corolla two-lipped, longer than calyx, upper lip entire, lower lip three-lobed, hairy on the outside, 4 stamens, lower ovary. The color of the stems is green, the leaves are green or darkish green, the sepals are green. Corolla pinkish-lilac. The smell is weak, the taste is bitter [9,10].

Raw materials were harvested at the beginning of flowering. Herbs of Turkestan motherwort were collected during mass maturation, when they lose most of their stem leaves. Then dried and threshed, and the seeds were cleaned. Medicinal raw material is the motherwort herb of Turkestan, collected at the beginning of flowering. When collecting motherwort, shoots no longer than 30 cm long were cut off. The cut raw materials were dried under a canopy, spread out in a thin layer. Dried motherwort herb should preferably be stored in a dry place in paper bags or glassware away from moisture and light. Zopnik grass Regel collected the flowering period since the highest content of flavonoids falls on the leaves (4.0-5.0%), and the smallest stems (2.7-3.1). The flowers contain (2.85-3.2%) flavonoids. For the analysis of motherwort and gopnik raw materials Regel was individually crushed to the particle size indicated in the relevant pharmacopoeia articles, and the dust was sieved through a sieve with an opening size of 0,18 mm.

To establish the authenticity of raw materials, a description of external and anatomical diagnostic features was carried out during microscopic examination, as well as qualitative reactions to the main biologically active substances.

The presence of flavonoids using the following qualitative reactions: cyanidin (concentrated hydrochloric acid and magnesium shavings were added to the studied extracts).

Cyanidin according to Briant, an equal volume of purified water was added to the solution remaining after the cyanidin test, 1 ml of octyl alcohol was added and shaken. The nature of the substances under study was judged by the

coloration of the octanol layer; with a solution of aluminum chloride 2%; with a solution of iron (III) chloride; with sodium hydroxide solution 10%; with Fehling's reagent [7].

For the purpose of qualitative analysis of flavonoids, paper chromatography was also performed [4]. For paper chromatography, the following chromatographic systems were used: acetic acid 30%, n-butanol - acetic acid - purified water (4:1:2) and n-butanol - acetic acid - purified water (4:1:5) [4,7].

The chromatograms were treated with the following chromogenic reagents: ammonia vapor, an alcoholic solution of sodium hydroxide, a solution of zirconium chlorine oxide in 2% methanol [7], and were also examined in ultraviolet light.

The study of numerical indicators was carried out according to the requirements of the Global Fund of the XI edition [2,3].

According to the requirements of SP XI, the following numerical indicators are determined in the studied medicinal raw materials: weight loss during drying, ash content and ash insoluble in 10% hydrochloric acid solution, determination of organic and mineral impurities, microbiological purity, as well as the content of biologically active substances [1, 2,3,6].

Humidity of medicinal raw materials is understood as the loss in mass due to hygroscopic moisture and volatile substances, which is determined in the raw material when dried to constant weight. The determination of this indicator was carried out according to the SP XI, according to the general article "Determination of the moisture content of medicinal plant materials" [2].

To do this, we crushed an analytical sample of raw materials to a particle size of about 2 mm, mixed and took two samples weighing 3-5 g, weighed with an error of ± 0.01 g. Each sample was placed in a pre-dried and weighed bottle with a lid and placed in an oven heated to 100-105°C. The first weighing was carried out after 2 hours. Drying was carried out to constant weight. A constant weight is considered to be achieved if the difference between two subsequent weighings after 30 minutes of drying and 30 minutes of cooling in a desiccator is not more than 0.01 g [2].

The determination of total ash was carried out according to the following method, about 3-5 g of raw materials (t. n) were placed in a pre-calcined and accurately weighed porcelain crucible, evenly distributing the collection along the bottom of the crucible. The crucible was then gently heated, allowing the collection to burn first at the lowest possible temperature. The combustion of the remaining particles of coal must also be carried out at the lowest possible temperature; after the coal had burned completely, the flame was increased.

In the case of incomplete combustion of the coal particles, the residue was cooled, moistened with a saturated solution of ammonium nitrate, evaporated on a water bath, and the residue was calcined.

The calcination was carried out at a weak red heat

(about 500°C) to a constant mass, avoiding the fusion of the ash and its sintering with the walls of the crucible. After the calcination was completed, the crucible was cooled in a desiccator and weighed [3].

One of the indicators of the good quality of raw materials is the determination of ash insoluble in 10% hydrochloric acid [3].

To the residue in the crucible obtained after burning the collection, 15 ml of 10% hydrochloric acid solution was added, then the crucible was covered with a watch glass and heated for 10 minutes in a boiling water bath. 5 ml of hot water was added to the contents of the crucible, washing the watch glass with it. The liquid was filtered through an ashless filter, transferring the residue to it with hot water. The filter with the residue was washed with hot water until it reacted negatively to chlorides in the wash water, transferring it to the same crucible, then dried, burned, calcined as above, and weighed.

Determination of organic and mineral impurities is carried out according to the method described in SP XI. To do this, after screening out the crushed particles, the analytical sample was placed on a clean and smooth surface, then the impurities specified in the regulatory documentation were isolated with a spatula [1]. Impurities usually include:

1. Parts of raw materials that have lost the color inherent in this species (brown, blackened, faded, etc.);
2. Other parts of raw materials that do not correspond to the established description;
3. Organic admixture (parts of other non-poisonous plants);
4. Mineral admixture (earth, sand, pebbles).

At the same time, attention was paid to the presence of barn pests.

Each type of impurity was weighed separately with

an error of ±0.1 g for an analytical sample mass of more than 100 g and with an error of ±0.05 g for an analytical sample mass of 100 g or less [2].

The content of each type of impurity in percent (X) was calculated by the formula:

$$X = \frac{m_1 \cdot 100}{m_2},$$

where m_1 - impurity mass in grams; m_2 - the mass of the analytical sample of raw materials in gr.

microbiological purity the drug was evaluated in accordance with the requirements of the Global Fund XI “Methods of microbiological control of drugs” and amendments No. 2 of September 29, 2005, category 3B [3,6].

The content of flavonoids was determined by the spectrophotometric method in the herb *Regel* in terms of hyperoside, and in the grass of motherwort *Turkestan o* - in terms of rutin [5]. The essential oil in the raw materials of peppermint leaves and, in the collection “Flegmen” was determined by the method of SP XI. The content of saponins in licorice root and in the collection itself in terms of glycyrrhizic acid was determined by the spectrophotometric method. For this, an analytical sample of the raw material was exhaustively extracted with a 3% solution of nitric acid in acetone, and the saponins were precipitated with a concentrated ammonia solution. The precipitate was separated, dissolved in water, and the optical density of the solution was determined on a spectrophotometer at a wavelength of 258 nm .

The results of the numerical indicators of medicinal raw materials of *Turkestan motherwort* harvested in the Tashkent region in 2021, during the period of mass flowering of plants, are presented in table 1.

Table 1. Numerical indicators of medicinal raw materials motherwort *Turkestan*

No.	The name of indicators	Content in %	
		Fine	Discovered
1	Description	Color greyish green. Odor weak, taste bitter	resp.
2	Humidity, no more	9.0	7.21
3	Total ash, no more	10.0	8.27
4	Ash, insoluble in 10% hydrochloric acid solution, not more than	4.0	3.06
5	Particles of raw materials that have changed their natural color, not more than	5.0	4.8
6	Pieces of stems	Not more than 40%	24.5
7	Particles of raw materials that do not pass through a sieve with a hole diameter of 7 mm, no more than	No more than 17%	11.7
8	Particles of raw materials passing through a sieve with a hole diameter 0,5 mm, not more than	No more than 5%	4.0
9	Organic impurity, no more	No more than 2%	1.22
10	Mineral impurity, no more	No more than 2%	1.21
11	Flavonoid content	Not less than 1%	2.7
12	Microscopy	Corresponds	resp.

New medicinal plant - Regel's zopnik (*Phlomis regelii* M._Pop), found on shallow -earth and rocky slopes from the foothills to the middle belt of mountains [11,12]. In Central Asia, it is distributed in the Western Tien Shan, namely, it prevails in the lower part of the upper band of hills of Chirchik-Angren interfluve on the slopes of the northern exposure [6,11,12].

The raw material consists of the tops of stems with leaves and an inflorescence with insignificant fruits, passing through a sieve with holes with a diameter of 7 mm. The stems are tetrahedral, dull green or grayish-densely felt, up to 0.5 cm thick. The leaves are petiolate, opposite, sharp, entire

or spaced serrate, wrinkled above; dull green, densely covered with hairs, with protruding veins below, whitish-grayish from omission. Flowers on short stalks, bracts subulate, densely pubescent. The calyx is also densely tomentose with finely subulate, almost horizontally recurved teeth. Corolla outside felt, pinkish-purple. The smell is irritating, the taste is bitter [4,12].

Having studied the numerical indicators of medicinal plant raw materials, we have identified the main ones that characterize its good quality. Regel's zopnik raw numerical results harvested in the Tashkent region in 2021 are presented in table 2.

Table 2. Numerical indicators of medicinal raw materials Regel's zopnik

No.	Name of indicators	Content in %	
		Fine	Discovered
1	Description	Color greyish green. Smell irritating, taste bitter	Resp.
2	Humidity, no more	No more than 10%	7.11
3	Total ash, no more	No more than 6%	4.7
4	Ash, insoluble in 10% hydrochloric acid solution, not more than	Not more than 0.5%	0.1
5	Particles of raw materials that do not pass through a sieve with a hole diameter of 7 mm, no more than	No more than 10%	8.6
6	Particles of raw materials passing through a sieve with a hole diameter 0,5 mm, not more than	No more than 3%	2.2
7	Organic impurity, no more	No more than 3%	1.12
8	Mineral impurity, no more	No more than 2%	1.1
9	Flavonoid content	Not less than 4%	5.7
10	Microscopy	Corresponds	resp.

Peppermint is a perennial herb. The raw material is - pieces of leaves of various shapes, up to 7 mm in size with an admixture of flowers and buds. The edge of the sheet is serrated with unequal sharp teeth; the surface is bare, only sparse, appressed hairs are visible from below along the veins under a magnifying glass, and shiny golden yellow or darker glands are visible throughout the leaf blade. Leaf color is light

green to dark green. The smell is strong, fragrant. The taste is slightly burning, cooling. C blossoms in July-August. It grows occasionally along ditches in the city of Tashkent and its environs [4,5,6,7].

Peppermint leaves are used medicinally. harvested peppermint leaves are presented in table 4.

Table 3. Numerical indicators of medicinal raw materials peppermint leaves

No.	The name of indicators	Content in %	
		Fine	Discovered
one	Description	Leaf color is light green to dark green. The smell is strong, fragrant. The taste is slightly burning cold	Resp.
2	Humidity, no more	No more than 14%	11.41
3	Total ash, no more	No more than 14%	10.5
4	Particles of raw materials that have lost their natural color	No more than 5%	3.4
5	Pieces of stems	No more than 10%	7.2
6	Particles of raw materials passing through a sieve with a hole diameter 0,5 mm, not more than	No more than 3%	2.4

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7	Organic impurity, no more	No more than 3%	1.32
8	Mineral impurity, no more	No more than 2%	1.4
9	Flavonoid content	Not less than 1%	2.5
10	Microscopy	Corresponds	resp.

Licorice is a perennial herbaceous plant. Licorice grows in Tashkent, Andijan, Namangan, Fergana, Kashkadarya, Samarkand and Surkhandarya regions, Karakalpakstan [9].

Licorice roots are harvested depending on the place of harvesting and weather conditions from November to March. The roots are dried under a canopy in a well-ventilated area [10].

The raw material is - pieces of roots and underground shoots of a cylindrical shape of various lengths, with a thickness of 0.5 to 5 cm or more. There are pieces of roots, turning into a strongly overgrown rhizome up to 15 cm thick. The surface of unpeeled roots and shoots is slightly

wrinkled longitudinally, covered with brown cork. The peeled raw material outside is from light yellow to brownish yellow with slight cork residues. Fracture light yellow, fibrous. There is no smell; the taste is sweet, cloying, slightly irritating.

According to the literature, up to 23% of saponin - glycyrrhizin (Fig. 1.8), and up to 4% of flavonoids, glabric, glycyrrhetic acids, steroids, essential oil, asparagine, ascorbic acid, bitterness, pigments, gums and others have been isolated from licorice roots [11,12].

The results of numerical indicators of licorice roots are presented in table 4.

Table 4. Numerical indicators of medicinal raw materials of licorice roots

No.	The name of indicators	Content in %	
		Fine	Discovered
one	Description	Pieces of roots. The color is light yellow, odorless, the taste is sweet, cloying, slightly irritating	Resp.
2	Humidity	No more than 14%	12.6
3	Ash total	No more than 8%	6.5
4	Ash insoluble in 10% HC L	Not more than 2.5%	1.8
5	Particles larger than 10mm	No more than 5%	3.4
6	Particles of raw materials passing through a sieve with holes of diameter 0,5 mm	Not more than 0.5%	0.2
7	organic impurity	No more than 1%	1.32
8	Mineral impurity	Not more than 0.5%	1.4
9	Content of glycyrrhizic acid	Not less than 6%	8.5
10	Extractive substances extracted with 0.25% ammonia solution	Not less than 25%	28
11	Microscopy	Corresponds	resp.

As can be seen from tables 1,2,3 and 4, the results of the obtained studies showed that the medicinal raw materials of Turkestan motherwort, Regel’s zopnik, harvested in the Tashkent region in 2021 during the period of mass flowering of plants, meet all the requirements and norms of regulatory documentation. Cultivated medicinal plant peppermint and

licorice roots meet all the requirements of the Global Fund XI edition.

Next, a sedative collection was prepared according to the approved prescription and its numerical indicators were studied. The results of the numerical indicators of the sedative collection “Flegmen” are presented in table 5.

Table 5. Numerical indicators of the sedative collection “Flegmen”

No.	The name of indicators	Content in %	
		Fine	Discovered
one	Description	It is a mixture of heterogeneous particles, pieces of various sizes from 0.5 to 7 mm	Resp.
2	Taste	Sweetish	Resp.
3	Humidity	No more than 12%	8.41
4	Ash total	No more than 9%	8.73
5	Ash insoluble in 10% HC L	No more than 3%	2.05

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6	Particles of raw materials passing through a sieve with holes of diameter 7 mm	No more than 10%	5.1
7	Particles of raw materials passing through a sieve with holes of diameter 0,5 mm	No more than 4%	3.50
8	Particles of raw materials that have lost their natural color	No more than 3%	2.02
9	organic impurity	Not more than 2.0%	1.32
10	Mineral impurity	No more than 1%	0.9
11	Flavonoid content	Not less than 0.5%	0.90
12	Microscopy	Corresponds	resp.

Based on the above, our further research was aimed at obtaining a liquid extract based on the “Flegmen” collection.

Raw materials for the preparation of liquid extract were crushed separately to the size of particles passing through a sieve with a diameter of 2 mm. Then they weighed crushed licorice roots, crushed herbs Regel, crushed herbs of Turkestan motherwort and crushed peppermint leaves in the amount indicated in the recipe, a liquid extract was obtained in a ratio of 1:1 by fractional maceration.

The composition of the liquid extract “Flegmen”:

100 ml of the drug contains a liquid extract (1:1) obtained from a mixture of medicinal plant materials

grass grass Regel 30 parts

(Herba phlomis Regelii)

(FS 42 Uz -0191-20 13)

Herb motherwort Turkestan

30 parts

(Herba Leonuri turkestanicae)

(FS 42 Uz -0190-20 13)

Roots licorice -

20 parts

(Radix Glycyrrhizae)

(FS 42 Uz -0280-2012)

Peppermint leaves

20 parts

(Folia Menthae piperite)

(FS 42 Uz -0263-2007)

Excipients

Medical ethyl alcohol - enough to get 100

(Ethanol) 70% (FS 42 - Uz - parts

0243 - 2010, liquid extract

GOST 5962 - 67, O' z Dst

958:2000)

The appearance and numerical indicators of the obtained liquid extract were determined according to the requirements of the Global Fund XI [3], alcohol concentration - by boiling point, dry residue, heavy metals and flavonoid content .

microbiological purity of the liquid extract was evaluated in accordance with the requirements of SP XI "Methods of microbiological control of drugs" and amendment No. 2 of September 29, 2005, category 3B. At the same time, in experiments carried out on five series of liquid extract, satisfactory results were obtained that meet the specified requirements. The content of flavonoids was determined by the spectrophotometric method. Numerical indicators of the liquid extract: are given in table 6 .

Table 6. Numerical indicators of the liquid extract “Flegmen”

No.	The name of indicators	Results
one.	Description	Transparent dark brown liquid with a greenish tinge, with a characteristic odor and a slightly burning, chilling taste.
2.	Alcohol concentration	65.02
3.	Density	0.98
4.	pH	6.5
five.	Dry residue	5.3
6.	Heavy metals	Not more than 0.01
7	Content flavonoids, %	0.3041%
8.	Microbiological purity	In 1 ml of the drug, the total number of aerobic bacteria is allowed: no more than 10^4 bacteria and no more than 2×10^2 of the total number of fungi, the presence of bacteria of the family Enterobacteriaceae no more than 10^2 Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa in 1 ml of the drug and the absence Salmonella in 10 ml of the drug

CONCLUSIONS

For the first time, a technology has been developed for obtaining a liquid extract from the sedative collection “Flegmen” by the method of percolation, using 70% ethyl alcohol. The numerical indicators of the obtained preparation were studied. The data obtained make it possible to judge the possibility of obtaining a liquid extract from the local sedative collection “Flegmen” and can be used in the preparation of the NTD for the specified drug. Collected medicinal raw materials of motherwort Turkestan and Regel’s zopnik at the beginning of flowering in the Tashkent region in 2021, showed the high quality of raw materials, as well as the correct chosen place for its growth, taking into account environmental and economic factors. Numerical indicators characterizing the quality of medicinal plant raw materials are determined - motherwort Turkestan, herbs Regel’s zopnik, peppermint leaves and licorice roots.

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