ҚАЗАҚСТАН РЕСПУБЛИКАСЫ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ

Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ

ЖАРАТЫЛЫСТАНУ ФАКУЛЬТЕТІ

ХИМИЯ КАФЕДРАСЫ

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ANALYTICAL CONTROL OF PLANT MATERIALS AND BIOLOGICAL ACTIVE ADDITIVES BASED ON IT

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Түйіндеме: *Serpylliherba* өсімдігі*Lamiaceae* тұқымдасына жататын емдік өсімдік. Зерттеу барысында Қазақстан Республикасы территориясында өсетін *Serpylli herba* өсімдігінің ылғылдылығы, антиоксиданттық белсенділігі, флавоноидтар жәнеқышқылдылығы анықталды. Зерттеу нәтижесі бойынша ылғалдылығы *Serpylli herba* өсімдігінде 8,1% және оған негізделген биологиялық белсенді қосылысында 9,0%, қышқылдығы 8,3 және флавоноидтар 0,88% және 0,4%, антиоксиданттық белсенділігі 337,6 мгO_2/дм^3 көрсетті.

Keywords: *Serpylliherba,* medicinally plant, antioxidant activity, flavonoids

Introduction.In the last decade shown the great interest to determine the antioxidant activity of dosage forms, biologically active substances, food and beverages. This is due to the fact that the generally accepted one of the main causes of the most dangerous diseases - the accumulation of free radicals in the human body. The concentration of free radicals (superoxide radical, hydrogen peroxide, hydroxyl radical, and others.) increased by reducing the activity of the natural antioxidant system of human associated with exposure to radiation, ultraviolet radiation, smoking, alcohol abuse, constant stress, infectious diseases, poor nutrition. Due to the harmful effects of free radicals damage the walls of blood vessels, membranes, lipids oxidize, which leads to serious pathological changes, cardiovascular and oncological diseases, and premature aging. The harmful effects of "free radicals" on the body can be reduced through the systematic use of certain medicinal herbal preparations, dietary supplements, food and beverage products with good antioxidant activity. Basic natural antioxidants - vitamin E, vitamin C, polyphenols, flavonoids, aromatic hydroxyl acids, anthocyanin, etc. Antioxidants protect the cell from damage their structure by free radicals, it protects the human body from disease.

The aim of this study was make an analytical control of the biological activity of *Serpylliherba* and dietary supplement "Phytosedan " based on it

Materials and methods.*1. Determination of humidity during drying in the drying cabinet.*In a pre-weighed dried glass box put 2-3 g of a measured sample, close it with a lid and weighed with an accuracy of ±0.02 g. Then box with the sample put in the oven, opened and left at 105 °C for 3 h. the Dried sample in buxa close lid in a drying Cabinet, box stand to cool in a desiccator containing calcium chloride. The cooled bux with the sample is weighed and put back in the drying cabinet for drying for 1 hour. The drying is repeated until the difference between the two subsequent weighings does not exceed 0.03 g.The moisture content in the sample X, %, is determined by the formula:$X = \frac{(B-C)}{(B-A)} \times 100\%$where A is the mass of an empty bux (with a lid), g;B - weight of the bux with a hitch before drying, g;C is the mass of the bux with a hitch after drying, G.

Sometimes the dryness of the sample is calculated, not the humidity. When performing analyses, it is more convenient to use the dryness coefficient of the material to calculate the content of absolutely dry material in the taken sample. The dryness coefficient Ksuh is the ratio of the mass of dry material to the mass of the material before drying

$$Kdry. = \frac{C - A}{B - A} = \frac{100 - W}{100}$$

To find the value of the absolutely dry mass of the material, it is necessary to multiply the value of the taken air-dry weight by the dryness coefficient.

2. Determination of permanganate antioxidant activity (Leventhal method) of plant raw materials

Materials and equipment: standard solution $KMnO_4$ (0,01 н), H_2SO_4 (2н), 100 ml beaker, 1 ml mora pipette, burette, electric stove, 10 ml cylinder, filter paper.

Analysis progress: Prepare an aqueous extract of vegetable raw materials: weigh 1 g of raw materials and pour it with 20 ml of water at a temperature of 30-400C, insist for 20 minutes, then filter through gauze into a glass of 100 ml. Extraction is repeated 2 more times. Collect the filtrate in a glass. Then select an aliquot of 10 ml in a flask for titration, add 10 ml of sulfuric acid and heat the flask 50-600C, then titrate 0.01 n with a standard solution of potassium permanganate until a pink color appears, which does not disappear for 30 seconds. Titration is repeated until convergent results are obtained. The calculation is carried out according to the formula:

$$\text{antioxidant activity} = \frac{C(KMnO_4) \cdot V(KMnO_4) \cdot 8 \cdot 1000}{V_a}$$

whereAntioxidant activity is oxidizability, mg of oxygen per liter of filtrate (mg of O2/l);
C-normal concentration of potassium permanganate, mol/l;
V – volume of potassium permanganate used for titration of the sample, ml;
Va – volume of aliquot, ml;
8-molar mass of oxygen equivalent, g/mol;
1000 – conversionfactor.

3. Determination of the acidity of plant raw materials

*Analysis progress:*We take 2 samples of plant materials weighing 2.5 g each (with an accuracy of 0.01 g). We place the sample in a glass and add 50 cm^3 of distilled water. Transfer to a porcelain cup and grind with a pestle until smooth. Transfer the resulting suspension into a conical flask. Mix the contents of the flask and add 3 drops of the indicator. The mixture is titrated with sodium hydroxide solution. Titration is carried out in drops evenly, with a slowdown at the end of the reaction with constant stirring of the contents of the flask until a clear pink color appears, which doesn't disappear within 20-30 s.

If after the specified time the pink color disappears after shaking, then add another 3-4 drops of phenolphthalein solution. If a pink color appears, then the titration is considered complete. Measure the volume of the titrant used for titration.

The result is determined in degrees of acidity using the formula

$$K = \frac{c(1/1NaOH) * V(NaOH) * 100}{m},$$

Where: c (1 / 1NaOH) - titrant concentration, mol / dm^3;
V (NaOH) - volume of titrant used for titration, cm^3;
m - the mass of the sample;
100 - conversion factor per 100 g of product.

Round off the calculation result to the first decimal place. The final result is obtained as the arithmetic mean of two parallel measurements with a difference of no more than 0.2 degrees.

4. Determination of the amount of flavonoids in plant raw materials

Work progress: take 4 weighed portions of 0.02 g of crushed raw materials. 10 ml of ethanol is added to each weighed portion and the first and second are kept for 30 minutes, the third and fourth for 45 minutes. Next, the obtained extracts are filtered and readings on KFK-3 in the wavelength range of 350-500 nm with a step of 10 nm. Build absorption spectrum, and it is determined by the analytical wavelength. If the selected wavelength is determined optical density.The content of the sum of flavonoids in terms of rutin (%) is calculated by the formula:

$$X=\frac{D_x \cdot n_0 \cdot 00 \cdot 00}{D_0 \cdot n_x \cdot 00 \cdot 100 - \ ')}$$, where

D_x- the optical density of the test solution;

D_0 -optical density of the RSO routine; (obtained from the teacher)

m_x - mass of raw materials (g);

m_0 - mass of rutin in PCO (0.035 g);

W - moisture content in plant raw materials (%)

Based on the results obtained, a table is drawn up and the optimal time for the extraction of flavonoids is determined.

Results and discussion

1 Results, processing:

The coefficient of dryness (Ksuh.) Is the ratio of the mass of dry material to the mass of material before drying.

Forthyme:
A = 11,88 г
B = 13,98 г
C = 13,81 г
X (thyme)= 8,1%
K_{dry} = 0,92

Tocollect:
A = 12,11 г
B = 14,11 г
C = 13,93 г
X (collection)= 9,0 %
K_{dry} = 0,91

The moisture content of the feed was determined by drying in an oven. Weighed sample was dried at 105 degrees to constant weight. The moisture content and the coefficient of dryness were determined by the formulas presented on the slide. The moisture content in the thyme herb was 8.1%, and in the collection - 9%.

2 Results, processing:

First parallel:
Va (Thyme) = 11,4 sm^3
Va (Collection) = 5,8 sm^3
AOA(Thyme) = 920 mgO_2/ dm^3

Second parallel :
Va (Thyme) = 11,6 sm^3
Va (Collection) = 5,6 sm^3
AOA(Collection) = 456 mg O_2/ dm^3

Permanganate AA was determined by the Leventhal method. The method is based on the ability of aqueous extracts of plant materials to be rapidly oxidized by potassium permanganate. The oxidizability of the aqueous extract was determined. T.O. The AOA of the thyme extract was 920 mg O2 / dm3, and the AOA of the harvest extract was 456 O2 / dm3

3 Results, processing:

Table 1.Determination of antioxidant activityin thyme and BAS

V_{NaOH}, sm^3	BAS	Thyme
1	3,20	2,40
2	3,20	2,35

Table 2.Determination of antioxidant activity in thyme and BAS

Sample	K, degrees
DS	11,30
Thyme	8,30

The acidity of plant materials was determined. Water was added to the weighed portions of the raw material, triturated, and the mixture was filtered. The filter was titrated with alkali with

phenolphthalein indicator until a red color appeared. The slide shows the filtrate before (left) and after (right) titration. The acidity of raw materials was determined by the formula; it amounted to 11.3 degrees for dietary supplements and 8.3 degrees for thyme.

4 Results, processing:

$X=\frac{D_x \cdot n_0 \cdot 00 \cdot 00}{D_0 \cdot n_x \cdot 00 \cdot 100 - 7)}$,D_x- the optical density of the test solution;D_0 -optical density of the RSO routine; (obtained from the teacher); m_x - mass of raw materials (g);m_0 - mass of rutin in PCO (0.035 g);W - moisture content in plant raw materials (%)

Based on the results obtained, a table is drawn up and the optimal time for the extraction of flavonoids is determined.

Table 3.determination of flavonoidsdetermination of flavonoids in thyme and BAS

Sample	X, %
DS 30 min	0,39
DS 45 min	0,40
Thyme 30 min	0,75
Thyme 45 min	0,88

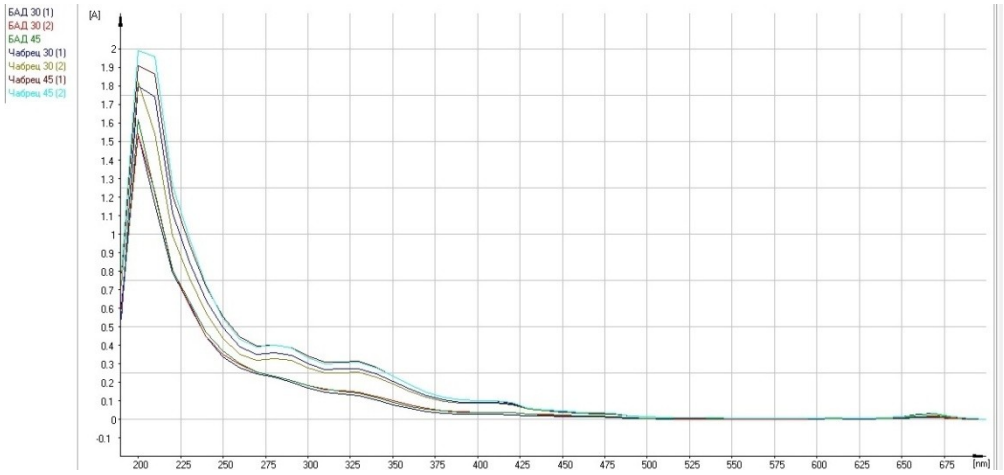

Figure 1.Absorption Spectra of Serpylliherba Plant Extracts and Sedative Collection

The amount of flavonoids was determined. To do this, the plant material was extracted with alcohol, the first part of the extracts was kept for 30 minutes, the second - 45 minutes. The absorption spectra were filtered and recorded on a Specord 50 instrument. The wavelength corresponding to the absorption maximum of flavonoids was selected. The amount of flavonoids calculated in terms of rutin was calculated. The results show that the optimal extraction time is 45 minutes. Moreover, the content of flavonoids in the thyme is greater than in dietary supplements.

In Russia, the content of flavonoids in plants of the genus Thymus (including T. serpyllum and T. vulgaris widely used in official medicine) has been little studied.

The sum of flavanoids according to volume 3 of the 2013 Pharmacopoeia is considered in terms of luteolin-7-O-glucoside.

In the article validation of methods of quantitative determination of the amount of flavonoids in the trees of the thyme scientific reports belsu series medicine.pharmacy. 2012. no. 22 (141).issue 20/1 there is data on the content of the total flavanoid in terms of luteolin 1.34% and cinaroside 0.3 mg.

the total content of quercetin is 3.54% in the article features of accumulation of pharmacologically significant compounds in representatives of the genus thymyan (thymus l.)

Conclution. 1.The moisture content of thyme grass and sedative collection “Fitosedan No. 3” was determined, and it amounted to 8.1% and 9.0%, respectively.

2. The acidity of the extract of *Serpylliherba* was 8.3 degrees, and the extract of the collection was 3 degrees more.

3. Permanganate antioxidant activity of the aqueous extract of Serpylliherba is higher than the sedative collection extract by 2 times.

4. The amount of flavonoids in the alcohol extract of thyme is 2 times greater than in the alcohol extract of sedative collection. After 45 minutes of settling, the sum of flavonoids in terms of rutin in thyme extract was 0.88%, and in the harvest extract 0.4%.

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ПЕРСПЕКТИВНОЕ ИСПОЛЬЗОВАНИЕ СОРБЕНТОВ И БИОСОРБЕНТОВ В ОЧИСТКЕ СТОЧНЫХ ВОД

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Түйіндеме: қазіргі уақытта қаламыздың урбанизациялануына байланысты табиғи сулардың ластануы артып, адамдарға, өсімдіктер мен жануарлар әлеміне кері әсерін тигізуде. Сондықтан табиғи суларды тазарту өзекті мәселе болып отыр. Бұл мақалада әртүрлі табиғи сорбенттер және олардың практикалық қолданылуы қарастырылады.

Ключевые слова: научно-технический процесс, техногенный ущерб, оксид графена, токсичность, каолин, отработанные машинные масла.