

# Study of Quality Medicinal Plants Bark Walnuts and Extract from it

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## ABSTRACT

**Objective:** The bark of walnut is currently poorly understood and is not represented in the Russian State Pharmacopeia. The purpose was to study the quality indicators medicinal plants walnut crust and extracts therefrom were studied: moisture content, total ash, ash insoluble in 10% hydrochloric acid feedstock walnut crust; content of tannins and juglone in walnut crust; GC-mass spectrometric study of the composition petroleum extract from the bark of a walnut. **Materials and Methods:** Microscopy was prepared by the pharmacopoeial method. The chemical composition of the petroleum extract was investigated by chromatography-mass spectrometry. **Results:** The content of glycosides amount in terms of gidroyuglone glucoside and absolutely dry RL was  $5.30 \pm 0.15$ . Humidity was  $9,41\% \pm 0,21$ . total ash content was  $10,18\% \pm 0,1$ . The ash content insoluble in 10% hydrochloric acid was  $4.8 \pm 0.16$ . Gas chromatography-mass spectrometry method in petroleum extraction from the bark of walnut were identified following compounds: oktadetsilgeksanoat (28%) of 4-isopropenyl-1-methyl-2-cyclohexenol-1 (38%), cineole (1,6%), thujone (0.7%), camphor (16.6%), 2 - benzamidoantrahinone (0.45%), 4,5 - dihydroxy - 3,4 - dihydro - 1 (2H) - naftalenon (6.4%) ethyl ester of palmitic acid (8.25%) Toxic effects petroleum extract was  $TD_{50} = 2,5$ . Chronic absent. All mice in the experimental group had diarrhea. It was established that the extraction has petroleum anthelmintic properties at askaridioze. **Conclusions:** The analysis of petroleum extraction from walnut partitions was carried out, the content of basic biologically active substances was revealed. The main anatomical and diagnostic signs of walnut bark walls were studied.

**Key words:** Juglans regia, Total ash, Toxic effect.

## INTRODUCTION

In the State Pharmacopoeia of the world necessarily present medicinal herbs morphological groups - bark.<sup>1</sup> Widely known for such raw materials as oak bark, buckthorn bark, bark viburnum, cinnamon bark, and others. The bark of the walnut is a medicinal plant raw materials, which is widely used in folk medicine as an anthelmintic funds, however, this raw material is currently poorly understood and is not represented in the pharmacopoeia.<sup>2</sup> However, medicinal herbs - walnut bark is widely used in folk medicine. The bark of walnut harvested from young branches of a walnut with a diameter of not more than 3 cm.<sup>3</sup> Young branches are cut during the formation of the tree crown, with no harm to the plant is not applied. The raw material is harvested, dried and further can be used as a drug in traditional medicine.<sup>4</sup> Currently, the State Pharmacopoeia of the Russian Federation there is no pharmacopoeial article on medicinal plant raw materials - bark of walnut.<sup>5,6</sup> Thus, the study of indicators of quality of medicinal plants bark of walnut is relevant.

The purpose was to study the quality indicators medicinal plants walnut crust: humidity, total ash, ash insoluble in 10% hydrochloric acid; juglone content walnut crust; GC-mass spectrometric study of the composition petroleum extract from the bark of a walnut.<sup>7</sup>

## MATERIALS AND METHODS

As the test material used the bark of walnut harvested from young branches of plants growing in the Kursk region. The bark is harvested in the beginning of sap flow of plants.<sup>1</sup>

Moisture, total ash, ash insoluble in 10% hydrochloric acid and tannin content determined by the method of the fourteenth edition of State Pharmacopoeia of the Russian Federation. Quantitative determination juglone in the feed was carried out by spectrophotometry.<sup>6</sup>

Analysis glycosides amount in terms of gidroyuglone glucoside in Juglans regia cortex was carried out according to the method of C. Daglish: about 1.0 g (accurately weighed) RL crushed, passing through a sieve of 1 mm, placed in a flask with 100 ml capacity lapped stopper, was added 50 ml of alcoholic solution of hydrochloric acid 0.27 mol / l and was stirred for 30 minutes on a magnetic stirrer. Vieira V. et al., 2019) Extract was filtered into a volumetric flask with 100 ml of a paper filter "red tape", was adjusted to the mark with an alcoholic solution of hydrochloric acid 0.27 mol / l, was stirred. 2 ml of the resulting solution was transferred into a volumetric flask of 25 ml, adjusted to the mark with the same solution, stirred and the absorbance was measured at SF-2000 spectrophotometer at a wavelength of 341

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nm in a cuvette with a working layer thickness of 1 cm with respect to hydrochloric acid of 0.27 mol / l. The content of glycosides amount in terms of gidroyuglona glucoside (X) as a percentage carried by the formula:

$$X = \frac{A \cdot 50 \cdot 25 \cdot 100}{A_{1\text{cm}}^{1\%} \cdot a \cdot 2 \cdot (100 - W)}$$

where A - the absorbance of the test solution;

l - the thickness of the working layer of the cell in cm;

but - RL weighed in grams;

W - RL humidity,%;

- Specific Absorption gidroyuglone glucoside index 174.2.

Petroleum extract assayed for apparatus from Agilent Technologies, USA. The analysis used a standard injection volume - 1 ml. Injector Temperature - 250 °C. interface temperature was 280 °C. The carrier gas was helium, flow rate - 1 ml / min. [10, 11]. Software - ChemStationE 02.00. Identification component composition (qualitative analysis) was carried out on the complete library of mass spectra of the NIST-05. The content ratio of mixture components (a quantitative analysis) was determined by calculating the ratio of the areas of the chromatographic peaks (by simple normalization).

## RESULTS AND DISCUSSION

Fresh feedstock is a trough pieces of bark and a length 5-6 cm., A thickness of about 2-3 mm. The outer surface of the crust with smooth transverse wrinkles (Figure 1). There are lenticels rounded shape. The inner surface is smooth bark. At the edge of the fiber fracture. Color brown crust on the outside and a greyish-brown, inside yellowish flesh. Odor weak crust when wetted with water is not amplified. The taste of water extract is bitter. The dried feedstock is a trough pieces of bark, some rolled tube and a length of 5-6 cm., about 2-3 mm thick. The outer surface of the crust with smooth transverse wrinkles (Figure 1). There are lenticels rounded shape. The inner surface is smooth bark. At the edge of the fiber fracture. Color outside brown bark and grayish-brown inside. yellowish flesh, light brown. Odor weak crust when wetted with water is not amplified. aqueous extract bitter taste.

The experimental results are statistically processed using Student's t test, presented in Table 1.

As follows from the data presented in the table, the content of glycosides amount in terms of gidroyuglone glucoside and was absolutely dry RL5.30 ± 0.15.

The disadvantage of this method is the fact that analyzes the juglone in reduced form - very unstable, easily oxidized. Furthermore, analytical wavelength used is not specific for gidroyuglone, in this area, many phenolic compounds also have a maximum light absorption.

Chromato-mass-spectrometry analyzed hydrocarbon extract obtained based walnut crust, wherein about sixty compounds have been identified. 8 were able to identify compounds related to raw walnut, since most major components of the petroleum hydrocarbon shield the active ingredients of the extract from the bark of a walnut (Figure 2).

Acute and chronic toxicity of petroleum extract from the bark of walnut were studied. The experiments were carried out on white linear mice. It was not possible to establish the lethal dose.<sup>8-11</sup> was determined toxic doses (mice manifested in a number of diarrhea TD<sub>50</sub> = 2,5). Experimental animals received the drug inside the maximum possible dose based on the capacity of the stomach experimental animal. The death of experimental animals has not been registered. All test animals in the experimental group appeared diarrhea. Studied the



Figure 1: The bark of walnut.

A - Whole raw material; B - Shredded raw materials; C - Walnut bark powder

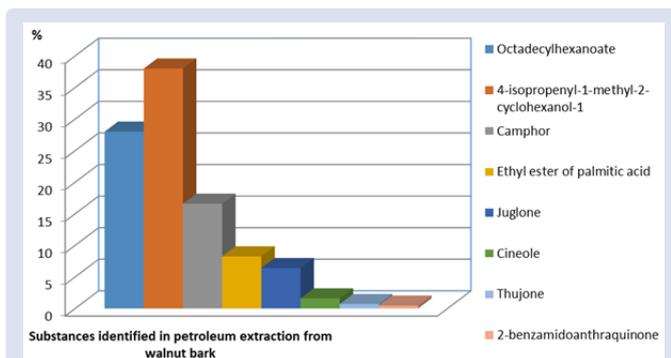


Figure 2: Analysis of petroleum extraction from walnut bark.

Table 1: Contents of gidroksiyuglone.

$X_i, \%$	$\bar{X}$	$\sigma^2$	$\sigma$	P	T (P, F)	$\Delta X$
5,334; 5,231; 5,377; 5,344; 5,223	5.30	0.0049237	0.070169082	95	5,334	0.15

Table 2: Humidity.

$X_i, \%$	$\bar{X}$	$\sigma^2$	$\sigma$	P	T (P, F)	$\Delta X$
9.30; 9.45; 9.34; 9.36; 9.51; 9.48	9.41	0.007186667	0.08477421	95	9.405	0.21

Table 3: Total ash.

$X_i, \%$	$\bar{X}$	$\sigma^2$	$\sigma$	P	T (P, F)	$\Delta X$
10.12; 10.10, 19, 22; 10.14; 10.21; 10.18;	10.18	0.001546667	0.039327683	95	10.185	0.1

Table 4: Ash insoluble in 10% hydrochloric acid.

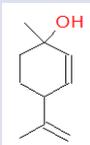
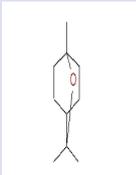
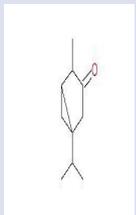
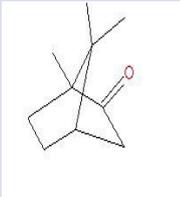
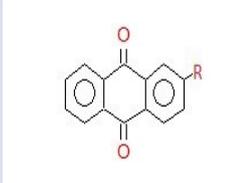
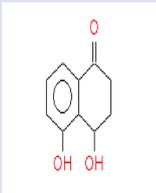
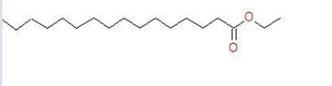
$X_i, \%$	$\bar{X}$	$\sigma^2$	$\sigma$	P	T (P, F)	$\Delta X$
4.8; 4.75; 4.82; 4.91 ; 4.78; 4.84	4.8	0.00122	0.034928498	95	4.8	0.16

pharmacological activity petroleum extract from the bark of a walnut. In experiments on chickens infected ascaridosis anthelmintic activity was observed. All of the experimental animals most free from parasites.

## CONCLUSIONS

1. When description external signs medicinal plant raw material - walnut crust following diagnostic features were found: fresh feedstock is a trough pieces of bark and a length 5-6 cm., A thickness of about 2-3 mm. The outer surface of the bark is smooth with transverse wrinkles. There are lenticels rounded shape. The inner surface is smooth bark. At the edge of the fiber fracture. Color brown crust on the outside and a greyish-brown, inside yellowish flesh. Odor weak crust when wetted with water is not amplified. aqueous extract bitter taste. The dried feedstock is a trough pieces of bark, some rolled tube and a length of 5-6 cm., About 2-3 mm thick. The outer surface of the crust with smooth

**Table 5: Compounds in petroleum extraction from the bark of walnut.**

number	Name	Formula	Rt, min	ICT	S	%	The main peaks
1	Oktadetsilgeksanoat		29.75	2578	1386689	28	117, 43, 55, 42, 57, 69, 99, 84, 71, 29
2	4-isopropenyl-1-methyl-2-cyclohexenol-1		30.74	1149	1902095	38	91, 134, 43, 119, 79, 47, 39, 77, 95, 137
3	cineole		27.85	1047	77115	1.6	43, 81, 71, 108, 111, 41, 69, 84, 95, 55
4	thujone		30.45	1171	34376	0.7	81, 41, 69, 110, 67, 69, 109, 95, 39, 55
5	Camphor		32.02	1142.5	823701	16.6	95, 81, 69, 55, 108, 84, 67, 109, 68, 152
6	2 - benzamidoantrahinon		45.51	1679.3	22551	0.45	207, 105, 133, 151, 136, 132, 104, 77, 106, 18
7	4,5 - dihydroxy - 3,4 - dihydro - 1 (2H) - naftalenon		47.13	1778.6	317579	6.4	88, 101, 55, 41, 89, 47, 27, 57, 73, 70
8	Ethyl ester of palmitic acid		56.42	1906.5	394446	8.25	160, 131, 132, 121, 39, 104, 77, 68, 64, 103

transverse wrinkles (Figure 1). There are lenticels rounded shape. The inner surface is smooth bark. At the edge of the fiber fracture. Color outside brown bark and grayish-brown inside. yellowish flesh, light brown. Odor mild.

2. The content of glycosides amount in terms of gidroyuglone glucoside and absolutely dry RL was  $5.30 \pm 0.15$ . Humidity was  $9.41\% \pm 0.21$ . total ash content was  $10.18\% \pm 0.1$ . The ash content insoluble in 10% hydrochloric acid was  $4.8 \pm 0.16$ .

3. The method of gas chromatography-mass spectrometry in petroleum extraction from the bark of walnut were identified following compounds: oktadetsilgeksanoat (28%) of 4-isopropenyl-1-methyl-

2-cyclohexenol-1 (38%), cineole (1.6%), thujone (0.7%), camphor (16.6%), 2 - benzamidoantrahinon (0.45%), 4,5 - dihydroxy - 3,4 - dihydro - 1 (2H) - naftalenon (6.4%), ethyl palmitate (8.25%).

4. Toxic effects petroleum extract was  $TD_{50} = 2,5$ . Chronic absent. All mice in the experimental group had diarrhea.

5. It is established that petroleum extraction has anthelmintic properties at askaridioze.

## FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

## CONFLICTS OF INTEREST

There are no conflicts of interest.

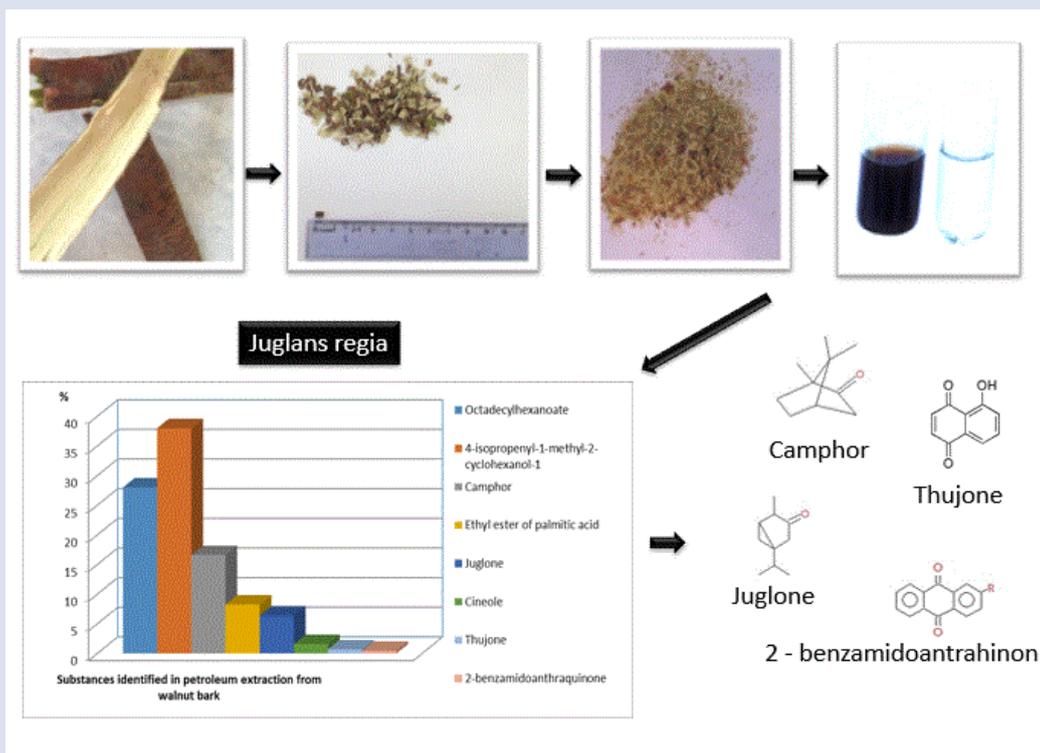
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## GRAPHICAL ABSTRACT



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