

The study of the qualitative composition of the lipophilic fraction of the leaves of the hawthorn
red

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Study of the qualitative composition of lipophilic fractions of blood-red hawthorn leaves

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SUMMARY

The article deals with the study of the lipophilic fraction of blood-red hawthorn leaves from the flora of the Republic of Bashkortostan. The lipophilic fraction was obtained by extraction with chloroform in a Soxhlet apparatus. The resulting lipophilic fractions were dark green resinous liquids with a characteristic odor, insoluble in water, slightly soluble in alcohol, soluble in chloroform and hexane. On average, the yield ranged from $1.5 \pm 0.07\%$ to $2.3 \pm 0.09\%$. As a result of GC / MS analysis, 32 compounds were detected, of which they were identified in comparison with the library mass spectra of 12 substances. Higher fatty acids and terpenoids prevail quantitatively in the lipophilic fraction.

Key words: blood-red hawthorn leaves, lipophilic fraction, fatty acids, terpenes.

RESUME

This article looks at the study of the lipophilic fraction Hawthorn blood-red leaves of the flora of the Republic of Bashkortostan. Lipophilic fraction was obtained by extraction with chloroform in the Sokslet apparatus. The lipophilic fractions were resinous liquid dark green color with a characteristic smell, insoluble in water, highly soluble in alcohol, soluble in chloroform, hexane. Average output ranged from $1.5 \pm 0.07\%$ to $2.3 \pm 0.09\%$. As a result of GC / MS analysis 32 components were found, of which identified compared with library mass spectrum - 12 substances. The lipophilic fractions of higher fatty acids and terpenoids quantitatively dominated.

Keywords: leaves Hawthornblood-red, lipophilic fraction, fatty acids, terpenoids.

Despite the huge number of synthesized drugs, medicinal plants still remain a powerful, and often the only source of new physiologically active and safe drugs. The greatest attention of modern researchers is attracted by the class of glycosides, which has a wide spectrum of pharmacological activity. Lipophilic substances of plants often remain unexplored, despite the fact that they are unique groups of biologically active substances and have a pronounced pharmacological activity [1, 2]. It is also necessary to take into account the fact that lipophilic compounds are better absorbed and last longer in the human body. In this regard, the study of lipophilic substances of new types of medicinal plant materials is relevant.

Blood-red hawthorn is a shrub or tree with a Eurasian type of habitat. In Bashkortostan, it is distributed mainly in the forest-steppe and steppe zones. The medicinal plant raw material of hawthorn, approved for use in medical practice, are fruits and flowers [3]. Blood-red hawthorn leaves are used abroad for quality replacement or joint use along with fruits and

flowers [4–7].

The aim of this work was to obtain and chemically study the lipophilic fraction of the leaves of the blood-red hawthorn growing in the flora of the Republic of Bashkortostan.

Materials and methods

We examined the leaves of blood-red hawthorn harvested from wild species in various regions of the Republic of Bashkortostan in 2009–2013. during the flowering period of the plant. The dried leaves were crushed to a particle size passing through a sieve with holes 2 mm in diameter. About 20 g (accurately weighed) of the crushed raw material was placed in a filter paper cartridge, transferred to a Soxhlet apparatus, and the lipophilic fraction was obtained by exhaustive extraction with chloroform for 5–6 hours. After the end of the extraction, the solvent was completely removed and the yield of lipophilic substances was calculated in terms of absolutely dry raw material.

Results and its discussion

The resulting lipophilic fractions were dark green resinous liquids with a characteristic odor, insoluble in water, slightly soluble in alcohol, soluble in chloroform and hexane. On average, the yield of the lipophilic fraction was from $1.5 \pm 0.07\%$ to $2.3 \pm 0.09\%$. As a result of the analysis of the obtained GC / MS data, 32 compounds were detected, of which 12 compounds were identified in comparison with the library mass spectra (Fig. 1).

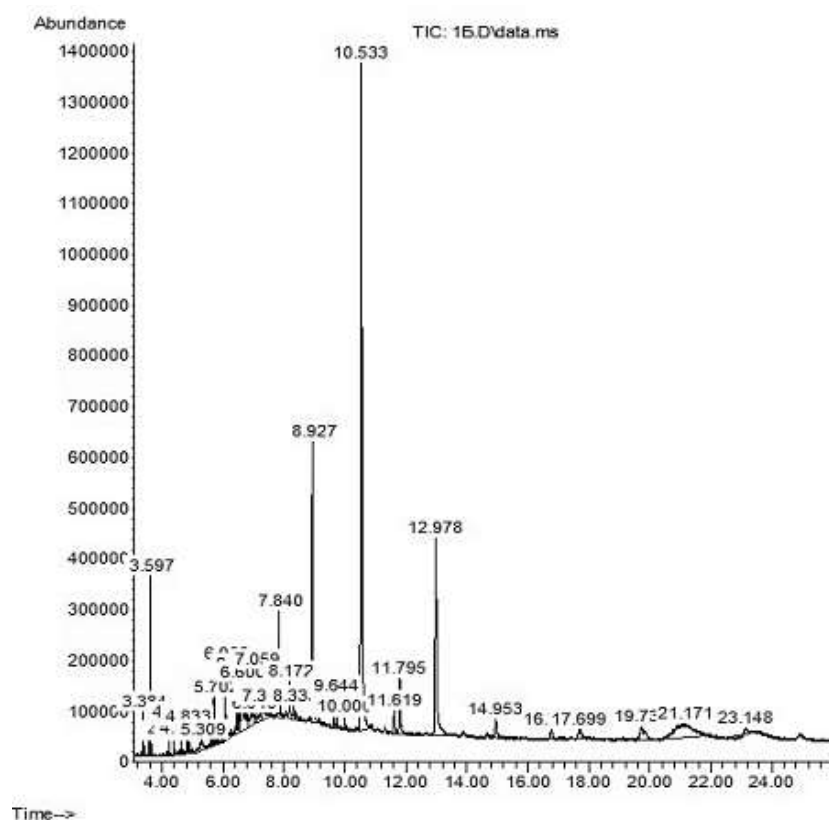


Fig. 1. Chromatogram of the lipophilic fraction of blood-red hawthorn leaves.

From the results presented in table. 1, it can be seen that the lipophilic fraction of blood-red hawthorn leaves contains monoterpenoids (trans-dihydrocarvone and carvone), sesquiterpenoids (trans-caryophyllene, germacrene), benzofuran derivatives (2 (4H) - benzofuranone), unsaturated hydrocarbons (alpha, octadecylene) 6 fatty acids, of which 5 are saturated (palmitic, stearic, heneicosanic, behenic, lignoceric acid) and 1 unsaturated (arachidonic acid). Higher fatty acids are the predominant group of biologically active substances in the lipophilic fraction and account for 59.1%, and the dominant ones are lignoceric (29.12%) and arachidonic (13.37%).

Table 1

Results of gas chromatography-mass spectrometric analysis of the lipophilic fraction
blood red hawthorn leaves

Compound	Time retention, min	Content in the sample, %	The degree of coincidence with library masses spectrum, %
Trans-dihydrocarvone	3.382	0.73	98
Carvon	3.597	2.56	96
Trans-caryophyllene	4,384	0.54	98
Germacren	4.616	0.41	98
2 (4H) -benzofuranone	4.834	0.76	96
Palmitic acid	6,063	2.19	96
Heneicosanoic acid	6,435	2.57	97
Arachidonic acid	12,978	13.37	98
Stearic cyst	7.84	2.94	97
Behenic acid	8,927	8.88	98
Lignoceric acid	10,533	29.12	98
Alpha octadecylene	11,796	5.15	95

Conclusion

Thus, the lipophilic fraction obtained from the leaves of the blood-red hawthorn has been chemically studied. It was found that it contains monoterpene and sesquiterpene hydrocarbons, benzofuran derivatives and higher fatty acids, which contribute to the pharmacological properties of the studied object of study. The data obtained expand the information on the chemical composition of blood-red hawthorn leaves and can be taken into account when developing a herbal remedy based on them.

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