

## THE ORGANIC ACIDS OF LEAVES OF *CRATAEGUS FLAVA* AIT.

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**Introduction.** Organic acids are formed in the plants and used for various synthetic processes in the cell. These compounds in plants content in the free form and in the form of salts or esters.

In plants organic acids are perform several functions: involved in photosynthesis and biosynthesis of terpenoids; breathing and metabolism of carbohydrates and lipids; are sources of amino acids; connect carbohydrate metabolism with proteins and lipids metabolism; promote excretion of ammonia and plant protection.

The most common in the plant world are formic, malonic, fumaric, succinic, benzoic, malic, citric, lilac, salicylic, *p*- coumaric and chlorogenic acids.

These compounds possess pharmacological activities such as: derivatives of benzoic acid (salicylic and benzoic) – bactericidal, anti-inflammatory, a whitening, astringent effect; mono, di - carboxylic acids reduce the formation of carcinogenic nitrosamines in the body, improve digestion, stimulate intestinal peristalsis, improve the skin condition; for hydroxycinnamic acids derivatives most character anti-inflammatory, choleric, diuretic, antiviral effects.

In cosmetology very Citric, malic, lactic acids - in cosmetology to treat acne, antiwrinkles.

For continue the phytochemical research the *Crataegus flava* Ait. leaves from Hawthorn genus and expand the information about the chemical composition the species of genus, a scientific interest is the study of organic acids in this raw material.

The **aim of our study** was to investigate the organic acids of *Crataegus flava* Ait. leaves.

**Materials and methods.** The object of the study was the dried leaves of *Crataegus flava* Ait., collected in May, 2015 year. Raw materials is collected in Botanical Garden of V.N. Karazin Kharkiv National University.

Qualitative and quantitative composition of the organic acid content conducted by used chromatography-mass spectrometry method in chromatograph Agilent Technology 6890N with mass spectrometric detector 5973N.

For the extraction used hexane. Analysis conditions: chromatographic column DB-5 capillary (length 30 m, internal diameter 0.25 mm); the carrier gas - helium; thermostat temperature 50°C programming 4°/ min.

To identify the components used data library of mass spectra and NIST05 WILEY 2007 with a total of more than 470,000 spectra in conjunction with programs

to identify AMDIS and NIST.

The content of substances calculated relative to internal standard (tridecane solution in hexane).

**Results and discussion.** In leaves of *C.flava* Ait. were identified 15 compounds – aromatic and aliphatic acids. The results of research are shown in Table 1.

**Table 1**

Aromatic and aliphatic acids of leaves of *Crataegus flava* Ait.

The retention time, min.	The name of acid	Content	
		mg/kg	%
5.780	Capronic	15.55	0.21
10.606	Formic	1538.38	21.61
13.552	Malonic	240.30	3.37
14.693	Fumaric	75.83	1.06
15.507	Succinic	729.83	10.25
15.996	Benzoic	133.73	1.87
19.079	Phenylacetic	10.19	0.14
19.515	Salicylic	35.54	0.49
23.777	Malic	3329.67	46.77
31.087	Citric	765.17	10.74
34.390	Vanillic	18.36	0.25
38.115	<i>p</i> - Coumaric	115.59	1.62
39.300	<i>p</i> -Hydroxybenzoic	115.26	1.61
39.736	Lilac	9.45	0.13
42.470	Ferulic	100.85	1.41
Total amount:		7118.11	100

Among aliphatic acids in most high concentration (mg/kg) are presented malic (3329.67), formic (1538.38), citric (765.17) and succinic (729.83) acids.

**Conclusions.** For the first time in *C. flava* Ait. leaves were identified 15 organic acids: 1 monobasic carboxylic acid – capronic (0.21%); 5 dicarboxylic acid – formic (21.61%), malonic (3.37%), fumaric (1.06%), succinic (10.25%), malic (46.77%); 1 tricarboxylic acid – citric (10.74%); 6 phenolcarbonic acids – salicylic (0.49%), vanillic (0.25%), benzoic (1.87%), lilac (0.13%), *p*-hydroxybenzoic (1.61%), phenylacetic (0.14%); 2 hydroxycinnamic acids - ferulic (1.41%) and *p*-coumaric (1.62%).