

RESEARCH THE CARBONIC ACIDS OF CRATAEGUS MONOGYNA FLOWERS

Gubcka O.N., Sydora N.V., Avidzba Yu.N., Kovalyova A.M.

The National University of Pharmacy, Kharkiv, Ukraine

allapharm@yahoo.com

The aim of investigation

C. monogyna it is one of the pharmacopoeia species, raw material of which are fruits and flowers. Their chemical composition is studied in detail. But *C. monogyna* forming hybrids, on its base was created the sorts differ in morphological structure. Are known pyramidal form (f. *stricta*) – tree with pyramidal crown; weeping (f. *pendula*) – pubescent branches; weeping pink (f. *rosea pendula*) – weeping with pink flowers; bright-red (f. *punicea*) – with dark -red single flowers; pink (f. *rosea*) – petals of flowers are pink with white stripes; white terry (f. *albo-plena*) – with terry flowers; red terry (f. *rubra-plena*) – with red terry flowers; always flowering (f. *semperflorens*) – low shrub, flowering whole summer until autumn; (f. *laciniata*) – with deeply lobed leaves; white-motley (f. *argentea-variegata*) – with white-motley leaves; thorn less (f. *inermis*) – branches without thorns, flowers are simple, white.

Materials and methods

The objects of our study were the leaves and flowers of *C. monogyna* simple and terry forms: *C. monogyna* var. *monogyna*, *C. monogyna* flore rubro-plena, *C. monogyna* flore Roseo-plena. As a result of chromatographic research in a thin layer of sorbent in all the samples was identified phenolcarbonic acids and hydroxycinnamic acids, anthocyanins, flavonols and flavones, catechins. By the method of chromatography-mass spectrometry for the first time was investigated carbonic acids of flowers *C. monogyna* var. *monogyna*. Research conducted in chromatograph Agilent Technology HP6890 GC, mass-spectrometric detector 5973N. The exact weight of the dried material was placed into 2 ml vial and added internal standard (50 mg tridecane in hexane) and 1.0 ml 14% BCl₃ in methanol (agent for methylation). The mixture was kept in a tightly closed vial 8 hours at 65 ° C. At this time the acids are completely extracted from the raw material and passes them transesterification. The reaction mixture was poured and diluted with 1 ml of

distilled water. For extraction of methyl esters of acids was added 0.2 ml dichloromethane, mixture was shaken 1 hour. Putting 2 ml sample into the chromatographic column was carried out in the mode “*splitless*”, which allows to enter the sample without loss to division and significant 20-times to increase the sensitivity of chromatography method. The speed of the sample enter - 1 ml / min, the term – 0,2 min. Detector of mass-spectrometry – quadrupoles, method of ionization - electron impact, energy of ionization 70 eV, to analyze used the complete registration mode of the ion current. For division was used the capillary column HP-INNOWAX, (30 m × 250 mkm). Moving phase – helium, the gas flow rate 1 ml/min. The temperature of the heater input the sample – 250 °C. The thermostat temperature is programmed from 50 to 250 °C. The identification of methyl esters of acids conducted on the base of calculating the equivalent length of the aliphatic chain, using data of the library mass spectra NIST 05 and Willey 2007 in complex with identification programs AMDIS and NIST; also compared the retention time with the retention time of standard substances (Sigma). To calculate the quantitative determination of the components used equation: $C = K1 * K2 * 1000$ (mg / kg), where: $K1 = \Pi1 / \Pi2$ ($\Pi1$ peak area of investigated substance, $\Pi2$ – peak area of standard); $K2 = 50 / M$, (50 – mass of internal standard, introduced in the sample, mkg; M – weight of investigated sample, mg); C – content the acids in raw materials, mg/kg.

Obtained results

It was established that the total acids content is 2,9%. Identified 37 carbonic acids. In raw material content of fatty acids – 8309,05 mg/kg, carbonic acids – 517,54 mg/kg, hydroxycinnamic acids – 338,26 mg/kg. Among the carbonic acids are dominated (mg/kg): malic – 3104,92, formic – 3040,05, succinic – 1316,32, malonic – 1969,33 acids. The share of fatty acids among the sum of organic acids is 28,5%, phenolcarbonic – 1,77%, hydroxycinnamic – 1,16%.

Conclusions

In *C. monogyna* flowers were determined: fatty acids (28,5%), phenol carbonic acids (1,77%), hydroxycinnamic acids (1,16%).