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BIOACTIVE COMPOUNDS OF *ROSA CANINA* L. BIOTYPES FROM SPONTANEOUS FLORA OF REPUBLIC OF MACEDONIA

[1]Vesna Kostik, [2]Biljana Bauer

[1]Institute of Public Health, 50 Divizija No. 6

[2]Faculty of Pharmacy, University SS. Cyril and Methodius, Mother Theresa 47, 1000 Skopje, Republic of Macedonia

Introduction

The genus Rosa contains over 100 species that are widely distributed mostly in Europe, Asia, the Middle East and North America.
Rose fruits have long been used in the Republic of Macedonia for food, medicinal, and many other purposes and for several special traditional products such as rose hip fruit juice, rose hip jam, rose hip marmalade, rose hip pistils and rose hip syrup.
Dog rose can be found all the mountains in the Republic of Macedonia. Usually grows in areas exposed to the sun, mostly on the southern slopes outside the forest or roadsides.

The aim of our study was to evaluate the amount of the main phyto-chemicals (vitamin C, total polyphenols, and total flavonoids) content in the dog rose pulp obtained from two genotypes var. transitoria, altitude 1120 m, and var. assiensis, altitude 410 m.

Material and methods

Dog rose pulp obtained from two genotypes var. *transitoria*, altitude 1120 m, and var. *assiensis,* altitude 410 m was used in this investigation.
Total polyphenolic content (TPC) was estimated and expressed using the Folin –Ciocalteu method. Gallic acid was used as standard.
The HPLC/UV–vis system was used to evaluate the concentration of ascorbic acid in frozen rose hips pulp, with L-ascorbic as standard.
In order to evaluate the total flavonoid content in our investigations we used method based on spectrophotometric technique, based on the formation of a complex between the aluminium ion and the carbonyl and hydroxyl groups of the flavonoids.

Results

Total polyphenol content (TPC)
The polyphenol compounds are important plant constituents because of their free radical scavenging ability, facilitated by their hydroxyl groups. The results (as gallic acid equivalent, mg/100 g dry pulp) were expressed as means ± standard deviation of triplicate analysis.

Figure 1 depicts the total polyphenols content of the extracts that were analysed

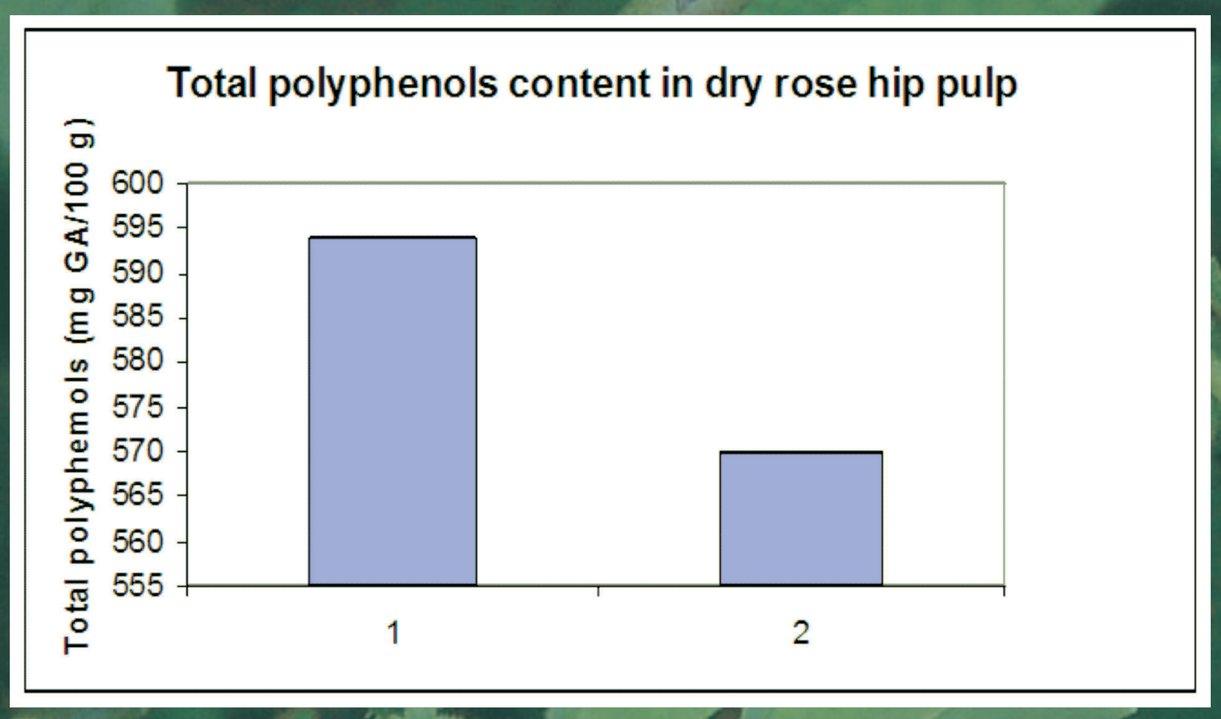

Figure 1. Total polyphenols content (1 - var. transitoria, 2 - var. assiensis)

Ascorbic acid
The HPLC/UV–vis system was used to evaluate the concentration of ascorbic acid in frozen rose hips pulp, with L-ascorbic as standard for the calibration curve (R^2 = 0.995).
The HPLC chromatogram of L-ascorbic acid from dry rose hips pulp of var. *transitoria* is presented in Figure 2.

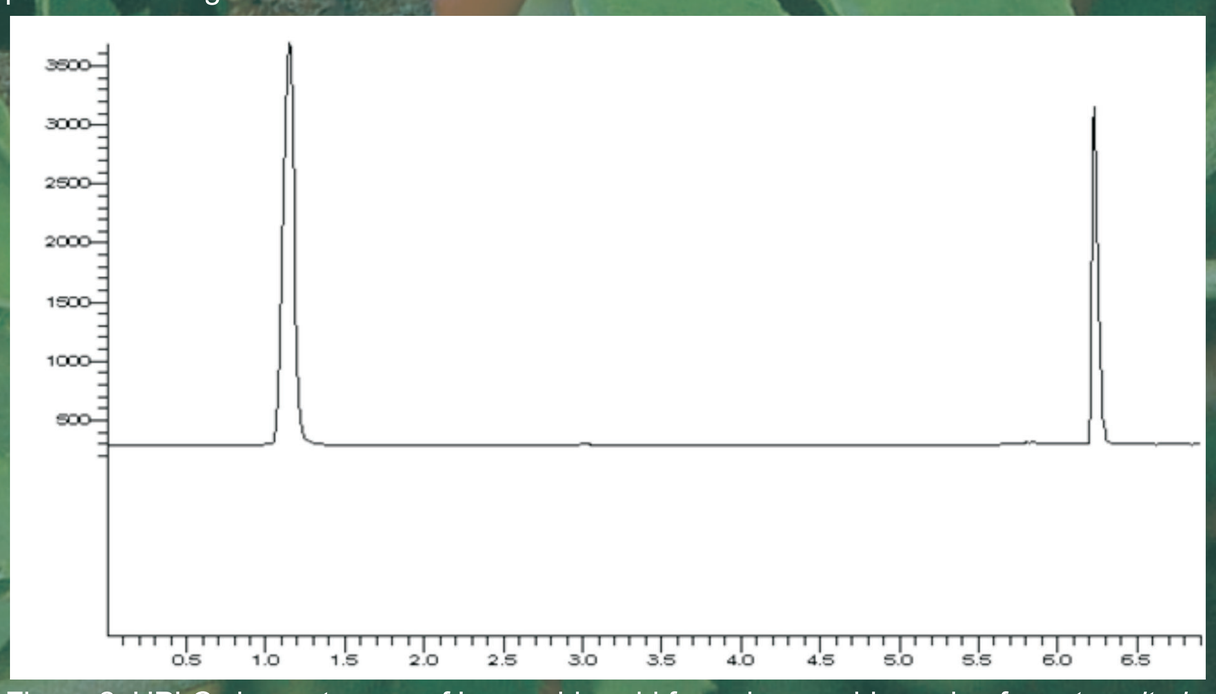

Figure 2. HPLC chromatogram of L-ascorbic acid from dry rose hips pulp of var. *transitoria*.

The amounts of L- ascorbic acid in the samples (dry rose hips pulp) of var. *transitoria*, and var. *assiensis* are presented in Figure 3.

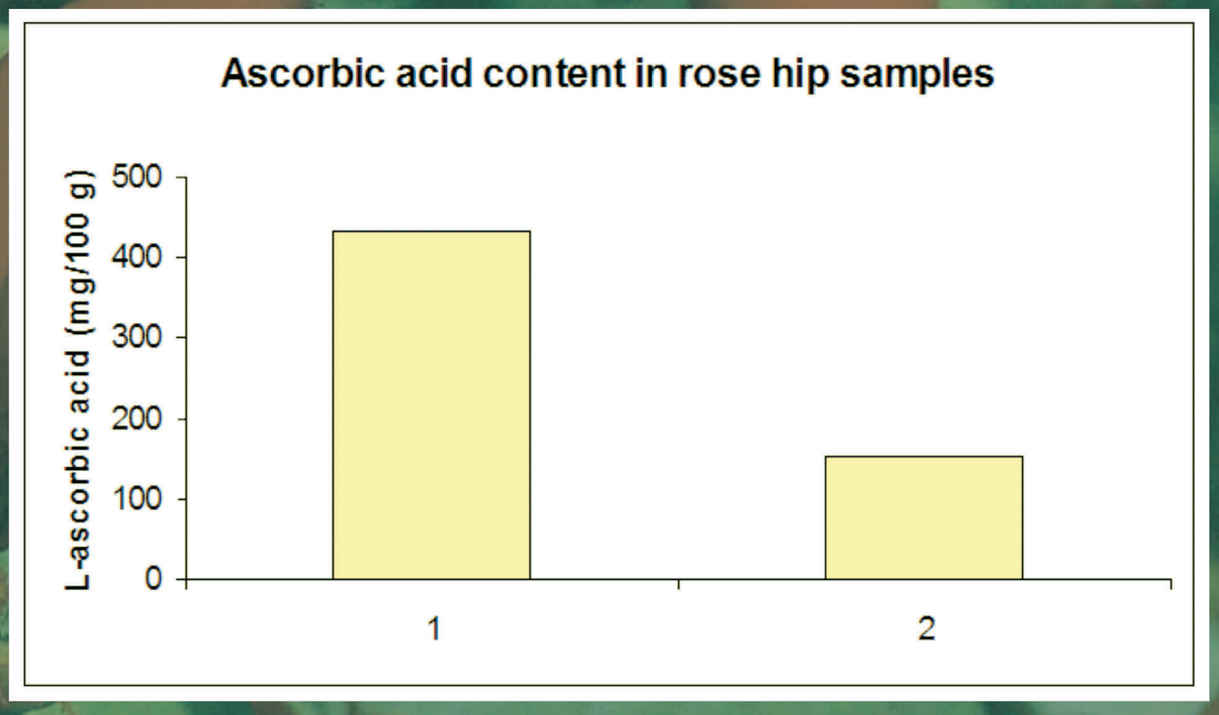

Figure 3. L- ascorbic acid content (1 - var. *transitoria*, 2 - var. *assiensis*)

Total flavonoids
In order to evaluate the total flavonoid content in our investigations we used method based on spectrophotometric technique, based on the formation of a complex between the aluminium ion and the carbonyl and hydroxyl groups of the flavonoids. The results of our investigations expressed as mg quercitin/100g dry pulp are shown in Figure 4.

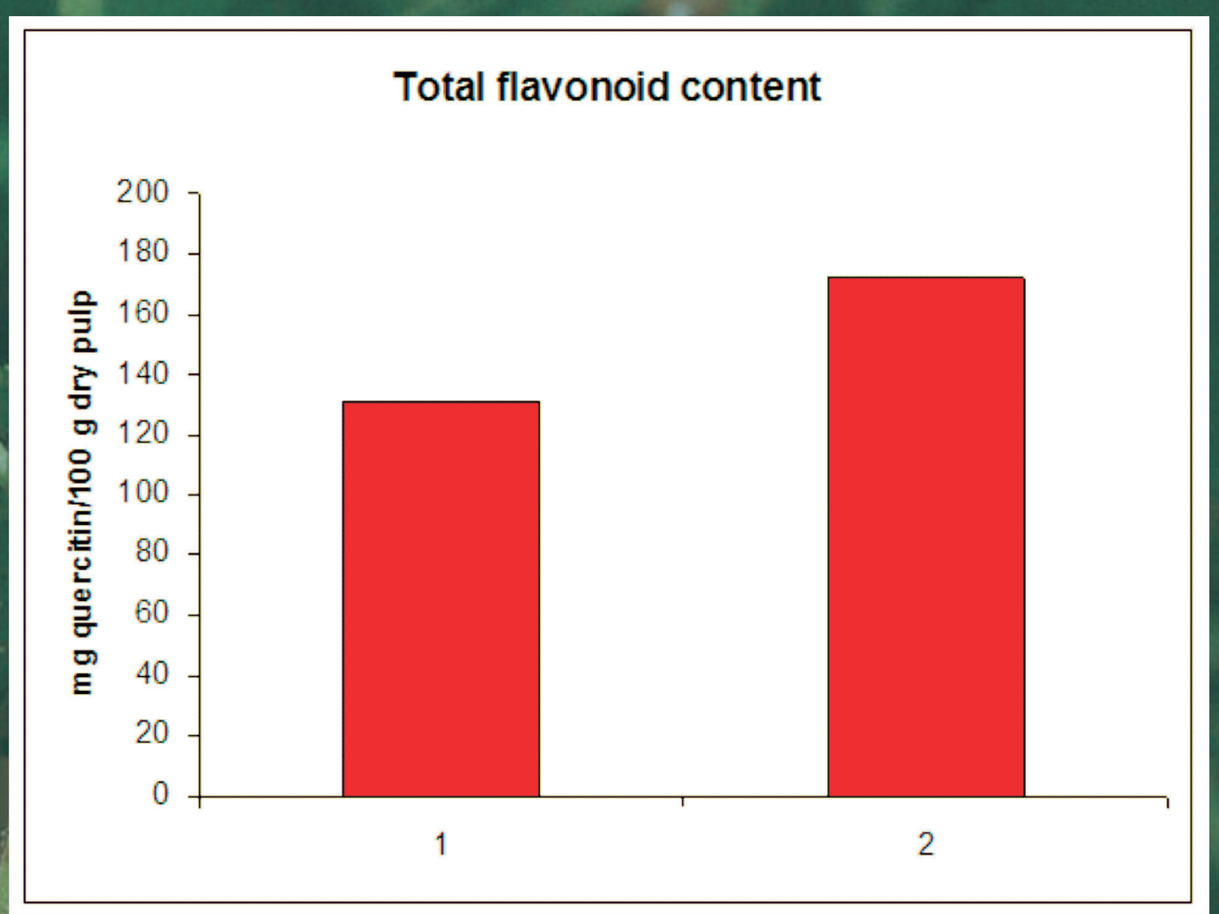

Figure 4. Total flavonoids content in frozen rose hip pulp

Conclusion

Rosa canina L. (dog rose) can be found all the mountains in the Republic of Macedonia. Usually grows in areas exposed to the sun, mostly on the southern slopes outside the forest or roadsides. The dog rose hips (Cynosbati fructus) comprise several biologically active compounds, such as: sugars, organic acids, pectins, flavonoids, tannins, carotenoids, fatty acids, vitamins (particularly vitamin C and also vitamins B1, B2, K, PP, E), macro - and microelements etc.
The results of our study revealed that regarding the content of vitamin C, have significant difference between the studied genotypes: 432.2 mg/100 g dry pulp for var. transitoria versus 154.3 mg/100 g dry pulp for var. assiensis. Contrary to these findings, the content of total polyphenos was found to be similar for the both genotypes: 594.3 mg/100 g dry pulp for var. transitoria and 570.3 mg/100 g dry pulp for var. assiensis. The content of total flavonoids expressed as mg quercitin/100 g dry pulp was 131 for var. transitoria and 172.4 for var. assiensis.
According to the obtained results, it can be concluded that the content of vitamin C in the pulp of *Rosa canina* L is in direct correlation of the altitude where the plant grows. Statistical difference ($p \geq 0.05$) was not found for the content of the total polyphenols between both varaities.