

# TOTAL PHENOLICS, VITAMIN C CONTENT AND ANTIOXIDANT POTENTIAL OF *ROSA TOMENTOSA* HIPS

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## Introduction

The genus *Rosa* (Rosaceae) consists of 200 wild-growing species, mostly distributed in the Northern Hemisphere, of which 21 have been recorded in the flora of Serbia [1,6]. *Rosa tomentosa* Sm. (Fig. 1a, b, c, d) is compact shrub which grows in the plain and mountains regions of Central and Southern Europe, Southwestern Asia and Caucasus. In the Flora of Serbia, it has been recorded in mountains Tara, Rudnik, Maljen, and in the National park „Đerdap” [6].

Species of the genus *Rosa* are traditionally used medicinal plants in Serbia to treat a variety of ordinary diseases, for cosmetic preparations and as food products [3]. Fresh or dried, rose hips are used for the production of tea, jam, juice and dietary supplements [5]. Products prepared from air-dried rose hips present a rich source of ascorbic acid and phenolic compounds which are effective against infectious and urinary diseases, diarrhea, rheumatism and arthritis [2,4]. This study was designed to provide data about the content of total phenolic (TPC), total flavonoid (TFC) and ascorbic acid values and to determine the antioxidant activity of extracts obtained from *R. tomentosa* hips (pericarp and nuts).

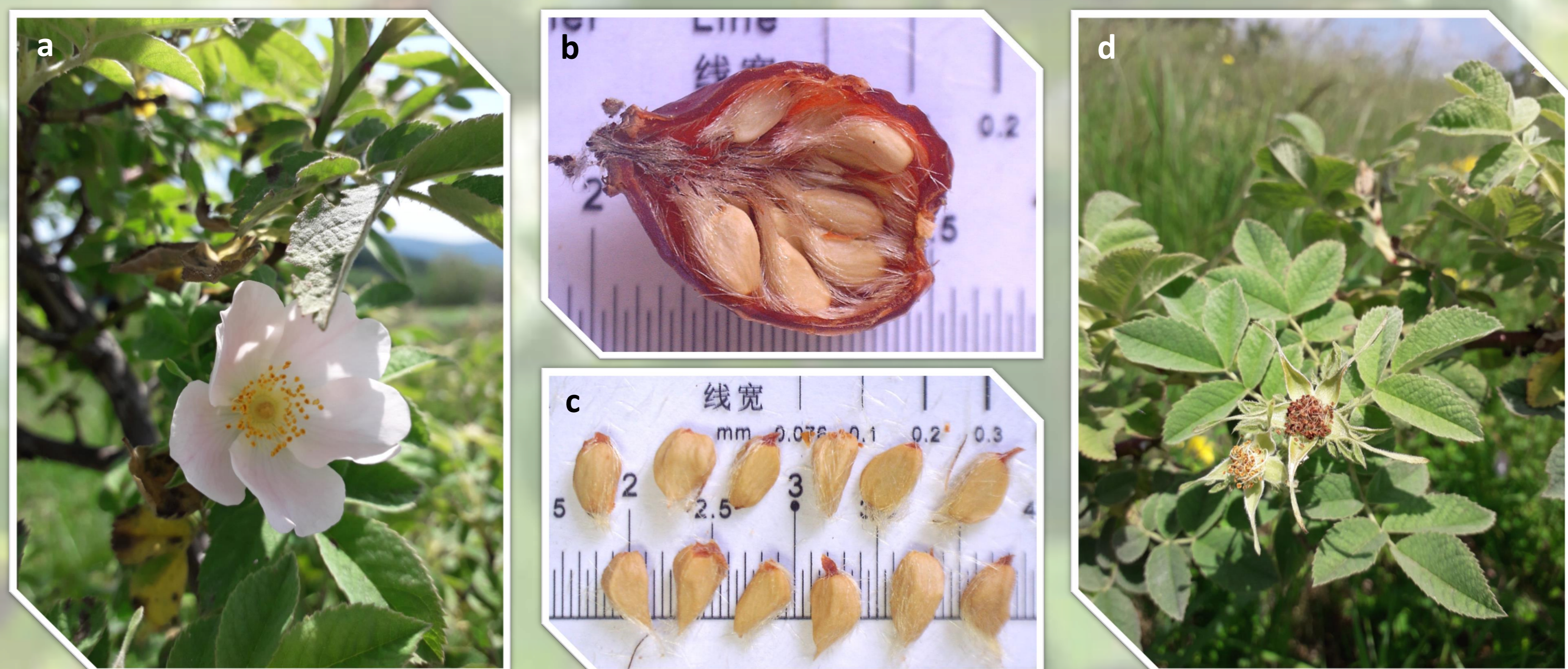


Figure 1. a, b, c, d-*Rosa tomentosa* Sm.

## Material and Methods

The plant material was collected from wild-growing shrubs during the 2017 year, from Zlatibor Mt., Serbia. Voucher specimens were deposited in the Herbarium of the Institute of Botany and Botanical Garden "Jevremovac", Faculty of Biology (BEOU). For the extraction dry rose hips were separated into pericarp and nuts. The extracts were prepared using ultrasonic assisted extraction with 70% ethanol. Spectrophotometric methods were used for the measuring of total phenolic (TPC), total flavonoids (TFC) content, as well as for determination of antioxidant potential. TPC was evaluated by Folin-Ciocalteu method, TFC using aluminium nitrate nonahydrate and for determination of free radicals scavenging activity were used DPPH (2,2-diphenyl-1-picrylhydrazyl), ABTS (3-ethylbenzothiazoline-6-sulfonic acid), and  $\beta$ -carotene/linoleic acid assays. HPLC analysis was performed for detection and quantification of vitamin C.

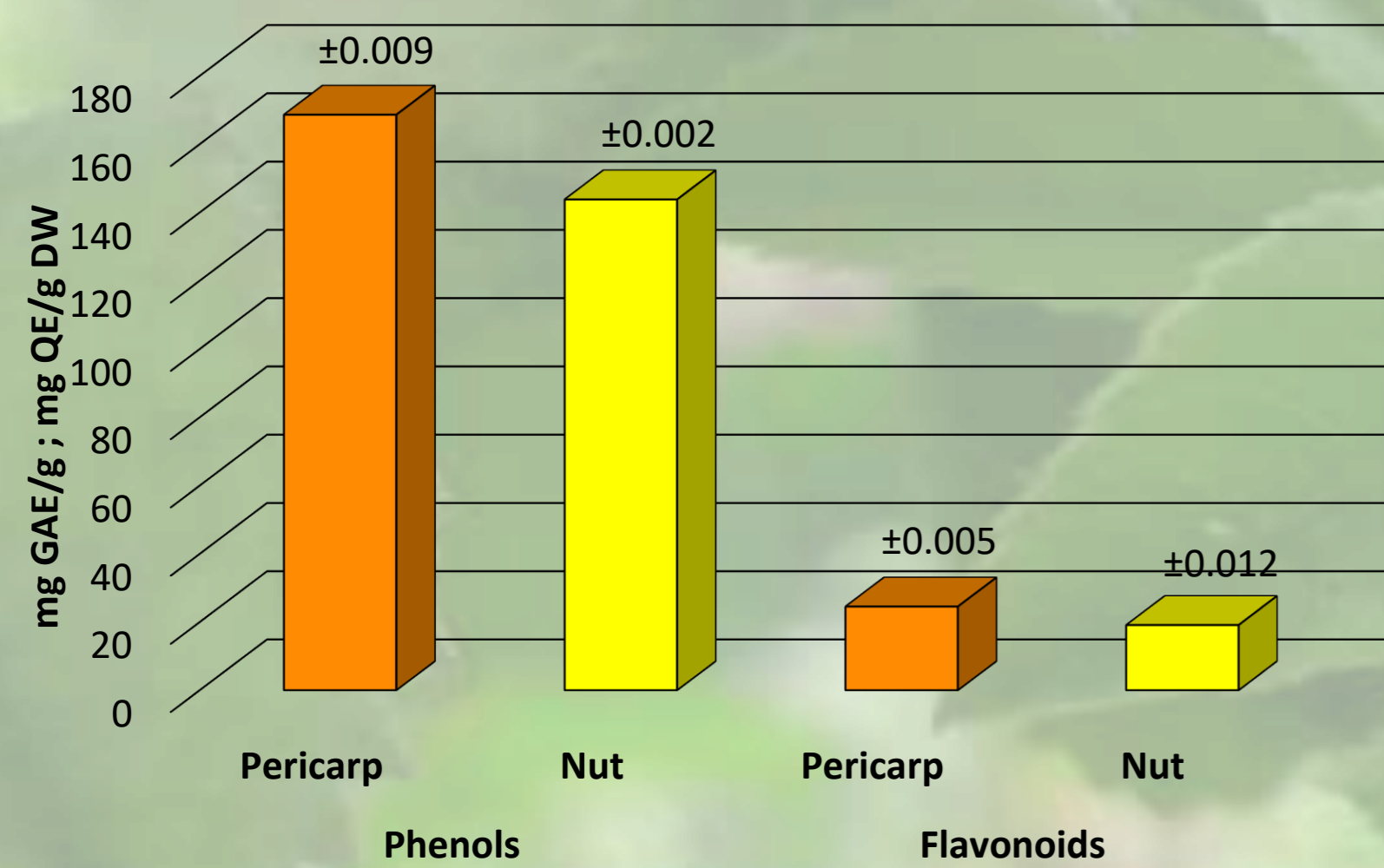


Figure 2. TPC and TFC in *R. tomentosa* extracts.

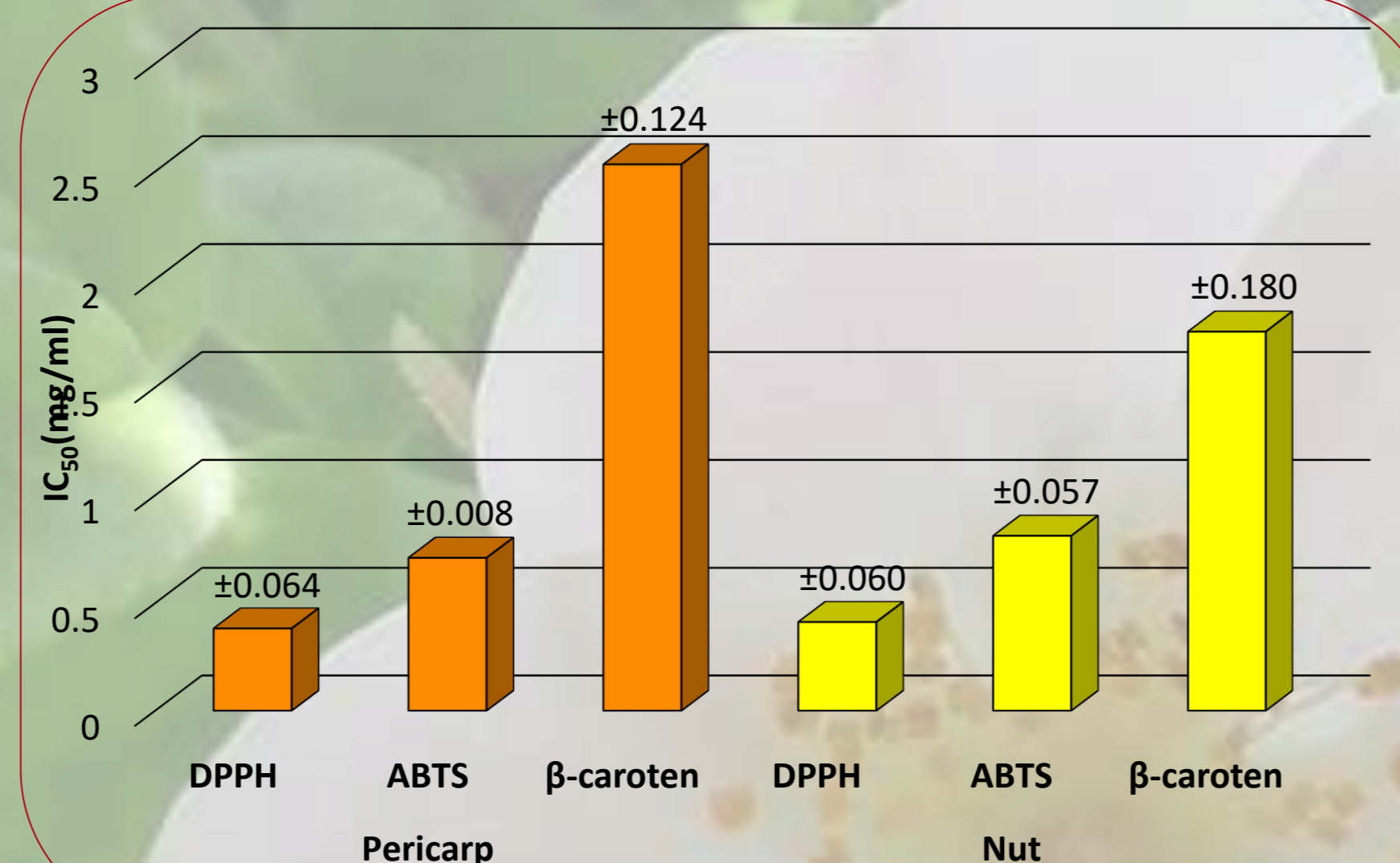


Figure 3. Free radical scavenging activity of *R. tomentosa* extracts in DPPH, ABTS, and  $\beta$ -carotene assays.

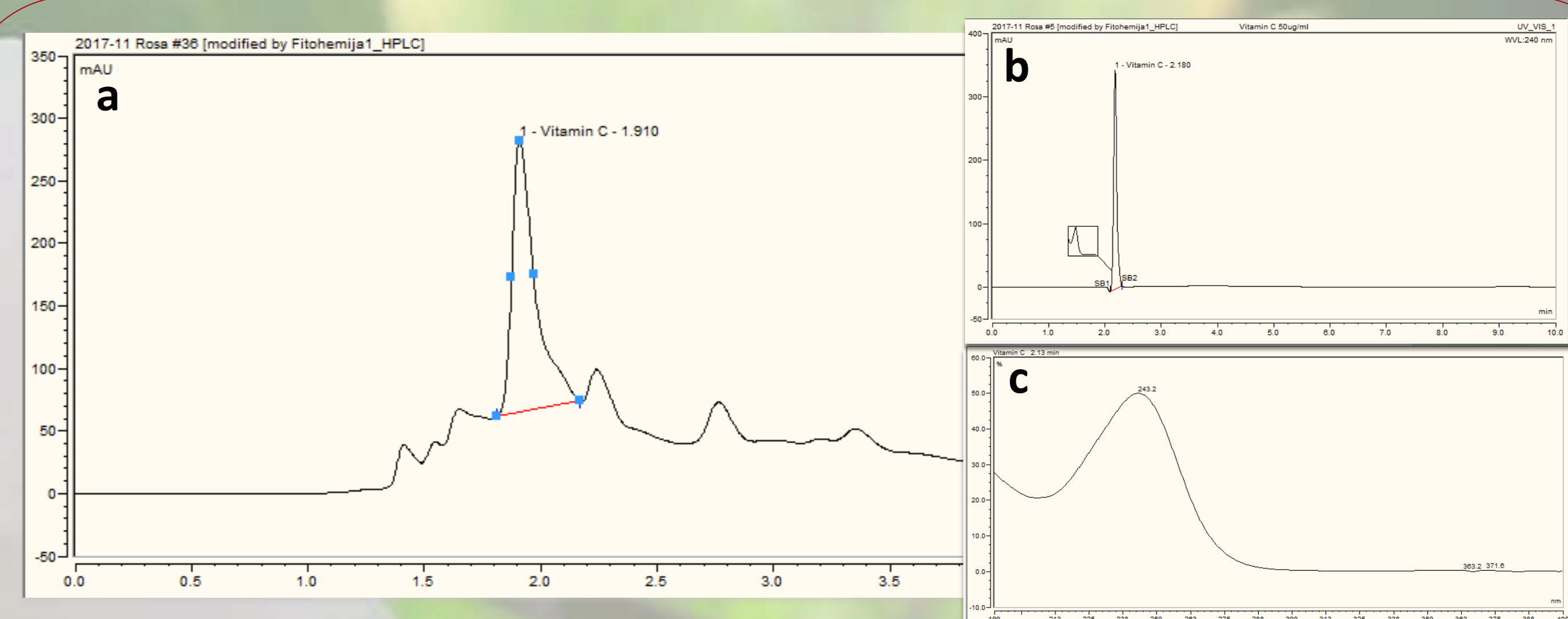


Figure 4. Detection and quantification of vitamin C content; a-sample chromatogram; b,c-standard chromatograms.

## Results and Discussion

Total polyphenols and flavonoids content, of the both tested extracts, are presented on Figure 2. The highest TPC and TFC were determined in pericarp extract (168.62 mg GAE/g and 24.54 mg QE/g of dry extract), while extracts of nuts showed the lower values (143.80 mg GAE/g and 19.11 mg QE/g of dry extract, respectively). The antioxidant capacity of ethanolic extracts were determined. Obtained results expressed as  $IC_{50}$  are given in Figure 3. In the DPPH radical and ABTS radical cation tests extracts obtained from pericarp possessed higher antioxidant potential ( $IC_{50}$  0.38 mg/ml and  $IC_{50}$  0.71 mg/ml, respectively) than those from nuts ( $IC_{50}$  0.41 mg/ml and  $IC_{50}$  0.81 mg/ml, respectively). Additionally, in the  $\beta$ -carotene test, the highest value of antioxidant activity was found for nuts extract ( $IC_{50}$  1.76 mg/ml). The results of HPLC analysis (Fig 4.) showed notable vitamin C content of 418.95  $\mu$ g/g dry weight in *R. tomentosa* hips pericarp.

## Conclusion

High polyphenolic and flavonoid content was observed for ethanolic extracts of *R. tomentosa* fruits. Their highest contents were measured in the pericarp extracts, for which it was determined good antioxidant activity. The better DPPH and ABTS radical scavenging activity were detected in pericarp extract, while the  $\beta$ -carotene test showed that the nuts extracts had higher antioxidant capacity than those from pericarps. The obtained activities could be attributed to the presence of high TPC, TFC and vitamin C. The study suggests that the hips of *R. tomentosa* are a rich source of natural antioxidant compounds and should be considered as a novel functional food product.

## References

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