Flowers of new genotypes of garden rose grown in Vojvodina (Serbia) as a source of natural antioxidants

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Introduction

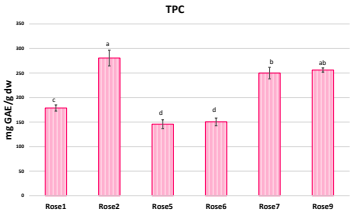
Roses belong to genus *Rosa* from Rosaceae family and are grown worldwide. There are 200 species and approximately 30000 registered cultivars obtained through the careful breeding and crossing of only a dozen wild rose species. Roses are primarily cultivated and used for horticultural purposes, but also for the manufacturing of essential oils, rose water and rose concentrate, as well as for production of jams, teas, and wine. Additionally, they are rich in biologically active compounds that contribute to human health.[1]

The aim of this study was to evaluate the potential of flowers of six new genotypes of garden rose (*Rosa* × *hybrida*) as sources of natural antioxidants and pharmacologically active compounds.

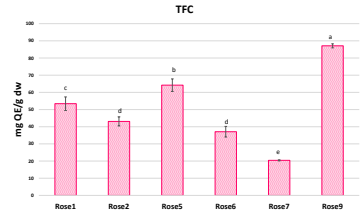
Materials and Methods

Flowers were collected in June 2021 from the experimental fields near Temerin (company Pheno Geno Roses). Petals were macerated with 70% MeOH and extracts were chemically characterized by determining total phenolic (TPC), flavonoid (TFC) and monomeric anthocyanin contents (TAC) as well as LC-MS/MS quantitative analysis. Antioxidant activity was evaluated by DPPH and FRAP assays.[2,3]

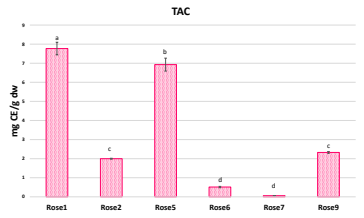
Results



Total phenolic content expressed as mg gallic acid equivalents/g dw



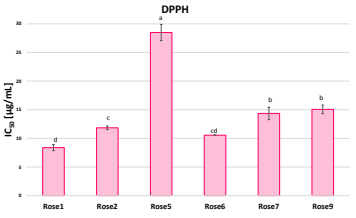
Total flavonoid content expressed as mg quercetin equivalents/g dw



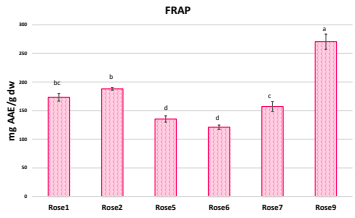
Total anthocyanin content expressed as mg cyanidin-3-O-Glc equivalents/g dw

Table 1. Results of quantitative analysis of selected compounds by LC-MS-MS (μg/g d.w.)

Compound	Rose1	Rose2	Rose5	Rose6	Rose7	Rose9
Protocatechuic acid	**79.1**	**15.3**	**84.0**	7.17	1.22	**18.9**
p- Coumaric acid	0.24	3.33	0.60	1.01	0.40	0.18
Gallic acid	**24.9**	**30.7**	**27.0**	**32.2**	**17.5**	**23.6**
Quinic acid	**18295**	**16144**	**9157**	**17209**	**37678**	**22790**
Chlorogenic acid	2.17	2.40	1.34	1.68	7.51	4.54
Kaempferol	3.83	4.00	**12.5**	**24.3**	**29.5**	8.22
Catechin	**25.5**	**10.3**	**89.9**	**35.4**	**52.6**	**41.0**
Quercetin	**25.6**	**19.9**	**35.6**	**15.2**	7.37	**17.3**
Kaempferol-3-O-Glc	**3344**	**6204**	**22150**	**42165**	**36135**	**9969**
Quercitrin	**17492**	**12208**	**14791**	**4473**	**408**	**12324**
Quercetin-3-O-Glc + Gal	**6389**	**9706**	**14113**	**5847**	**918**	**11266**
Rutin	**751**	**780**	**925**	**477**	**528**	**1540**



Neutralization of DPPH radical expressed as IC50 (μg/mL)



Total antioxidant power expressed as mg ascorbic acid equivalents/g dw


Experimental fields – Pheno Geno Roses Company

Conclusion

- Based on total phenolic content these new rose genotypes are a good source of phenolics
- The highest content of total phenolics is determined in Rose9, followed by Rose5, Rose1 and Rose2
- The highest content of total flavonoids was detected in roses Rose9, followed by Rose5, Rose1 and Rose2
- The highest amount of total monomeric anthocyanins was determined in Rose1, followed by Rose5 and Rose9, this result is according to expectations since these are pink-colored roses
- LC-MS-MS results show that the major components of rose extracts are quinic acid, kaempferol-3-O-glucoside, quercitrin, quercetin-3-O-galactoside and glucoside, and rutin
- Based on the FRAP assay highest antioxidant potential showed Rose9, followed by Rose2, Rose1 and Rose7
- Based on the ability to neutralize DPPH· radical highest antioxidant potential was determined in Rose1, followed by Rose6 and Rose2, while Rose5 showed the lowest activity
- Based on the obtained results, the new genotypes of garden roses investigated in this study can be considered as functional food due to the high level of bioactive compounds with health-promoting properties

References

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