

Phenolic Composition Influences the Health-Promoting Potential of Bee-Pollen

Mirjana Mosić¹, Jelena Trifković¹, Irena Vovk², Uroš Gašić^{3,*}, Živoslav Tešić¹,
Branko Šikoparija⁴ and Dušanka Milojković-Opsenica^{1,*}

¹ University of Belgrade—Faculty of Chemistry P.O. Box 51, 11158 Belgrade, Serbia

² Department of Food Chemistry, National Institute of Chemistry, Hajdrihova 19, SI-1000 Ljubljana, Slovenia

³ Institute for Biological Research “Siniša Stanković” — National Institute of Republic of Serbia, University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia

⁴ BioSense Institute—Research Institute for Information Technologies in Biosystems, University of Novi Sad, 21000 Novi Sad

* Correspondence: uros.gasic@ibiss.bg.ac.rs; dusankam@chem.bg.ac.rs (D.M.-O.); Tel.: +381112078385 (U.G.)
Tel.: +381113336766 (D.M.-O.)

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Table S1. Frequency classes [23] of identified pollen types and interpretation of floral origin from results of pollen analysis published in Kostić *et al.*, [16].

Sample No.	Sample No. from [16]	Total Pollen Types	Very Frequent (>85%)	Frequent (46–85%)	Accompanying (16–45%)	Important Isolated (3–15%)	Floral Origin
P1	2	5	Brassicaceae (93%)		-	Moraceae	MONOFLORAL (Brassicaceae)
P2	3	25	-	Fabaceae (48%)	Brassicaceae (19%)	Ranunculaceae, <i>Vitis</i>	BIFLORAL (Fabaceae, Brassicaceae)
P3	5	14	-	-	Brassicaceae (45%), <i>Salix</i> (35%)	Rosaceae, <i>Vitis</i>	BIFLORAL (Brassicaceae, <i>Salix</i>)
P4	8	15	-	Fabaceae (72%)	-	Brassicaceae, <i>Sophora</i>	MONOFLORAL (Fabaceae)
P5	9	15	-	Fabaceae (50%)	-	Brassicaceae, Rosaceae, <i>Salix</i> , <i>Vitis</i>	MONOFLORAL (Fabaceae)
P6	10	12	-	Apiaceae (69%)	-	-	MONOFLORAL (Apiaceae)
P7	11	18	-	-	Brassicaceae (31%), Fabaceae (18%), Moraceae (18%)	Lamiaceae, <i>Salix</i> , <i>Tilia</i>	POLYFLORAL
P8	12	12	-	Brassicaceae (76%)	-	<i>Salix</i> , Rosaceae, <i>Sambucus</i> , Apiaceae	MONOFLORAL (Brassicaceae)
P9	13	15	-	Brassicaceae (53%)	-	Apiaceae, Asteraceae, Fabaceae, Ranunculaceae	MONOFLORAL (Brassicaceae)
P10	14	13	-	Fabaceae (81%)	-	Brassicaceae	MONOFLORAL (Fabaceae)
P11	15	22	-	-	Rosaceae (42%), Fabaceae (23%)	Asteraceae, <i>Plantago</i>	BIFLORAL (Rosaceae, Fabaceae)
P12	16	10	-	-	<i>Plantago</i> (35%), Fabaceae (19%), <i>Ambrosia</i> (19%), Asteraceae (18%)	<i>Zea mays</i>	POLYFLORAL
P13	17	18	-	-	Brassicaceae (34%), Fabaceae (28%)	<i>Helianthus</i> , Ranunculaceae, <i>Tilia</i>	BIFLORAL (Brassicaceae, Fabaceae)
P14	18	17	-	-	Asteraceae (31%), <i>Ambrosia</i> (18%)	Asteraceae, Apiaceae, <i>Artemisia</i> , <i>Helianthus</i> , Brassicaceae, Chenopodiaceae, Ranunculaceae,	POLYFLORAL
P15	19	23	-	-	Asteraceae (18%)	Rust spores, Asteraceae, <i>Helianthus</i> , <i>Carduus</i> , Brassicaceae, Fabaceae, <i>Plantago</i> , Poaceae, <i>Zea mays</i> , Ranunculaceae, Rosaceae,	POLYFLORAL
P16	20	22	-	-	Fabaceae (34%), Brassicaceae (25%)	<i>Artemisia</i> , <i>Ambrosia</i> , Ranunculaceae, <i>Vitis</i>	BIFLORAL (Fabaceae, Brassicaceae)
P17 ¹	-	17	-	-	Ranunculaceae (33%), Apiaceae (28%)	-	BIFLORAL (Ranunculaceae,

P18	21	18	-	Ranunculaceae (76%)	-	Asteraceae, <i>Artemisia</i> , <i>Helianthus</i>	Apiaceae) MONOFLORAL (Ranunculaceae)
P19	22	17	-	Fabaceae (57%)	-	Brassicaceae, <i>Ambrosia</i> , <i>Helianthus</i> , <i>Vitis</i>	MONOFLORAL (Fabaceae)
P20	23	7	-	-	<i>Sophora</i> (42%)	Asteraceae, Cannabaceae, Brassicaceae	MONOFLORAL (<i>Sophora</i>)
P21	24	18	-	Fabaceae (78%)	-	Brassicaceae	MONOFLORAL (Fabaceae)
P22	25	12	-	<i>Sophora</i> (46%)	<i>Helianthus</i> (21%)	Asteraceae, Chenopodiaceae, <i>Zea mays</i> , Ranunculaceae	BIFLORAL (<i>Sophora</i> , <i>Helianthus</i>)
P23	26	19	-	-	Ranunculaceae (24%), <i>Robinia</i> (22%)	Asteraceae, <i>Artemisia</i> , <i>Ambrosia</i> , Chenopodiaceae, Brassicaceae, <i>Cornus</i>	POLYFLORAL
P24¹	-	14	-	-	Apiaceae (38%), Chenopodiaceae (20%)	Asteraceae, <i>Artemisia</i> , Brassicaceae, Moraceae, Poaceae, <i>Zea mays</i> , unidentified-large reticulate	BIFLORAL (Apiaceae, Chenopodiaceae)

¹Samples **P17** and **P24** were not analysed in Kostić *et al.*, 2015 [16].

Table S2. Presence of each identified glycoside in bee-pollen samples.

Peak No.	Flavonol Glycosides	Bee-pollen samples																							
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
1	Quercetin 3,7-di- <i>O</i> -hexoside	-	-	-	-	-	+	-	-	-	+	-	+	-	-	+	-	-	+	+	+	+	+	-	+
2	Quercetin 3- <i>O</i> -(6"- <i>O</i> -rhamnosyl)hexoside-7- <i>O</i> -hexoside	+	+	-	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	Quercetin 3- <i>O</i> -(2"- <i>O</i> -hexosyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	Kaempferol 3- <i>O</i> -(6"- <i>O</i> -malonyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	Kaempferol 3,7-di- <i>O</i> -hexoside	+	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	+	-	+	-	-	-	+	-
6	Isorhamnetin 3- <i>O</i> -(6"- <i>O</i> -rhamnosyl)hexoside-7- <i>O</i> -hexoside	-	+	+	+	-	+	+	-	-	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+
7	Isorhamnetin 3,7-di- <i>O</i> -hexoside	-	-	-	-	-	+	-	-	+	+	+	+	-	+	+	-	-	+	+	+	+	+	+	+
8	Quercetin 3- <i>O</i> -(2"- <i>O</i> -hexosyl)hexoside-7- <i>O</i> -rhamnoside	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	+	+	+	+	-	+	+	+	+
9	Quercetin 3- <i>O</i> -(2"- <i>O</i> -pentosyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10	Isorhamnetin 3- <i>O</i> -(2"- <i>O</i> -hexosyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	-	+	-	+	-
11	Quercetin 3- <i>O</i> -(2"- <i>O</i> -rhamnosyl)hexoside	-	+	+	+	+	+	-	-	+	+	+	+	-	-	-	-	+	+	+	+	+	+	+	+
12	Kaempferol 3- <i>O</i> -(2"- <i>O</i> -hexosyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	-	+	-	+	+	+	+
13	Kaempferol 3- <i>O</i> -(2"- <i>O</i> -hexosyl)hexoside-7- <i>O</i> -rhamnoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	-	+	-	-	-	-	+
14	Isorhamnetin 3- <i>O</i> -(2"- <i>O</i> -rhamnosyl)hexoside isomer 1	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	-
15	Quercetin 3- <i>O</i> -(6"- <i>O</i> -rhamnosyl)hexoside	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-
16	Isorhamnetin 3- <i>O</i> -(2"- <i>O</i> -pentosyl)hexoside	-	-	-	-	-	+	-	-	-	-	+	+	-	-	+	+	-	+	+	+	-	-	+	+
17	Kaempferol 3- <i>O</i> -(2"- <i>O</i> -rhamnosyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
18	Kaempferol 3- <i>O</i> -(2"- <i>O</i> -pentosyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	+	+
19	Isorhamnetin 3- <i>O</i> -(2"- <i>O</i> -rhamnosyl)hexoside isomer 2	-	+	+	+	+	+	-	+	+	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+
20	Quercetin 3- <i>O</i> -hexoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
21	Isorhamnetin 3- <i>O</i> -(6"- <i>O</i> -pentosyl)hexoside	-	-	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
22	Quercetin 3- <i>O</i> -(6"- <i>O</i> -malonyl)hexoside	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
23	Isorhamnetin 3- <i>O</i> -(6"- <i>O</i> -rhamnosyl)hexoside	-	-	-	-	-	+	+	-	-	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+
24	Isorhamnetin 3- <i>O</i> -hexoside isomer 1	+	+	+	+	+	-	+	+	+	+	+	-	+	-	-	+	-	-	-	-	+	-	-	-
25	Kaempferol 3- <i>O</i> -hexoside	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+
26	Isorhamnetin 3- <i>O</i> -hexoside isomer 2	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+
27	Isorhamnetin 3- <i>O</i> -(6"- <i>O</i> -malonyl)hexoside	+	+	+	+	+	+	+	+	+	+	+	-	+	-	-	+	+	-	-	-	-	-	-	-

+ stands for detected: - stands for not detected.

Table S3. Total phenolic content (TPC) of the bee-pollen samples.

Sample No	TPC mg GAE/g
P1	15.504 ± 0.146
P2	10.925 ± 0.136
P3	13.607 ± 0.111
P4	8.303 ± 0.059
P5	5.600 ± 0.351
P6	13.563 ± 0.176
P7	23.004 ± 0.351
P8	17.983 ± 0.381
P9	16.572 ± 0.117
P10	8.581 ± 0.088
P11	11.819 ± 0.171
P12	9.607 ± 0.029
P13	12.146 ± 0.039
P14	10.990 ± 0.069
P15	30.244 ± 0.049
P16	11.928 ± 0.098
P17	14.286 ± 0.293
P18	11.872 ± 0.078
P19	13.132 ± 0.234
P20	6.542 ± 0.293
P21	11.402 ± 0.084
P22	5.696 ± 0.107
P23	13.004 ± 0.224
P24	17.793 ± 0.127

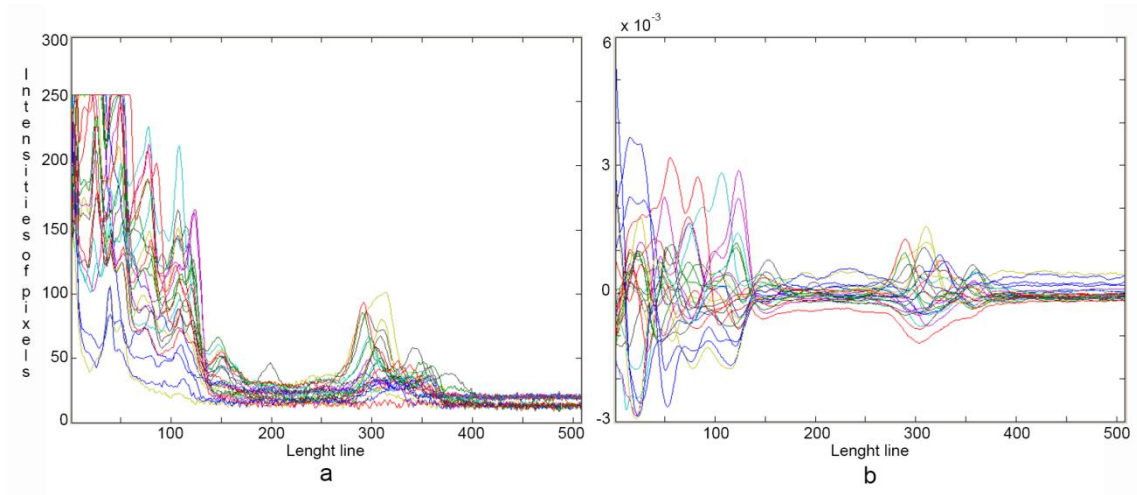


Figure S1. Raw data (a) versus preprocessed data (b) of HPTLC profiles.

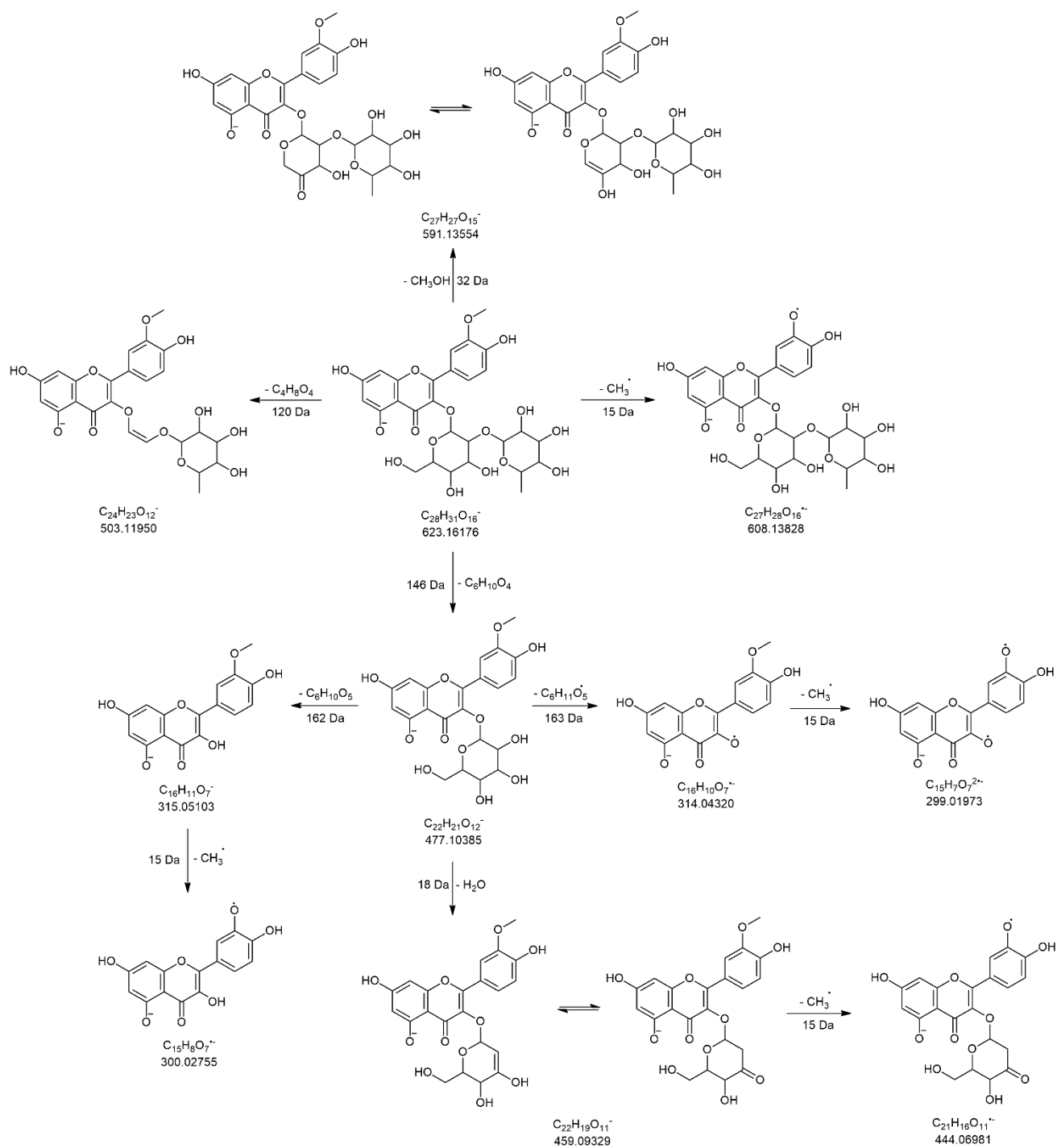


Figure S2. Proposed fragmentation pathway of compounds 14 and 19 (m/z 623).