SUPPLEMENTARY MATERIAL

State of the Art of Anthocyanins: Antioxidant Activity, Sources, Bioavailability and Therapeutic Effect in Human Health

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Table S1. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify delphinidin and its derivatives identified with codes.

	Delphinidin and its derivatives							Extraction, identification, quantification and antioxidant activity	References
Code	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Raspberry (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	3.5	4.6	4.7	-	-	-		
Blackberry (mg/g)	-	-	-	-	-	-	-		
Blueberry (mg/g)	-	0.7	1.4	0.1	-	-	-		
Blueberry Wild (mg/100 g FW)	-	57.4 - 85.2	65.3 - 124.7	78.9 - 133.9	-	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	12.5 - 46.2	ND - 60.3	21.7 - 60.6	-	-	-		
Cranberry (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	1.4	8.6	0.4	-	-	-		
Mulberry (mg/g)	-	-	-	-.	-	-	-		
Blackcurrant (mg/g)	-	-	-	2.9	-	9.8	-		
Blackcurrant Commercial (%)	-	-	-	11.8 - 15.1	-	31.7 - 35.7	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	-	-	-	-		
Pomegranate juice (mg/L)	-	-	-	138.2 - 147.4	85.5 - 93.0	-	-	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	ND - <LOQ	-	<LOQ - 0.2	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	-	-	-	-	-		
Red Chicory (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-	-	-	8.7		
Red onion (mg/100 g DW)	ND	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	11.5 ± 0.8	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]

Purple potato (mg/100 g DW)	0.3 - 0.6	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	ND	-	-	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	ND - 0.3	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	ND	-	-	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	ND	-	-	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	ND	-	-	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	ND	-	-	-	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	210.9- 211.0	-	-	-		
Mini rose, dark red (µg/g)	-	-	-	ND	-	-	-		
Clitoria, blue (µg/g)	-	-	-	ND	-	-	-		
Mini daisy, white (µg/g)	-	-	-	11.1 - 11.2	-	-	-		
Tagete, orange (µg/g)	-	-	-	ND	-	-	-		
Cosmos, yellow (µg/g)	-	-	-	0.3	-	-	-		
Cravine, red wine (µg/g)	-	-	-	ND	-	-	-		

Note: ND, not detected; 1, Delphinidin; 2, Delphinidin 3-arabinoside; 3, Delphinidin 3-galactoside; 4, Delphinidin 3-glucoside; 5, Delphinidin 3,5-diglucoside; 6 Delphinidin 3-rutinoside; 7, Delphinidin 3-O-(6"-p-coumaroyl-glucoside)

Table S2. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify cyanidin and its derivatives identified with codes. Continue….

	Cyanidin and its derivatives part 1							Extraction, identification, quantification and antioxidant activity	References
Code	**8**	**9**	**10**	**11**	**12**	**13**	**14**		
Raspberry (mg/g)	-	-	-	1	-	0.3	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	2.5	3.7	4.1	-		-		
Blackberry (mg/g)	-	0.1	-	7.2	-	0.1	-		
Blueberry (mg/g)	-	0.1	0.3	0.1	-	-	-		
Blueberry Wild (mg/100 g FW)	-	-	33.7 - 101.8	37.2 - 107.5	-	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	-	ND - 11.8	0.1 - 3.7	-	-	-		
Cranberry (mg/g)	-	0.6	3.9	0.3	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	2.3	8	0.6	-	-	-		
Mulberry (mg/g)	-	-	-	9.6	-	4.2	-		
Blackcurrant (mg/g)	-	-	-	1.1	-	7.1	-		
Blackcurrant Commercial (%)	-	-	-	6.8 - 10.6		41.1-47.1	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	-	-	-	0.4	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	0.1	-	-	-		
Pomegranate juice (mg/L)	-	-	-	219.2 - 239.2	168.0 - 178.8	-	-	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	-	<LOQ - 0.1	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	-	ND - 40.1	-	ND - 0.7	-		
Red Chicory (mg/100 g FW)	-	-.	-	30.9	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	4.4	-	-	-		
Red onion (mg/100 g DW)	3.0 - 5.9	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]

Eggplant Black Beauty (mg/100 g DW)	ND	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	0.1 - 0.2	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	0.5 - 0.6	-	-	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	13.1 - 18.6	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	52.1 ± 64.1	-	-	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	61.5 - 65.9	-	-	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	8.0 -8.2	-	-	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	ND	ND	-	-	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	ND	ND	-	-		
Mini rose, dark red (µg/g)	-	-	-	ND	ND	-	-		
Clitoria, blue (µg/g)	-	-	-	4.7 -4.8	3.2 -3.3	-	-		
Mini daisy, white (µg/g)	-	-	-	ND	ND	-	-		
Tagete, orange (µg/g)	-	-	-	ND	ND	-	-		
Cosmos, yellow (µg/g)	-	-	-	ND	ND	-	-		
Cravine, red wine (µg/g)	-	-	-	17.3- 17.5	ND	-	-		

Note: ND, not detected; 8, Cyanidin; 9, Cyanidin 3-arabidoside; 10, Cyanidin 3-galactoside; 11, Cyanidin 3-glucoside; 12, Cyanidin 3,5-diglucoside; 13, Cyanidin 3-rutinoside; 14, Cyanidin 3-(6'-malonylglucoside).

Table S2. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify cyanidin and its derivatives identified with codes.

	Cyanidin and its derivatives part 2														Extraction, identification, quantification and antioxidant activity	References
Code	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**		
Raspberry (mg/g)	-	-	-	-	-	6.3	1.2	-	0.5	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Blackberry (mg/g)	-	0.5	-	2.1	-	-	-	-	-	-	-	-	-	-		
Blueberry (mg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Blueberry Wild (mg/100 g FW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cranberry (mg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mulberry (mg/g)	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-		
Blackcurrant (mg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Blackcurrant Commercial (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	1.8	-	-	-	-	0.3	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Pomegranate juice (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	ND - 9.1	-	-	-	-	-	-	-	-	-	-	-	-	-		
Red Chicory (mg/100 g FW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Red onion (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]

Eggplant (mg/100 g FW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	-	-	-	-	-	-	-	1.0	0.4	2.4	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	-	-	-	-	-	-	-	21.2	0.7	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mini rose, dark red (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Clitoria, blue (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mini daisy, white (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Tagete, orange (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cosmos, yellow (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cravine, red wine (µg/g)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Note: ND, not detected; 15, Cyanidin 3-(3",6"-dimalonylglucoside); 16, Cyanidin 3-xyloside; 17, Cyanidin 3-xylosylrutinoside; 18, Cyanidin 3-dioxaloylglucoside; 19, Cyanidin 3-halavtoside; 20, Cyanidin 3-O-sophoroside; 21, Cyanidin 3-sophoroside-5-rhamnoside; 22, Cyanidin 3-sambubioside; 23, Cyanidin 3-sambubioside-5-rhamnoside; 24, Cyanidin-3-p-hydroxybenzoylsophoroside-5-glucoside; 25, Cyanidin-3-caffeoylsophoroside-5-glucoside; 26, Cyanidin-3-caffeoyl-p-hydroxybenzoylsophoroside-5-glucoside; 27, Cyanidin 3-(p-coumaroyl)-diglucoside-5-glucoside; 28, Cyanidin 3-(p-coumaroyl)-diglucoside-5-glucoside.

Table S3. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify petunidin and its derivatives identified with codes.

	Petunidin and its derivatives							
Code	**29**	**30**	**31**	**32**	**33**	**34**	**Extraction, identification, quantification and antioxidant activity**	**References**
Raspberry (mg/g)	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	0.8	-	2.9	1.5	-		
Blackberry (mg/g)	-	-	-	-	-	-		
Blueberry (mg/g)		0.5	1.1	0.1				
Blueberry Wild (mg/100 g FW)	-	8.4 - 14.7	16.6 - 33.2	77.4 - 165.3	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	ND - 14.6	ND - 26.0	7.3 - 27.6	-	-		
Cranberry (mg/g)	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	0.5	3.8	0.2	-	-		
Mulberry (mg/g)	-	-	-	-	-	-		
Blackcurrant (mg/g)	-	-	-	-	-	0.18		
Blackcurrant Commercial (%)	-	-	-	-	-	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	-	-	-		
Pomegranate juice (mg/L)	-	-	-	-	-	-	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	-	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	-	-	-	-		

Red Chicory (mg/100 g FW)	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-	-	-		
Red onion (mg/100 g DW)	ND	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	0.5 - 0.6	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	13.1 - 31.0	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	-	-	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	ND - 0.3	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	ND	-	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	ND	-	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	ND	-	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	ND	-	-	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	ND	-	-		
Mini rose, dark red (µg/g)	-	-	-	ND	-	-		
Clitoria, blue (µg/g)	-	-	-	27.5 - 27-6	-	-		
Mini daisy, white (µg/g)	-	-	-	ND	-	-		
Tagete, orange (µg/g)	-	-	-	ND	-	-		
Cosmos, yellow (µg/g)	-	-	-	ND	-	-		
Cravine, red wine (µg/g)	-	-	-	ND	-	-		

Note: ND, not detected; 29, Petunidin; 30, Petunidin 3-arabinoside; 31, Petunidin 3-galactoside; 32, Petunidin 3-glucoside; 33, Petunidin 3-halactoside; 34, Petunidin 3-rutinoside.

Table S4. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify peonidin and its derivatives identified with codes. Continue….

	Peonidin and derivatives part 1							Extraction, identification, quantification and antioxidant activity	References
Code	**35**	**36**	**37**	**38**	**39**	**40**	**41**		
Raspberry (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	0.5	-	-	-	-	3.5		
Blackberry (mg/g)	-	-	-	-	-	-	-		
Blueberry (mg/g)	-	0.2	-	-	-	-	3.7		
Blueberry Wild (mg/100 g FW)	-	ND - 10.0	26.9 - 120.8	-	-	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	ND - 137.8	11.2 - 61.9	-	-	-	-		
Cranberry (mg/g)	-	-	0.1	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	-	-	-	-	-	-		
Mulberry (mg/g)	-	-	-	-	-	-	-		
Blackcurrant (mg/g)	-	-	-	-	-	-	-		
Blackcurrant Commercial (%)	-	-	-	-	-	-	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	-	-	-	-		

Pomegranate juice (mg/L)	-	-	-	-	-	-	-	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	-	-	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	0.1- 34.0	ND - 0.7	ND - 26.1	ND - 5.9	-		
Red Chicory (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-	-	-	-		
Red onion (mg/100 g DW)	ND	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	ND	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	0.5	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	0.3 - 0.9	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	1.3 - 2.5	-	-	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	0.3 - 0.5	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	0.6 - 0.7	-	-	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	ND	-	-	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	ND	-	-	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	-	-	-	-	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	-	-	-	-		
Mini rose, dark red (µg/g)	-	-	-	-	-	-	-		
Clitoria, blue (µg/g)	-	-	-	-	-	-	-		
Mini daisy, white (µg/g)	-	-	-	-	-	-	-		
Tagete, orange (µg/g)	-	-	-	-	-	-	-		
Cosmos, yellow (µg/g)	-	-	-	-	-	-	-		
Cravine, red wine (µg/g)	-	-	-	-	-	-	-		

Note: ND, not detected; 35, Peonidin; 36, Peonidin 3-galactoside; 37, Peonidin 3-glucoside; 38 Peonidin 3-rutinoside; 39, Peonidin 3-(6'-malonylglucoside); 40, Peonidin 3-(3",6"-dimalonylglucoside); 41, Peonidin 3-glucoside/malvidin 3-galactoside.

Table S4. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify peonidin and its derivatives identified with codes.

	Peonidin and derivatives part 2							Extraction, identification, quantification and antioxidant activity	References
Code	**42**	**43**	**44**	**45**	**46**	**47**	**48**		
Raspberry (mg/g)		-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	3.6	-	-	-	-	-	-		
Blackberry (mg/g)		-	-	-	-	-	-		
Blueberry (mg/g)	0.4	-	-	-	-	-	-		
Blueberry Wild (mg/100 g FW)	-	-	-	-	-	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	-	-	-	-	-	-		
Cranberry (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	1.6	-	-	-	-	-	-		
Mulberry (mg/g)	-	-	-	-	-	-	-		
Blackcurrant (mg/g)	-	-	-	-	-	-	-		
Blackcurrant Commercial (%)	-	-	-	-	-	-	-	Fresh berries extracted with 95%	[50]

								(v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	
Redcurrant (mg/g)	-	-	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	-	-	-	-		
Pomegranate juice (mg/L)	-	-	-	-	-	-	-	Juice clarify 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	-	-	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	-	-	-	-	-		
Red Chicory (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-	-	-	-		
Red onion (mg/100 g DW)	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	0.8	3.4	3.9	10.2	15.2	4.5	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	-	-	-	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	-	-	-	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	-	-	-	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	-	-	-	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	-	-	-	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	-	-	-	-	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	-	-	-	-		
Mini rose, dark red (µg/g)	-	-	-	-	-	-	-		
Clitoria, blue (µg/g)	-	-	-	-	-	-	-		
Mini daisy, white (µg/g)	-	-	-	-	-	-	-		
Tagete, orange (µg/g)	-	-	-	-	-	-	-		
Cosmos, yellow (µg/g)	-	-	-	-	-	-	-		
Cravine, red wine (µg/g)	-	-	-	-	-	-	-		

Note: ND, not detected; 42, Peonidin 3-arabinoside/malvidin 3-glucoside; 43, Peonidin 3-O-sophoroside-5-O-glucoside; 44, Peonidin 3-p-hydroxybenzoylsophoroside-5-glucoside; 45, Peonidin 3-caffeoylsophoroside-5-glucoside; 46, Peonidin 3-dicaffeoylsophoroside-5-glucoside; 47, Peonidin 3-caffeoyl-p-hydroxybenzoylsophoroside-5-glucoside; 48, Peonidin 3-caffeoy-feruloylsophoroside-5-glucoside.

Table S5. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify malvidin and its derivatives identified with codes.

	Malvidin and its derivatives					**Extraction, identification, quantification and antioxidant activity**	**References**
Code	**49**	**50**	**51**	**52**	**53**		
Raspberry (mg/g)	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	0.8	-	-	-		
Blackberry (mg/g)	-	-	-	-	-		
Blueberry (mg/g)	-	-	-	-	-		
Blueberry Wild (mg/100 g FW)	-	-	34.7 - 131.5	4.9 - 20.7	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	-	25.1- 76.5	ND - 37.2	-		

Cranberry (mg/g)	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	1.4	-	-	-		
Mulberry (mg/g)	-	-	-	-	-		
Blackcurrant (mg/g)	-	-	-	-	-		
Blackcurrant Commercial (%)	-	-	-	-	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	-	-	-	-		
Pomegranate juice (mg/L)	-	-	-	-	-	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	-	-	-		
Red Chicory (mg/100 g FW)	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-	-		
Red onion (mg/100 g DW)	0.1 - 0.4	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	ND	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	2.7 - 4.9	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	ND	-	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	0.8 - 3.5	-	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	8.2 - 8.3	-	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	6.8 - 7.0	-	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	ND	-	-	-	-		
Begonia, light red (µg/g)	-	-	-	ND	759.0 - 759.1	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	-	-	ND	ND		
Mini rose, dark red (µg/g)	-	-	-	ND	ND		
Clitoria, blue (µg/g)	-	-	-	ND	16.5 -16.6		
Mini daisy, white (µg/g)	-	-	-	ND	ND		
Tagete, orange (µg/g)	-	-	-	ND	ND		
Cosmos, yellow (µg/g)	-	-	-	3.0 - 3.1	ND		
Cravine, red wine (µg/g)	-	-	-	2274.3 - 2274.4	ND		

Note: ND, not detected; 49, Malvidin; 50, Malvidin 3-arabinoside; 51, Malvidin 3-galactoside; 52, Malvidin 3-glucoside; 53, Malvidin 3,5-diglucoside

Table S6. Natural source, type of extraction, chromatographic method and antioxidant assay applied to identify and quantify pelargonidin and its derivatives identified with codes.

	Pelargonidin and its derivatives				Extraction, identification, quantification and antioxidant activity	References
Code	**54**	**55**	**56**	**57**		
Raspberry (mg/g)	-	0.7	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Bilberry (mg/g)	-	-	-	-		
Blackberry (mg/g)	-	-	-	-		
Blueberry (mg/g)	-	-	-	-		

Blueberry Wild (mg/100 g FW)	-	-	-	-	Ground fruit (85:15 v/v, MeOH:HCl) RP-HPLC-DAD. DPPH, ABTS, FRAP,ORAC.	[47]
Blueberry monocultivar (mg/100 g FW)	-	-	-	-		
Cranberry (mg/g)	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Crowberry (mg/g)	-	-	-	-		
Mulberry (mg/g)	-	1.7	0.54	-		
Blackcurrant (mg/g)	-	-	-	-		
Blackcurrant Commercial (%)	-	-	-	-	Fresh berries extracted with 95% (v/v) ethanol acidified with 0.1N HCl. HPLC–UV–MS	[50]
Redcurrant (mg/g)	-	-	-	-	Freeze dried fruit, 80% MeOH 0.5% AcOH. HPLC-ESI-MS/MS; HPLC-DAD. DPPH, ABTS, FRAP.	[63]
Strawberry (mg/g)	-	5.1	-	-		
Pomegranate juice (mg/L)	-	10.2 - 11.0	-	10.7- 12.0	Juice clarified 5 mL 15% gelatine HPLC, TEAC	[46]
Green rye grains (mg/Kg DW)	-	-	-	-	Dried and ground grain 70% EtOH and 1% (w/v) citric acid, purification, HPLC-ESI-MS	[64]
Violet rye grains (mg/Kg DW)	-	-	-	-		
Red Chicory (mg/100 g FW)	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Red Onion (mg/100 g FW)	-	-	-	-		
Red onion (mg/100 g DW)	ND	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Eggplant (mg/100 g FW)	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Eggplant Black Beauty (mg/100 g DW)	ND	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Purple sweet potato (mg/100 g FW)	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple potato (mg/100 g DW)	ND	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red potato (mg/100 g DW)	16.0 - 32.7	-	-	-		
Black carrot (mg/100 g FW)	-	-	-	-	Ground sample MeOH and 0.03% HCl) HPLC-PDA/-ESI+-MS. ABTS, CRUPAC, DPPH	[42]
Purple carrot (mg/100 g DW)	0.4 - 0.6	-	-	-	Freeze powder sample MeOH 0.1% HCl, UPLC, LC–DAD–ESI–MS. DPPH, FRAP, ORAC	[39]
Red cabbage Gario (mg/100 g DW)	ND	-	-	-		
Purple cauliflower Graffitti (mg/100 g DW)	ND	-	-	-		
Purple asparagus Albenga (mg/100 g DW)	ND	-	-	-		
Begonia, light red (µg/g)	-	ND	-	ND	Maceration of flower (1:10) (80% MeOH, 19% H_2O and 1% HCl, v/v/v). HPLC-DAD DPPH, FRAP, ORAC	[65]
Torenia, purple (µg/g)	-	ND	-	ND		
Mini rose, dark red (µg/g)	-	ND	-	1631.0 - 1631.2		
Clitoria, blue (µg/g)	-	ND	-	ND		
Mini daisy, white (µg/g)	-	ND	-	ND		
Tagete, orange (µg/g)	-	3.7-3.8	-	ND		
Cosmos, yellow (µg/g)	-	ND	-	ND		
Cravine, red wine (µg/g)	-	ND	-	ND		

Note: ND, not detected; 54, Pelargonidin; 55, Pelargonidin 3-glucoside; 56, Pelargonidin 3-rutinoside; 57, Pelargonidin 3,5-diglucoside.

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