

**Supplementary Table 3. Contents of anthocyanidins, flavonoids and procyanidin in tyrosine or water treatment as determined by ESI-HPLC-MS/MS system**

Index	Compounds	Class	Tyr-1	Tyr-2	Tyr-3	CK-1	CK-2	CK-3
Cya-3-O-rut	Cyanidin-3-O-rutinoside	Cyanidin	9.60	3.57	2.12	4.38	0.40	0.50
Fla_quercetin-glu	Quercetin-3-O-glucoside	flavonoid	2522.63*	2644.61*	2691.16*	2148.13*	2644.32*	2676.91*
Fla_rutin	Rutin	flavonoid	8748.77*	7586.58*	9248.44*	8439.77*	8968.82*	8498.86*
Mal-3-O-glu	Malvidin-3-O-glucoside	Malvidin	0.03	0.02	0.01*	0.02*	0.02	0.00*
Pel-3-O-gal	Pelargonidin-3-O-galactoside	Pelargonidin	0.15	0.18	0.17	0.15	0.17	0.16
Pel-3-O-glu	Pelargonidin-3-O-glucoside	Pelargonidin	0.00*	0.01*	0.01*	0.01*	0.01*	0.01*
Pet-3-O-glu	Petunidin-3-O-glucoside	Petunidin	0.10	0.08	0.06*	0.10	0.07	0.07
Del-3-O-glu	Delphinidin-3-O-glucoside	Delphinidin	4.52	6.52	5.56	4.06	4.57	4.87
Del-3-rut-5-glu	Delphinidin-3-rutinoside-5-glucoside	Delphinidin	1.51	2.55	4.40	2.35	2.30	2.64
Fla_afzelin	Afzelin	flavonoid	0.29*	0.48*	0.41*	0.25*	0.19*	0.29*
Fla_kaempferol-3-O-rut	Kaempferol-3-O-rutinoside	flavonoid	783.72*	584.55*	484.36*	1016.88*	798.76*	777.83*
Fla_naringenin	Naringenin	flavonoid	0.06	0.13	0.10	0.09	0.16	0.16
Fla_naringenin-7-O-glu	Naringenin-7-O-glucoside	flavonoid	3.28	8.13	7.11	2.89	4.25	3.73
Peo-3-O-ara	Peonidin-3-O-arabinoside	Peonidin	0.015*	0.01*	0.01*	0.02*	0.01*	0.01*
Peo-3-O-rut	Peonidin-3-O-rutinoside	Peonidin	0.46	0.18	0.12	0.36	0.10	0.10
Pet-3-O-(coumaryl)-glu	Petunidin-3-O-(coumaryl)-glucoside	Petunidin	7.65	4.69	3.43	6.03	5.63	5.26
Pet-3-O-gal	Petunidin-3-O-galactoside	Petunidin	0.16*	0.16*	0.17*	0.161*	0.15*	0.15*

Cya-3-O-glu	Cyanidin-3-O-glucoside	Cyanidin	0.69	0.26	0.17*	0.08*	N/A	N/A
Cya-3,5-O-diglu	Cyanidin-3,5-O-diglucoside	Cyanidin	0.54	0.40	0.33	N/A	N/A	N/A
Cya-3-O-(coum aryl)-glu	Cyanidin-3-O-(coumaryl)-glucoside	Cyanidin	0.17	0.12*	0.11*	0.14*	N/A	N/A
Peo-3,5-O-diglu	Peonidin-3,5-O-diglucoside	Peonidin	0.02*	0.01*	0.01*	N/A	N/A	N/A
Del-3-O-rha	Delphinidin-3-O-rhamnoside	Delphinidin	0.11*	0.09*	0.09*	N/A	N/A	N/A
Del-3-O-rut	Delphinidin-3-O-rutinoside	Delphinidin	0.59	0.53	0.47	N/A	N/A	N/A
Cya-3-O-sop	Cyanidin-3-O-sophoroside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Fla_chalcone	Chalcone	flavonoid	N/A	N/A	N/A	N/A	N/A	N/A
Fla_dihydromyri cetin	Dihydromyricetin	flavonoid	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-ara	Malvidin-3-O-arabinoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-gal	Malvidin-3-O-galactoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel-3,5-O-diglu	Pelnidin-3,5-O-diglucoside	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-O-gal	Peonidin-3-O-galactoside	Peonidin	N/A	0.16	0.15	N/A	N/A	N/A
Pet-3-O-rut	Petunidin-3-O-rutinoside	Petunidin	0.15	0.12*	0.11*	N/A	N/A	N/A
Cya-3-O-(6-O- malonyl)-glu	Cyanidin-3-O-(6-O-malonyl-beta-D -glucoside)	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-ara	Cyanidin-3-O-arabinoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-gal	Cyanidin-3-O-galactoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-sam	Cyanidin-3-O-sambubioside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-xyl	Cyanidin-3-O-xyloside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-sam-5-gl u	Cyanidin-3-O-sambubioside-5-O-gl ucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3,5-O-diglu	Delphinidin-3,5-O-diglucoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-gal	Delphinidin-3-O-galactoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A

Del-3-O-sam	Delphinidin-3-O-sambubioside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-sam-5-glu	Delphinidin-3-O-sambubioside-5-O-glucoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Fla_dihydrokaempferol	Dihydrokaempferol	flavonoid	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3,5-O-diglu	Malvidin-3,5-O-diglucoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel-3-(6-p-coumaroyl)-glu	Pelargonidin-3-O-(coumaryl)-glucoside	Pelargonidin	N/A	0.14	0.10	N/A	N/A	N/A
Peo-3-O-glu	Peonidin-3-O-glucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Procyanidin A1	Procyanidin A1	Procyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Procyanidin A2	Procyanidin A2	Procyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Procyanidin B1	Procyanidin B1	Procyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Procyanidin B2	Procyanidin B2	Procyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Procyanidin B3	Procyanidin B3	Procyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-(6-caf)-glu	Cyanidin-3-(6-caffeoyl)-glucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-(6-caf-sop)-5-glu	Cyanidin-3-(6-caffeoylsophoroside)-5-glucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-fer-sop-5-glu	Cyanidin-3-O-feruloylsophoroside-5-glucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-triglu	Cyanidin-3,5,3'-O-triglucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel-3-(6-caf-sop)-5-glu	Pelargonidin-3-(6-caffeoylsophoroside)-5-glucoside	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel-3-O-[6-O-fer-2-O-glucosyl-glu]-5-O-glu	Pelargonidin-3-O-[6-O-feruloyl-2-O-glucosyl-glucoside]-5-O-glucoside	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A

Pel-3-O-sop	Pelargonidin-3-O-sophoroside	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel-triglu	Pelargonidin-3,5,3'-O-triglucoside	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-(caf-gluco syl-glu)-5-glu	Peonidin-3-(caffeoyl-glucosyl-gluco side)-5-glucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-O-(6-O-p- coumaryl)-glu	Peonidin-3-O-(6-O-p-coumaryl)-glu coside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-O-P-hydr oxybenzoylsop- 5-glu	Peonidin-3-O-P-hydroxybenzoylsop -5-glucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-O-caf-fer- sop-5-glu	Peonidin-3-O-caffeoyl-feruloyl-sop horoside-5-glucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-O-fer-sop -5-glu	Peonidin-3-O-ferulylsophoroside-5- glucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-sam-5-glu	Peonidin-3-O-sambubioside-5-O-gl ucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-triglu	Peonidin-3,5,3'-O-triglucoside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-5-O-(6 -O-coumaryl)-di glu	Cyanidin-3-O-5-O-(6-O-coumaryl)- diglucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Cya-3-O-rut-5- O-glu	Cyanidin-3-rutinoside-5-glucoside	Cyanidin	N/A	N/A	N/A	N/A	N/A	N/A
Del	Delphinidin	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-(6-O-ac etyl)-glu	Delphinidin-3-O-(6-O-acetyl)-gluco side	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-(6-O-m alonyl)-glu	Delphinidin-3-O-(6-O-malonyl-beta -D-glucoside)	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A

Del-3-O-(6-O-malonyl)-glu-glu	Delphinidin-3-O-(6-O-malonyl)-glucoside-3'-glucoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-(coumaryl)-glu	Delphinidin-3-O-(coumaryl)-glucoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-5-O-(6-O-coumaryl)-diglu	Delphinidin-3-O-5-O-(6-O-coumaryl)-diglucoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-ara	Delphinidin-3-O-arabinoside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Del-3-O-sop	Delphinidin-3-O-sophoroside	Delphinidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal	Malvidin	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-(6-O-malonyl)-glu	Malvidin-3-O-(6-O-malonyl-beta-D-glucoside)	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-(coumaryl)-glu	Malvidin-3-O-(coumaryl)-glucoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-5-O-(6-O-coumaroyl)-diglu	Malvidin-3-O-5-O-(6-O-coumaroyl)-diglucoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-acetylglu-5-glu	Malvidin-3-O-(6"-acetylglu)-5-glucoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-rut	Malvidin-3-O-rutinoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-sam	Malvidin-3-O-sambubioside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-O-sop	Malvidin-3-O-sophoroside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Mal-3-sam-5-glu	Malvidin-3-O-sambubioside-5-O-glucoside	Malvidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel	Pelnidin	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A
Pel-3-O-(6-O-malonyl)-bet	Pelargonidin-3-O-(6-O-malonyl-beta-D-glucoside)	Pelargonidin	N/A	N/A	N/A	N/A	N/A	N/A



Peo-3-O-sam	Peonidin-3-O-sambubioside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Peo-3-O-sop	Peonidin-3-O-sophoroside	Peonidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3,5-O-diglu	Petunidin-3,5-O-diglucoside	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3-O-(6-O-malonyl)-glu	Petunidin-3-O-(6-O-malonyl-beta-D-glucoside)	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3-O-5-O-(6-O-coumaryl)-diglu	Petunidin-3-O-5-O-(6-O-coumaryl)-diglucoside	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3-O-ara	Petunidin-3-O-arabinoside	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3-O-sam	Petunidin-3-O-sambubioside	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3-O-sop	Petunidin-3-O-sophoroside	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Pet-3-sam-5-glu	Petunidin-3-O-sambubioside-5-O-glucoside	Petunidin	N/A	N/A	N/A	N/A	N/A	N/A
Procyanidin C1	Procyanidin C1	Procyanidin	N/A	N/A	N/A	N/A	N/A	N/A

N/A, not detected; \* concentration is lower than LLOQ or higher than ULOQ, the signal-to-noise ratio is below 10, or the methodology was not verified.