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Content of flavan-3-ol monomers and gallic acid in grape seeds by variety and year

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Table

Representation of flavan-3-ols monomers and gallic acid in grape seeds of vine varieties in 2012 and 2013

Variety	GA [$\mu\text{g}\cdot\text{g}^{-1}$]		EGC [$\mu\text{g}\cdot\text{g}^{-1}$]		CAT [$\mu\text{g}\cdot\text{g}^{-1}$]		EC [$\mu\text{g}\cdot\text{g}^{-1}$]		ECG [$\mu\text{g}\cdot\text{g}^{-1}$]		Sugar level [%]	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Albalonga (226)	554 ± 44	139 ± 4	420 ± 43	273 ± 13	4184 ± 110	655 ± 31	3255 ± 94	914 ± 8	503 ± 19	47 ± 4	18.2	21.0
Andre (456)	1216 ± 83	599 ± 19	1813 ± 124	1231 ± 47	5750 ± 371	5728 ± 87	4131 ± 276	3961 ± 36	599 ± 43	319 ± 14	18.4	18.0
Auxerrois (792)	347 ± 8	481 ± 18	818 ± 29	1378 ± 19	2101 ± 51	5150 ± 188	3291 ± 87	6084 ± 173	84 ± 3	385 ± 5	17.9	18.5
Bacchus W. (851)	484 ± 16	320 ± 24	362 ± 25	303 ± 27	1566 ± 19	1445 ± 169	1719 ± 67	1707 ± 49	154 ± 6	129 ± 5	17.2	16.0
Devin (3537)	553 ± 9	324 ± 21	511 ± 48	607 ± 27	4793 ± 71	6925 ± 124	2757 ± 63	2895 ± 34	548 ± 20	266 ± 7	18.6	18.8
Fratava (22807)	585 ± 18	407 ± 13	342 ± 13	457 ± 51	2036 ± 73	4203 ± 160	2572 ± 57	4635 ± 151	209 ± 4	647 ± 14	18.6	19.6
Hibernal (4711)	251 ± 50	158 ± 2	1235 ± 88	1059 ± 70	10742 ± 318	9588 ± 531	3685 ± 129	3159 ± 63	122 ± 6	41 ± 2	19.6	20.0
Chard. B. (2455)	559 ± 31	282 ± 33	1483 ± 18	618 ± 79	3803 ± 116	1755 ± 54	5655 ± 168	3351 ± 120	360 ± 10	209 ± 10	18.6	18.4
Kerner (6123)	469 ± 27	255 ± 4	449 ± 65	376 ± 34	438 ± 24	254 ± 28	787 ± 44	543 ± 15	88 ± 9	44 ± 6	19.3	18.6
Muskat D. (8271)	1024 ± 22	457 ± 23	1119 ± 14	830 ± 35	5353 ± 112	2356 ± 65	3549 ± 64	2057 ± 40	1315 ± 42	187 ± 5	17.8	17.5
Muskat Do. (8272)	1313 ± 49	1269 ± 20	1503 ± 124	1467 ± 77	5290 ± 299	7775 ± 74	10373 ± 507	16421 ± 121	1557 ± 103	2606 ± 4	18.1	16.0
MOPR (13641)	277 ± 15	133 ± 5	462 ± 51	299 ± 18	2142 ± 25	785 ± 76	1977 ± 30	816 ± 93	296 ± 22	91 ± 12	21.0	19.6
Neronet (13980)	626 ± 31	311 ± 8	390 ± 55	375 ± 38	1232 ± 36	927 ± 35	1863 ± 102	1505 ± 32	61 ± 6	97 ± 2	17.6	17.5
Palava (8875)	406 ± 14	293 ± 4	793 ± 86	634 ± 22	4770 ± 138	3060 ± 37	3749 ± 222	3390 ± 28	226 ± 19	187 ± 2	20.0	16.0
Pinot B. (9272)	577 ± 19	420 ± 9	1004 ± 69	959 ± 32	3349 ± 79	2643 ± 53	4313 ± 74	3943 ± 99	315 ± 12	210 ± 11	20.1	19.0
Pinot G. (9275)	628 ± 30	239 ± 21	833 ± 47	906 ± 27	12572 ± 372	6688 ± 289	5354 ± 112	4333 ± 187	361 ± 9	212 ± 25	21.0	18.4
Pinot N. (9279)	336 ± 3	365 ± 4	495 ± 13	761 ± 18	20959 ± 175	15569 ± 317	9364 ± 119	9812 ± 288	2028 ± 42	1442 ± 35	18.6	21.0
Pinot P.N. (9280)	534 ± 52	282 ± 11	608 ± 1	447 ± 37	8603 ± 572	2718 ± 46	6609 ± 463	2044 ± 35	1247 ± 115	102 ± 2	17.7	18.1
Port. Gra. (9623)	395 ± 41	257 ± 8	565 ± 26	507 ± 21	4174 ± 298	6684 ± 106	2157 ± 189	3361 ± 18	160 ± 18	97 ± 2	17.7	15.5
Port. Gru. (9624)	496 ± 60	245 ± 14	420 ± 30	500 ± 39	1777 ± 58	4960 ± 110	1124 ± 41	2175 ± 46	65 ± 16	67 ± 7	16.5	15.6
Aromriesling (637)	643 ± 32	390 ± 10	757 ± 30	642 ± 33	16535 ± 768	17782 ± 712	2940 ± 70	4057 ± 67	163 ± 14	148 ± 14	20.4	17.9
Riesling R (10076)	528 ± 9	204 ± 3	414 ± 23	208 ± 19	1087 ± 20	358 ± 31	1370 ± 21	606 ± 52	151 ± 6	42 ± 12	18.2	18.6
Riesling W. (10077)	463 ± 25	267 ± 12	381 ± 33	254 ± 7	1074 ± 11	1439 ± 28	1303 ± 37	1946 ± 52	71 ± 18	127 ± 21	17.8	16.2
Saint Laur. (10470)	548 ± 20	407 ± 7	301 ± 28	846 ± 45	2721 ± 21	6132 ± 137	1707 ± 29	2218 ± 40	113 ± 7	291 ± 17	18.4	19.5
Sauvign. B. (10790)	536 ± 21	237 ± 3	523 ± 30	540 ± 30	3163 ± 87	1743 ± 75	2617 ± 106	1962 ± 45	508 ± 9	190 ± 9	20.1	21.6
Savagnin B. (17636)	428 ± 8	306 ± 4	472 ± 44	670 ± 47	12382 ± 135	6398 ± 295	3224 ± 45	2292 ± 95	484 ± 3	103 ± 6	20.0	19.3
Silvaner F. (-)	562 ± 24	437 ± 4	298 ± 16	350 ± 27	1874 ± 43	1490 ± 26	1958 ± 71	2030 ± 16	264 ± 16	130 ± 6	16.2	18.3
Silvaner G. (11805)	658 ± 56	443 ± 12	269 ± 37	551 ± 49	919 ± 14	2123 ± 70	1353 ± 62	3033 ± 37	145 ± 4	190 ± 8	19.1	20.0
Savagnin R. (10797)	424 ± 13	261 ± 6	317 ± 13	554 ± 24	3182 ± 167	4661 ± 191	1671 ± 88	1635 ± 67	381 ± 20	148 ± 12	19.6	20.6

Table, continued

Variety	GA [$\mu\text{g g}^{-1}$]		EGC [$\mu\text{g g}^{-1}$]		CAT [$\mu\text{g g}^{-1}$]		EC [$\mu\text{g g}^{-1}$]		ECG [$\mu\text{g g}^{-1}$]		Sugar level [%]	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Veltliner G. (12930)	671 \pm 30	349 \pm 10	559 \pm 99	561 \pm 17	5539 \pm 196	9148 \pm 280	1993 \pm 132	2033 \pm 37	248 \pm 12	510 \pm 11	20.2	18.6
Veritas (12985)	870 \pm 45	399 \pm 9	393 \pm 143	639 \pm 25	6522 \pm 235	2573 \pm 41	4450 \pm 142	2349 \pm 20	1399 \pm 54	465 \pm 3	20.0	23.4
Welschries. (13217)	499 \pm 9	306 \pm 10	314 \pm 50	271 \pm 51	6025 \pm 118	1732 \pm 48	5665 \pm 123	1724 \pm 24	713 \pm 15	76 \pm 2	15.3	16.0
Zahoranka (22402)	493 \pm 45	479 \pm 16	302 \pm 31	365 \pm 55	1637 \pm 80	3483 \pm 118	1103 \pm 121	1714 \pm 12	190 \pm 18	266 \pm 6	15.6	16.3
Zenit (13424)	606 \pm 14	268 \pm 3	297 \pm 52	661 \pm 42	7612 \pm 119	3220 \pm 24	3869 \pm 51	2289 \pm 19	935 \pm 64	294 \pm 18	20.5	18.0
644 - 76 (-)	417 \pm 25		446 \pm 35		3133 \pm 153		5067 \pm 263		238 \pm 12		18.2	
Biserka R. (1388)	562 \pm 23		305 \pm 5		5683 \pm 140		3701 \pm 143		621 \pm 19		15.1	
Domina (3632)	597 \pm 15		606 \pm 32		5628 \pm 166		1951 \pm 76		141 \pm 23		19.3	
Huxelrebe (5463)	362 \pm 12		219 \pm 44		3060 \pm 26		1402 \pm 46		74 \pm 8		18.5	
Kilmanuv H. (-)	596 \pm 23		334 \pm 91		3078 \pm 139		2930 \pm 187		562 \pm 25		17.9	
Madeleine R. (7068)	566 \pm 13		685 \pm 69		1089 \pm 23		1009 \pm 9		96 \pm 6		18.2	
Madeleine A. (7062)	678 \pm 34		822 \pm 57		1320 \pm 45		1649 \pm 75		73 \pm 8		17.2	
Magarach 360 (7086)	445 \pm 2		494 \pm 86		358 \pm 19		826 \pm 62		78 \pm 6		17.8	
Pinot M. (9278)	668 \pm 55		1089 \pm 67		12498 \pm 893		5837 \pm 354		451 \pm 59		16.9	
Hans (5286)	960 \pm 26		339 \pm 52		8416 \pm 223		1795 \pm 62		348 \pm 2		20.8	
Knipperle (6312)	583 \pm 24		1443 \pm 40		3292 \pm 120		4883 \pm 158		214 \pm 20		16.7	
Ortega (8811)	472 \pm 54		405 \pm 54		2838 \pm 244		2455 \pm 261		127 \pm 20		15.4	
Parth. Q.L. (20506)	431 \pm 9		596 \pm 32		51 \pm 13		<LOD		<LOD		-	
Alarije (213)	987 \pm 48		982 \pm 38		2669 \pm 41		2343 \pm 85		161 \pm 12		15.9	
Pinot Noir Swiss (-)	325 \pm 41		439 \pm 36		21528 \pm 1448		9783 \pm 773		2369 \pm 176		18.3	
Schoenburg. (10833)	305 \pm 15		342 \pm 13		3011 \pm 264		1411 \pm 24		59 \pm 3		20.3	
Siegerrebe (11781)	553 \pm 18		934 \pm 40		9392 \pm 318		6052 \pm 452		552 \pm 41		19.1	
Odesskii Ch. (8689)		184 \pm 10		561 \pm 21		991 \pm 31		1521 \pm 31		95 \pm 3		18.4
Blauburger (1457)		276 \pm 5		423 \pm 14		5438 \pm 37		3496 \pm 23		664 \pm 8		15.6
Bratislavske B. (-)		183 \pm 3		239 \pm 29		699 \pm 43		1207 \pm 20		123 \pm 7		15.4
Deckrot (3482)		554 \pm 12		1035 \pm 51		5311 \pm 150		3073 \pm 95		167 \pm 4		20.2
Dornfelder (3659)		308 \pm 7		510 \pm 21		2148 \pm 22		2594 \pm 70		104 \pm 6		21.4
Heroldrebe (5365)		163 \pm 8		283 \pm 19		624 \pm 9		1854 \pm 59		102 \pm 6		16.2
Kanzler (5962)		218 \pm 11		558 \pm 74		1306 \pm 83		1338 \pm 54		119 \pm 12		21.5
Morio Muskat (7996)		261 \pm 3		465 \pm 33		3264 \pm 44		2054 \pm 38		136 \pm 8		16.0
Ferdin. de L. (4088)		304 \pm 8		389 \pm 15		1039 \pm 11		1908 \pm 14		57 \pm 2		15.4
Muskat Ob. (24648)		356 \pm 11		457 \pm 20		2552 \pm 78		1636 \pm 47		46 \pm 7		19.1
Muscat Ot. (8243)		255 \pm 7		295 \pm 18		710 \pm 52		1039 \pm 15		100 \pm 3		16.2
Muscat H. (8226)		324 \pm 9		600 \pm 32		1053 \pm 55		3154 \pm 118		84 \pm 8		15.8
Muscat R. (16522)		278 \pm 5		287 \pm 25		184 \pm 18		198 \pm 15		43 \pm 10		13.2

Table, continued

Variety	GA [$\mu\text{g g}^{-1}$]		EGC [$\mu\text{g g}^{-1}$]		CAT [$\mu\text{g g}^{-1}$]		EC [$\mu\text{g g}^{-1}$]		ECG [$\mu\text{g g}^{-1}$]		Sugar level [%]	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Muskat Susanna (-)		621 \pm 6		691 \pm 36		2555 \pm 23		4189 \pm 57		777 \pm 8		15.6
Neuburger (8501)		547 \pm 14		872 \pm 67		6331 \pm 37		6188 \pm 64		302 \pm 9		21.1
Portugieser B. (9620)		261 \pm 6		502 \pm 53		5642 \pm 103		2939 \pm 35		109 \pm 9		16.0
Ranuse Ceska (-)		217 \pm 6		303 \pm 34		2101 \pm 23		1095 \pm 18		65 \pm 1		18.7
Veltliner F. (16157)		660 \pm 15		714 \pm 28		2839 \pm 109		3727 \pm 46		213 \pm 2		15.5
Zweigelt. B. (13484)		323 \pm 4		326 \pm 41		1907 \pm 117		3670 \pm 63		558 \pm 21		20.7

GA = gallic acid; EGC = epigallocatechin; CAT = catechin; EC = epicatechin; ECG = epicatechin gallate; <LOD – below limit of detection.

List of varieties: Albalonga (226); Andre (456); Auxerrois (792); Bacchus Weiss (851); Devin (3537); Fratava (22807); Hibernal (4711); Chardonnay Blanc (2455); Kerner (6123); Muskat Desertnyi (8271); Muskat Donskoi (8272); MOPR (13641); Neronet (13980); Palava (8875); Pinot Blanc (9272); Pinot Gris (9275); Pinot Noir (9279); Pinot Precoce Noir (9280); Portugieser Grau (9623); Portugieser Gruen (9624); Aromriesling (637); Riesling Rot (10076); Riesling Weiss (10077); Saint Laurent (10470); Sauvignon Blanc (17636); Silvaner Froelich (-); Silvaner Gruen (11805); Savagnin Rose (10797); Veltliner Gruen (12930); Veritas (12985); Welschriesling (13217); Zahoranka (22402); Zenit (13424); 644 - 76 (-); Biserka Rana (1388); Domina (3632); Huxeltrebe (5463); Kilmanuv Hrozen (-); Madeleine Royale (7068); Magarach 360 (7086); Pinot Meunier (9278); Hans (5286); Knipperle (6312); Ortega (8811); Parthenocissus Quinquifolia Linne (20506); Alarije (213); Pinot Noir Swiss (-); Schoenburger (10833); Siegerrebe (11781); Odesskii Chernyi (8689); Blauburger (1457); Bratislavské Biele (-); Deckrot (3482); Dornfelder (3659); Heroldrebe (5365); Kanzler (5962); Morio Muskat (7996); Ferdinand de Lesseps (4088); Muskat Oberlin (24648); Muskat Ortonel (8243); Muscat Hamburg (8226); Muscat Rammi (16522); Muskat Susanna (-); Neuburger (8501); Portugieser Blau (9620); Ranuse Ceska (-); Veltliner Fruhhrot (16157); Zweigeltrebe Blau (13484). (-) Not registered.