Supplementary Information

Table S1. Concentration of individual low molecular weight phenolic compounds (mg/L) identified and quantified in the white wines.

	PROTECTED DESIGNATION OF ORIGIN					GRAPE VARIETY		
	RD	**BI**	**TO**	**CI**	**RU**	**VERDEJO**	**SAUVIGNON BLANC**	**MALVASIA**
HBA								
Gallic acid	4.78	4.75	8.68	6.10	5.16	7.29 **b**	4.50 **ab**	3.70 **a**
Protocatechuic acid	1.46 **b**	1.05 **ab**	1.35 **b**	0.47 **a**	0.83 **ab**	0.97	0.71	0.87
Vanillic acid	0.68 **b**	0.08 **a**	0.56 **b**	0.03 **a**	0.65 **b**	0.56	0.40	0.61
Syringic acid	0.91 **a**	0.63 **a**	1.37 **a**	1.18 **a**	2.59 **b**	2.47	1.64	0.58
Ellagic acid	0.13 **ab**	n.d. **a**	0.12 **ab**	0.10 **ab**	0.21 **b**	0.24	0.05	0.00
Ethyl gallate	0.76	0.91	2.58	1.68	0.96	1.98	0.56	0.76
HCA								
Caffeic acid	1.45 **a**	1.65 **a**	1.80 **a**	2.04 **ab**	3.36 **b**	3.10 **b**	2.70 **ab**	0.88 **a**
Trans-coumaric acid	1.18 **ab**	1.18 **ab**	0.78 **a**	0.76 **a**	1.52 **b**	1.17 **b**	1.63 **c**	0.48 **a**
HCATE								
Trans-caftaric acid	13.42 **b**	8.12 **ab**	7.27 **a**	5.62 **a**	7.85 **a**	6.43	8.65	9.62
Cis-coutaric acid	2.08 **b**	1.11 **a**	1.35 **ab**	0.71 **a**	1.77 **b**	1.01 **a**	2.53 **c**	1.92 **b**
Trans coutaric acid	5.01 **b**	1.80 **a**	1.56 **a**	0.67 **a**	1.18 **a**	0.76 **a**	1.66 **b**	2.60 **c**
Trans fertaric acid	1.54 **ab**	1.08 **a**	1.85 **bc**	1.84 **bc**	2.19 **c**	2.35 **b**	1.57 **a**	1.39 **a**
FLAVANOLS								
Catechin	1.47 **a**	3.48 **bc**	5.19 **d**	2.88 **ab**	4.35 **cd**	4.45	3.88	4.54
Epicatechin	2.28 **b**	0.69 **a**	0.92 **ab**	0.73 **a**	0.93 **ab**	0.91	1.12	0.29
FLAVONOLS								
Quercetin	0.07 **ab**	0.01 **a**	0.14 **ab**	0.18 **b**	0.04 **a**	0.10	0.02	0.15
Quercetin derivatives	0.77 **ab**	0.07 **a**	0.39 **ab**	0.30 **ab**	0.**82** b	0.68	0.47	0.66
PHENOLIC ALCOHOLS								
Tyrosol	15.2	12.3	11.8	12.4	11.2	12.2	8.82	143.0
Tryptophol	3.76 **b**	1.42 **a**	1.38 **a**	1.91 **a**	1.18 **a**	1.63 **b**	0.61 **a**	1.48 **ab**

Values with different letter in the same row indicate statistically significant differences ($p< 0.05$), and values without letter indicate no statistically significant differences.

n.d. Not detected

Table S2. Concentration of individual volatile compounds (μg/L) identified and quantified in the white wines.

	PROTECTED DESIGNATIION OF ORIGIN					GRAPE VARIETY		
	RD	**BI**	**TO**	**CI**	**RU**	**VERDEJO**	**SAUVIGNONBLANC**	**MALVASIA**
HIGHER ALCOHOLS								
1-propanol	20343 **a**	21556 **a**	32049 **ab**	29807 **ab**	37426 **b**	37921	32093	23053
Isobutanol	25468 **ab**	23267 **ab**	32340 **b**	25467 **ab**	16239 **a**	19895 **a**	16254 **a**	45250 **b**
1-butanol	178 **a**	711 **abc**	536 **ab**	883 **bc**	929 **c**	845	883	558
2-methyl-1-butanol	24938 **ab**	27389 **b**	28846 **b**	28293 **b**	22088 **a**	24368 **a**	21084 **a**	35748 **b**
3-methyl-1-butanol	153598 **ab**	156644 **ab**	174393 **b**	149647 **ab**	140460 **a**	145928 **a**	144190 **a**	190755 **b**
2-phenylethanol	19025 **ab**	17591 **ab**	18053 **ab**	20571 **b**	14866 **a**	17753 **a**	13575 **a**	16900 **ab**
ETHYL ESTERS								
Ethyl butyrate	421 **ab**	330 **a**	353 **a**	329 **a**	455 **b**	416	406	373
Ethyl isovalerate	47.0 **c**	35.1 **c**	13.4 **a**	38.4 **c**	24.8 **b**	26.5 **b**	25.5 **b**	8.2 **a**
Ethyl-2-methylbutyrate	25.5 **b**	20.7 **b**	7.4 **a**	21.9 **b**	11.2 **a**	13.4 **b**	12.3 **ab**	3.5 **a**
Ethyl hexanoate	644	745	631 1375	694	811	736	809	667
Ethyl octanoate	813 **ab**	807 **a**	**ab**	2440 **b**	1245 **ab**	1507	1304	1690
Ethyl decanoate	211 **ab**	192 **a**	534 **bc**	646 **c**	494 **bc**	523	478	684
ALCOHOL ACETATES								
Propyl acetate	14.0 **a**	18.3 **a**	49.9 **b**	15.5 **a**	56.4 **b**	44.7	52.6	56.4
Isobutyl acetate	22.3 **a**	24.0 **a**	75.4 **c**	30.4 **a**	55.8 **b**	47.6 **a**	64.7 **b**	89.3 **c**
Isoamyl acetate	751 **a**	904 **a**	3191 **b**	872 **a**	3722 **b**	2691.4 **a**	4194.8 **b**	3113.5 **ab**
Hexyl acetate	17.7 **a**	62.1 **ab**	123.6 **b**	35.2 **a**	187.0 **c**	109.1 **a**	242.8 **b**	139.2 **a**
β-phenethyl acetate	121**ab**	117 **a**	233 **c**	82 **a**	212 **bc**	164.8 **a**	215.3 **a**	326.7 **b**
ALCOHOLS C6								
1-hexanol	542 **a**	1161 **b**	1128 **b**	1309 **b**	1423 **b**	1154 **a**	1860 **b**	1156 **a**
Trans-3-hexenol	51.3 **a**	91.0 **a**	99.7 **a**	112.8 **a**	187.0 **b**	134 **a**	237 **b**	71 **a**
Cis-3-hexenol	67.4 **a**	132.6 **ab**	117.1 **a**	169.9 **ab**	186.91 **b**	136 **a**	256 **b**	142 **a**
TERPENES								
Linalool	123.6 **c**	59.7 **b**	29.0 **a**	34.9 **a**	32.7 **a**	28.9	40.2	32.3
α-Terpineol	19.4 **c**	12.2 **bc**	8.4 **ab**	2.6 **a**	4.0 **a**	4.15	4.89	8.90
β-citronellol	2.10 **a**	2.39 **a**	3.99 **a**	9.50 **b**	3.16 **a**	5.09	2.84	4.17
WHISKEY LACTONES								
Trans-whiskey lactone	46.7 **b**	17.9 **ab**	7.2 **a**	27.2 **ab**	13.8 **a**	21.8 **b**	0.84 **a**	2.15 **a**
Cis-whiskey lactone	58.2	28.2	10.4	29.8	18.5	28.5	0.14	0.52
VANILLIC DERIVATIVES								

Vanillin	24.7	33.3	43.5	27.2	25.5	28.9	28.5	42.0
Methyl vanillate	15.7 **bc**	6.6 **a**	10.9 **ab**	18.8 **c**	13.4 **bc**	14.2	13.7	10.4
Ethyl vanillate	15.4 **b**	10.5 **ab**	10.0 **ab**	9.0 **ab**	6.8 **a**	7.8 **ab**	7.1 **a**	11.0 **b**
Acetovanillone	25.1 **a**	30.0 **a**	68.5 **c**	66.7 **bc**	51.6 **b**	61.9 **b**	46.1 **a**	65.3 **b**
FURANIC DERIVATIVES								
Furfural	168	205	179	253	175	271 **b**	52.8 **a**	19.2 **a**
5-Methylfurfural	15.8	25.7	39.2	26.7	21.0	40.0 **b**	2.76 **a**	1.85 **a**
Furfuryl alcohol	892 **a**	883 **a**	1668 **b**	943 **a**	1224 **a**	1291 **ab**	1051 **a**	1803 **b**
POSITIVE VOLATILE PHENOLS								
Guaiacol	11.9 **b**	10.9 **b**	6.5 **b**	0.37 **a**	0.27 **a**	1.76 **a**	0.13 **a**	6.28 **b**
Eugenol	14.2 **b**	6.5 **ab**	3.6 **a**	5.8 **ab**	4.7 **a**	5.91	2.74	1.33
Trans-isoeugenol	9.0 **ab**	8.5 **ab**	16.5 **ab**	n.d. **a**	22.8 **b**	22.6 **b**	4.5 **a**	17.2 **ab**
Syringol	4.68 **ab**	5.03 **b**	2.52 **a**	6.62 **bc**	7.72 **c**	7.24 **b**	5.41 **ab**	2.35 **a**
4-methyl-syringol	25.9 **c**	12.8 **bc**	14.8 **bc**	1.9 **ab**	1.3 **a**	5.82 **ab**	0.69 **a**	7.92 **b**
4-allyl syringol	10.3 **ab**	13.2 **b**	2.7 **a**	8.6 **ab**	7.6 **ab**	7.23 **b**	6.72 **b**	2.37 **a**
FATTY ACIDS								
Isobutyric acid	713 **ab**	591 **a**	1375 **c**	1417 **c**	988 **b**	1155	1226	1004
Butyric acid	1244 **ab**	1049 **a**	1550 **b**	1695 **bc**	1931 **c**	1859	1802	1427
Isovaleric acid	398 **ab**	397 **a**	566 **c**	552 **bc**	497 **abc**	518	549	495
Hexanoic acid	4075 **ab**	3746 **a**	3922 **ab**	4714 **bc**	5144 **c**	4872	4805	4077
Octanoic acid	3969 **ab**	3612 **a**	4162 **b**	3959 **ab**	4135 **b**	4076	4049	4466
Decanoic acid	2191 **b**	1798 **ab**	1554 **a**	1753 **ab**	2124 **b**	1961	1857	1822
Dodecanoic acid	61.6 **b**	45.0 **ab**	31.4 **a**	25.9 **a**	50.5 **b**	43.4	39.2	37.0
ALDEHYDES								
Isobutyraldehyde	7.9 **ab**	9.1 **ab**	12.8 **b**	12.6 **b**	7.1 **a**	10.3	6.3	11.6
2-methylbutanal	2.75 **ab**	2.73 **ab**	3.11 **b**	2.40 **ab**	1.73 **a**	2.36	1.64	2.43
3-methylbutanal	10.9 **ab**	8.8 **a**	18.5 **b**	17.5 **b**	16.4 **b**	16.9	17.4	17.7
NEGATIVE VOLATILE PHENOLS								
4-ethylguaicol	3.93 **b**	5.64 **c**	0.78 **a**	0.35 **a**	0.31 **a**	0.37 **a**	0.19 **a**	1.37 **b**
4-ethylphenol	1.53 **ab**	8.43 **b**	1.50 **ab**	n.d. **a**	n.d. **a**	0.10 **a**	0.03 **a**	2.80 **b**
4-vinylguaiacol	119 **a**	131 **a**	435 **b**	280 **ab**	249 **a**	330 **b**	165 **a**	437 **b**
4-vinylphenol	234 **ab**	258 **b**	642 **c**	39 **a**	33 **a**	140 **a**	28.9 **a**	807 **b**
SULPHUR COMPOUNDS								
Methyl thioacetate	3.78 **ab**	2.53 **a**	4.87 **b**	5.27 **b**	3.13 **a**	4.00	3.30	4.87
Dimethyl disulfide	6.10 **b**	5.87 **b**	9.19 **c**	1.37 **a**	1.25 **a**	2.47 **a**	1.32 **a**	12.1 **b**
Ethyl thioacetate	4.58 **a**	3.54 **a**	11.56 **b**	1.50 **a**	1.21 **a**	3.46 **a**	1.73 **a**	10.9 **b**
Methional	2.18 **a**	3.60 **a**	4.26 **a**	5.85 **ab**	7.62 **b**	6.66	7.1	4.10

Values with different letter in the same row indicate statistically significant differences ($p< 0.05$), and values without letter indicate no statistically significant differences.

n.d. Not detected

Table S3. Concentration of individual low molecular weight phenolic compounds (mg/L) and volatile compounds (μg/L) identified and quantified in the rosé wines.

	RD	BI	TO	CI
HBA				
Gallic acid	5.81 **a**	5.96 **a**	21.54 **b**	9.59 **a**
Protocatechuic acid	0.89 **ab**	0.80 **a**	1.10 **b**	0.84 **a**
Vanillic acid	0.30	0.62	0.48	0.29
Syringic acid	1.97 **a**	1.94 **a**	2.27 **a**	5.37 **b**
Ellagic acid	n.d.	n.d.	n.d.	n.d.
Ethyl gallate	0.58	1.46	3.41	1.54
HCA				
Caffeic acid	7.79 **b**	2.18 **a**	1.76 **a**	1.77 **a**
Trans-coumaric acid	3.35 **b**	1.67 **a**	1.29 **a**	1.28 **a**
HCATE				
Trans-caftaric acid	12.78 **ab**	9.17 **a**	22.45 **b**	12.40 **ab**
Cis-coutaric acid	2.44 **b**	1.15 **a**	2.40 **b**	2.70 **b**
Trans coutaric acid	3.42 **ab**	1.80 **a**	5.34 **b**	4.36 **b**
Trans fertaric acid	1.83 **b**	1.04 **a**	2.25 **c**	2.21 **c**
FLAVANOLS				
Catechin	5.50	7.26	5.08	6.22
Epicatechin	2.46	4.76	2.46	3.17
FLAVONOLS				
Quercetin	0.32 **ab**	0.13 **a**	0.08 **a**	0.43 **b**
Quercetin derivatives	0.40 **a**	0.26 **a**	0.84 **a**	1.83 **b**

Values with different letter in the same row indicate statistically significant differences ($p< 0.05$), and values without letter indicate no statistically significant differences.

n.d. Not detected

Table S4. Concentration of individual volatile compounds (μg/L) identified and quantified in the rosé wines.

	RD	BI	TO	CI
HIGHER ALCOHOLS				
1-propanol	19865	29700	18997.5	28924
Isobutanol	23083	24550	33883	23609
1-butanol	408 **a**	933 **b**	583 **ab**	650 **ab**
2-methyl-1-butanol	29583	29667	31450	26758
3-methyl-1-butanol	191163 **ab**	177300 **a**	215633 **b**	172851 **a**
2-phenylethanol	25103	18366	21511	22325
ETHYL ESTERS				
Ethyl butyrate	365 **ab**	409 **ab**	460 **b**	353 **a**
Ethyl isovalerate	20.5 **ab**	28.5 **b**	14.5 **a**	16.1 **a**
Ethyl-2-methylbutyrate	8.8 **ab**	15.7 **b**	7.7 **a**	8.5 **a**
Ethyl hexanoate	679	721	798	715
Ethyl octanoate	1011	1034	976	935
Ethyl decanoate	351	279	178	288
ALCOHOL ACETATES				
Propyl acetate	28	35	47.3	31.5
Isobutyl acetate	50 **a**	255 **ab**	447 **b**	130 **a**
Isoamyl acetate	3683 **b**	2360 **ab**	1660 **a**	2225 **ab**
Hexyl acetate	61.3	112.2	85.5	147.1
β-phenethyl acetate	553 **b**	196 **a**	214 **a**	268 **a**
ALCOHOLS C6				
1-hexanol	1048 **a**	962 **a**	1948 **b**	1623 **b**
Trans-3-hexenol	45	58.7	58.3	43.3
Cis-3-hexenol	256 **b**	99 **a**	187 **ab**	255 **b**
TERPENES				
Linalool	42.3 **a**	35.2 **a**	112 **a**	427 **b**
α-Terpineol	3.00	5.33	9.50	4.50
β-citronellol	3.25	3.00	9.00	5.70
WHISKEY LACTONES				
Trans-whiskey lactone	7.3 **a**	8.5 **a**	42.0 **a**	163 **b**
Cis-whiskey lactone	5.0 **a**	3.7 **a**	13.3 **a**	442 **b**
VANILLIC DERIVATIVES				

Vanillin	3.5 **a**	6.67 **a**	9.5 **a**	118 **b**
Methyl vanillate	7.0 **a**	7.83 **a**	16.0 **a**	132 **b**
Ethyl vanillate	15.3 **a**	38.3 **a**	61.0 **a**	272 **b**
Acetovanillone	19.3 **a**	16.3 **a**	41.0 **a**	144 **b**
FURANIC DERIVATIVES				
Furfural	46.5	76.5	19.3	228
5-Methylfurfural	1.75	2.17	1.25	27.5
Furfuryl alcohol	1173 **ab**	693 **a**	1563 **b**	816 **a**
POSITIVE VOLATILE PHENOLS				
Guaiacol	3.0	2.50	1.25	12.5
Eugenol	2.75 **a**	1.67 **a**	7.0 **a**	95.0 **b**
Trans-isoeugenol	3.5 **a**	5.67 **a**	1.00 **a**	54.5 **b**
Syringol	3.25 **a**	1.83 **a**	3.50 **a**	49.6 **b**
4-methyl-syringol	3.00	3.67	0.50	17.2
4-allyl syringol	12.8 **a**	20.0 **a**	5.0 **a**	65.6 **b**
FATTY ACIDS				
Isobutyric acid	806	654	554	574
Butyric acid	1166	1211	1221	958
Isovaleric acid	400	416	322	313
Hexanoic acid	3609	3415	3573	3145
Octanoic acid	3819	3575	3338	3546
Decanoic acid	1949 **b**	2015 **ab**	1464 **ab**	1064 **a**
Dodecanoic acid	48.3	50.3	40.8	56.2
ALDEHYDES				
Isobutyraldehyde	6.00 **a**	10.7 **b**	8.50 **ab**	7.80 **ab**
2-methylbutanal	1.25 **a**	3.33 **b**	2.00 **ab**	2.7 **b**
3-methylbutanal	13.6 **ab**	10.5 **a**	13.3 **ab**	16.5 **b**
NEGATIVE VOLATILE PHENOLS				
4-ethylguaicol	0.25	0.17	0.50	6.30
4-ethylphenol	1.50	1.17	2.25	4.60
4-vinylguaiacol	12.8 **a**	19.7 **a**	19.3 **a**	155 **b**
4-vinylphenol	30.5	62.5	2.00	17.5
SULPHUR COMPOUNDS				
Methyl thioacetate	5.54 **b**	2.43 **a**	4.3 **ab**	3.11 **ab**
Dimethyl disulfide	1.9 **a**	5.77 **b**	4.7 **b**	4.1 **ab**

Ethyl thioacetate	3.43	4.18	4.69	5.34
Methional	5.01	2.22	5.36	4.68

Values with different letter in the same row indicate statistically significant differences ($p < 0.05$), and values without letter indicate no statistically significant differences.

n.d. Not detected