

## Supplementary Materials

**Table S1.** Yeast isolates from the 2020 wine lees after spontaneous fermentation.

Grape variety	Vessel type	Yeast species	Number of isolates <sup>a</sup>	GenBank accession number <sup>*</sup>
<i>V. sylvestris</i>	Borosilicate glass	<i>S. cerevisiae</i>	6 <sup>a</sup>	SUB14622635
	Erlenmeyer flask	<i>S. cerevisiae</i>	7 <sup>a</sup>	SUB14622637
<b>Vinhão</b>	Borosilicate glass	<i>S. cerevisiae</i>	11 <sup>a</sup>	SUB14606160
	Erlenmeyer flask	<i>S. cerevisiae</i>	7 <sup>a</sup>	SUB14622632
<b>Marufo</b>	Borosilicate glass	<i>S. cerevisiae</i>	7 <sup>a</sup>	SUB14606245
	Erlenmeyer flask	<i>S. cerevisiae</i>	6 <sup>a</sup>	SUB14606214
<b>Castelão</b>	Borosilicate glass	<i>Saccharomyces cerevisiae</i>	13	SUB14606266
		<i>Zygosaccharomyces bailii</i>	1	SUB14606303
	Borosilicate glass	<i>S. cerevisiae</i>	8	SUB14606283
	Erlenmeyer flask	<i>S. cerevisiae</i>	17 <sup>a</sup>	SUB14606260

<sup>a</sup> Number of yeasts isolates from two fermentations.

<sup>\*</sup> Sequences of one of each group of identified isolates have been submitted to GenBank.

**Table S2.** Simplified version of the principal component (PC) coefficients for the main physical-chemical and CIELAB parameters of the 2020 wines.

Variables	Coefficients			Simplified <sup>a</sup>		
	PC1	PC2	PC3	PC1	PC2	PC3
Volatile acidity	0.31	−0.51	0.01	strong	(strong)	weak
Ethanol at 20°C	0.29	0.36	−0.35	strong	strong	(moderate)
pH	0.39	0.36	0.20	strong	strong	weak
Total acidity	−0.03	−0.66	−0.14	(weak)	(strong)	(weak)
Free SO <sub>2</sub>	−0.42	0.20	−0.24	(strong)	moderate	(moderate)
Total SO <sub>2</sub>	−0.47	0.07	−0.09	(strong)	weak	(weak)
C*	−0.49	−0.03	−0.06	(strong)	(weak)	(weak)
H*	0.18	−0.02	−0.86	moderate	(weak)	(strong)

<sup>a</sup> ‘Strongly loaded’ – the absolute value of the coefficient is greater than half of the maximum absolute value of the coefficient associated with the component, ‘moderately loaded’ – the absolute value of the coefficient lies between a quarter and a half of the largest absolute value, and ‘weakly loaded’ – the absolute value is below a quarter of the largest absolute value. The parentheses indicate negative-correlated contributions.

**Table S3.** Simplified version of the principal component (PC) coefficients for the main physical-chemical and CIELAB parameters of the 2021 wines.

Variables	Coefficients			Simplified <sup>a</sup>		
	PC1	PC2	PC3	PC1	PC2	PC3
Volatile acidity	0.41	0.27	−0.15	strong	moderate	(weak)
Ethanol at 20°C	−0.44	−0.24	0.00	(strong)	(moderate)	weak
pH	−0.24	−0.27	−0.66	(strong)	(moderate)	(strong)
Total acidity	0.39	0.29	0.13	strong	strong	weak
Free SO <sub>2</sub>	−0.38	0.34	0.30	(strong)	strong	moderate
Total SO <sub>2</sub>	−0.21	−0.30	0.59	(moderate)	(strong)	strong
C*	−0.39	0.44	−0.28	(strong)	strong	(moderate)
H*	−0.29	0.56	0.04	(strong)	strong	weak

<sup>a</sup> ‘Strongly loaded’ – the absolute value of the coefficient is greater than half of the maximum absolute value of the coefficient associated with the component, ‘moderately loaded’ – the absolute value of the coefficient lies between a quarter and a half of the largest absolute value, and ‘weakly loaded’ – the absolute value is below a quarter of the largest absolute value. The parentheses indicate negative-correlated contributions.

**Table S4.** Simplified version of the principal component (PC) coefficients for the chromatic characteristics of the 2020 wines.

Variables	Coefficients			Simplified <sup>a</sup>		
	PC1	PC2	PC3	PC1	PC2	PC3
Intensity (I)	0.36	0.19	−0.08	strong	moderate	(weak)
Shade (N)	−0.32	0.38	0.05	(strong)	strong	weak
Total phenol index	0.36	−0.08	0.12	strong	(weak)	weak
Anthocyanins	0.16	−0.70	0.30	moderate	(strong)	moderate
Total anthocyanins	0.36	0.13	−0.20	strong	weak	(moderate)
Degree of ionization of anthocyanins	0.32	−0.13	0.43	strong	(weak)	strong
Ionized anthocyanins	0.36	0.20	−0.08	strong	moderate	(weak)

Total pigments	0.36	0.15	−0.15	strong	weak	(weak)
Polymerization index	0.00	0.45	0.79	weak	strong	strong
Polymerized pigments	0.36	0.18	−0.08	strong	moderate	(weak)

<sup>a</sup> ‘Strongly loaded’ – the absolute value of the coefficient is greater than half of the maximum absolute value of the coefficient associated with the component, ‘moderately loaded’ – the absolute value of the coefficient lies between a quarter and a half of the largest absolute value, and ‘weakly loaded’ – the absolute value is below a quarter of the largest absolute value. The parentheses indicate negative-correlated contributions.

**Table S5.** Simplified version of the principal component (PC) coefficients for the chromatic characteristics of the 2021 wines.

Variables	Coefficients		Simplified <sup>a</sup>	
	PC1	PC2	PC1	PC2
Intensity (I)	−0.36	0.01	(strong)	weak
Shade (N)	0.33	−0.21	strong	(moderate)
Total phenol index	−0.28	−0.21	(strong)	(moderate)
Anthocyanins	−0.35	0.08	(strong)	weak
Total anthocyanins	−0.35	0.11	(strong)	weak
Degree of ionization of anthocyanins	−0.27	−0.47	(strong)	(strong)
Ionized anthocyanins	−0.34	0.01	(strong)	weak
Total pigments	−0.35	0.09	(strong)	weak
Polymerization index	0.03	−0.82	weak	(strong)
Polymerized pigments	−0.35	−0.04	(strong)	(weak)

<sup>a</sup> ‘Strongly loaded’ – the absolute value of the coefficient is greater than half of the maximum absolute value of the coefficient associated with the component, ‘moderately loaded’ – the absolute value of the coefficient lies between a quarter and a half of the largest absolute value, and ‘weakly loaded’ – the absolute value is below a quarter of the largest absolute value. The parentheses indicate negative-correlated contributions.

**TABLE S6.** Simplified version of the principal component (PC) coefficients for the volatile contents of the 2020 wines.

Variables	Coefficients					Simplified <sup>a</sup>				
	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Acetaldehyde	0.23	0.07	−0.30	−0.11	−0.48	strong	weak	(strong)	(weak)	(strong)
Methanol	0.38	−0.17	0.04	0.06	0.10	strong	(moderate)	weak	weak	weak
1-Propanol	0.34	0.18	−0.07	−0.17	0.13	strong	moderate	(weak)	(moderate)	moderate
Diacetyl	−0.03	0.19	0.36	0.35	0.22	(weak)	moderate	strong	strong	moderate
Ethyl acetate	−0.19	0.27	0.37	−0.04	−0.24	(strong)	strong	strong	(weak)	(strong)
Isobutanol	0.14	0.26	−0.12	0.59	−0.18	moderate	strong	(weak)	strong	(moderate)
Acetoin	0.31	0.08	−0.08	−0.22	−0.18	strong	weak	(weak)	(moderate)	(moderate)
2-Methyl-1-butanol	0.35	−0.05	−0.15	0.22	0.21	strong	(weak)	(moderate)	moderate	moderate
3-Methyl-1-butanol	0.28	−0.23	−0.02	0.40	−0.11	strong	(moderate)	(weak)	strong	(weak)
Isobutyl acetate	−0.05	−0.47	0.03	−0.07	−0.37	(weak)	(strong)	weak	(weak)	(strong)
Ethyl lactate	0.34	0.17	−0.07	−0.32	−0.08	strong	moderate	(weak)	(strong)	(weak)
2,3-Butanediol	0.30	−0.18	0.36	−0.08	0.10	strong	(moderate)	strong	(weak)	weak
Isoamyl acetate	−0.14	−0.38	−0.15	−0.19	0.36	(moderate)	(strong)	(moderate)	(moderate)	strong
Hexanol	0.12	0.03	0.58	−0.16	−0.28	moderate	weak	strong	(moderate)	(strong)
2-Phenylethanol	0.30	−0.14	0.31	−0.05	0.25	strong	(moderate)	strong	(weak)	strong
2-Phenylethyl acetate	−0.05	−0.49	0.09	0.22	−0.28	(weak)	(strong)	weak	moderate	(strong)

<sup>a</sup> ‘Strongly loaded’ – the absolute value of the coefficient is greater than half of the maximum absolute value of the coefficient associated with the component, ‘moderately loaded’ – the absolute value of the coefficient lies between a quarter and a half of the largest absolute value, and ‘weakly loaded’ – the absolute value is below a quarter of the largest absolute value. The parentheses indicate negative-correlated contributions.

**Table S7.** Simplified version of the principal component (PC) coefficients for the volatile contents of the 2021 wines.

Variables	Coefficients					Simplified <sup>a</sup>				
	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Acetaldehyde	−0.27	−0.30	0.14	−0.13	−0.37	(strong)	(strong)	moderate	(weak)	(strong)
Methanol	−0.06	0.39	0.06	0.15	0.37	(weak)	strong	weak	moderate	strong
1-Propanol	−0.16	0.35	0.12	0.42	−0.07	(moderate)	strong	moderate	strong	(weak)
Diacetyl	−0.10	0.30	0.01	0.25	−0.54	(weak)	strong	weak	moderate	(strong)
Ethyl acetate	0.28	−0.24	0.38	0.10	−0.06	strong	(strong)	strong	weak	(weak)
Isobutanol	−0.40	−0.10	0.25	0.09	0.06	(strong)	(weak)	strong	weak	weak
Acetoin	0.20	0.10	0.37	−0.35	0.21	moderate	weak	strong	(strong)	moderate
2-Methyl-1-butanol	−0.40	0.09	0.28	−0.09	0.14	(strong)	weak	strong	(weak)	moderate
3-Methyl-1-butanol	−0.44	0.06	0.12	0.06	0.12	(strong)	weak	moderate	weak	weak
Isobutyl acetate	0.13	−0.18	0.05	0.57	−0.18	moderate	(moderate)	weak	strong	(moderate)
Ethyl lactate	0.04	0.27	−0.07	−0.27	−0.39	weak	strong	(weak)	(moderate)	(strong)
2,3-Butanediol	0.19	0.42	0.09	−0.23	−0.19	moderate	strong	weak	(moderate)	(moderate)
Isoamyl acetate	0.11	−0.33	0.41	0.03	−0.08	moderate	(strong)	strong	weak	(weak)
Hexanol	0.17	0.22	0.32	0.21	0.21	moderate	strong	strong	moderate	moderate
2-Phenylethanol	−0.35	0.00	0.17	−0.26	−0.16	(strong)	weak	moderate	(moderate)	(moderate)
2-Phenylethyl acetate	0.19	0.17	0.46	−0.04	−0.19	moderate	moderate	strong	(weak)	(moderate)

<sup>a</sup> ‘Strongly loaded’ – the absolute value of the coefficient is greater than half of the maximum absolute value of the coefficient associated with the component, ‘moderately loaded’ – the absolute value of the coefficient lies between a quarter and a half of the largest absolute value, and ‘weakly loaded’ – the absolute value is below a quarter of the largest absolute value. The parentheses indicate negative-correlated contributions.

**Table S8.** Means and standard deviations (SDs) of standard physical-chemical and CIELAB parameters of the 2020 wines, followed by the results of the Kruskal-Wallis (Chi-square, *df*, *p*-value) <sup>A</sup> and the Conover-Iman tests <sup>B</sup>.

Sample code *	Volatile acidity (g/L acetic acid)	Ethanol at 20°C (% v/v)	pH	Total acidity (g/L tartaric acid)	Free SO <sub>2</sub> (mg/L)	Total SO <sub>2</sub> (mg/L)	C*	H*
SB	0.51 ± 0.01 <sup>h</sup>	8.50 ± 0.00 <sup>b</sup>	3.00 ± 0.06 <sup>d</sup>	12.85 ± 0.07 <sup>af</sup>	20.50 ± 0.71 <sup>fg</sup>	36.50 ± 2.12 <sup>a</sup>	63.31 ± 0.45 <sup>d</sup>	7.51 ± 1.30 <sup>bef</sup>
SE	0.55 ± 0.02 <sup>dh</sup>	12.35 ± 0.07 <sup>ig</sup>	3.17 ± 0.02 <sup>de</sup>	11.00 ± 0.00 <sup>fg</sup>	19.50 ± 0.71 <sup>efg</sup>	36.50 ± 2.12 <sup>a</sup>	60.40 ± 0.56 <sup>de</sup>	5.90 ± 0.74 <sup>abf</sup>
VB	2.68 ± 0.11 <sup>ef</sup>	10.80 ± 0.00 <sup>ab</sup>	3.34 ± 0.01 <sup>def</sup>	12.85 ± 0.07 <sup>af</sup>	20.50 ± 0.71 <sup>fg</sup>	35.00 ± 0.00 <sup>a</sup>	47.16 ± 0.05 <sup>be</sup>	25.09 ± 0.05 <sup>dg</sup>
VE	1.71 ± 0.01 <sup>eg</sup>	12.60 ± 0.00 <sup>ef</sup>	3.45 ± 0.01 <sup>bfg</sup>	9.75 ± 0.21 <sup>eg</sup>	22.50 ± 2.12 <sup>g</sup>	33.50 ± 2.12 <sup>a</sup>	50.30 ± 1.98 <sup>de</sup>	26.71 ± 0.99 <sup>g</sup>
MB	2.59 ± 0.06 <sup>ef</sup>	11.50 ± 0.00 <sup>ac</sup>	3.73 ± 0.01 <sup>ac</sup>	9.00 ± 0.00 <sup>de</sup>	13.50 ± 0.71 <sup>ace</sup>	20.00 ± 0.00 <sup>ab</sup>	16.88 ± 0.40 <sup>ac</sup>	23.42 ± 0.54 <sup>cd</sup>
ME	0.99 ± 0.01 <sup>cg</sup>	14.30 ± 0.00 <sup>e</sup>	3.80 ± 0.01 <sup>c</sup>	6.45 ± 0.00 <sup>cd</sup>	18.00 ± 1.41 <sup>aef</sup>	20.00 ± 0.00 <sup>ab</sup>	16.78 ± 0.87 <sup>ac</sup>	21.40 ± 0.22 <sup>ce</sup>
CB	6.40 ± 0.28 <sup>ab</sup>	10.75 ± 0.21 <sup>ab</sup>	3.64 ± 0.03 <sup>ab</sup>	13.30 ± 0.28 <sup>ab</sup>	10.50 ± 0.71 <sup>abcd</sup>	20.00 ± 2.83 <sup>ab</sup>	26.47 ± 0.36 <sup>ab</sup>	-0.14 ± 0.47 <sup>a</sup>
CE	0.64 ± 0.06 <sup>cd</sup>	12.10 ± 0.00 <sup>cd</sup>	3.83 ± 0.04 <sup>c</sup>	5.33 ± 0.32 <sup>c</sup>	12.50 ± 2.12 <sup>abce</sup>	23.00 ± 7.07 <sup>ab</sup>	25.25 ± 2.50 <sup>ab</sup>	-0.01 ± 0.47 <sup>ab</sup>
WCB	8.89 ± 0.64 <sup>a</sup>	12.30 ± 0.14 <sup>dg</sup>	3.43 ± 0.01 <sup>efg</sup>	18.20 ± 0.57 <sup>b</sup>	5.50 ± 0.71 <sup>bd</sup>	13.50 ± 2.12 <sup>b</sup>	8.44 ± 0.62 <sup>cf</sup>	23.64 ± 1.04 <sup>cd</sup>
WCE	3.74 ± 0.17 <sup>bi</sup>	12.60 ± 0.00 <sup>ef</sup>	3.62 ± 0.01 <sup>bg</sup>	9.75 ± 0.21 <sup>eg</sup>	4.00 ± 1.41 <sup>d</sup>	15.00 ± 4.24 <sup>b</sup>	6.45 ± 0.16 <sup>f</sup>	33.86 ± 2.68 <sup>g</sup>
WCES	3.05 ± 0.16 <sup>fi</sup>	12.20 ± 0.00 <sup>cdg</sup>	3.65 ± 0.00 <sup>ab</sup>	8.85 ± 0.21 <sup>cde</sup>	7.00 ± 1.41 <sup>bcd</sup>	27.50 ± 3.54 <sup>ab</sup>	7.48 ± 0.12 <sup>f</sup>	14.14 ± 0.37 <sup>ef</sup>
Chi-square (X <sup>2</sup> ) <sup>A</sup>	20.798	20.718	20.662	20.726	20.373	19.16	20.68	20.704
<i>p</i> -value <sup>A</sup>	0.02254	0.02315	0.02358	0.02309	0.02592	0.03827	0.02344	0.02326

\* S, *V. sylvestris*; V, Vinhão; M, Marufo; C, Castelão; B, beaker fermentations; E, Erlenmeyer fermentations; W, white wine type fermentations.

<sup>A</sup> Degrees of freedom (*df*) = 10. Differences between treatment groups at the 5% significance level (*p* < 0.05).

<sup>B</sup> The means displayed in the same column with different lowercase superscript letters differ significantly at the *p* < 0.05 level of probability. The means with at least one common letter are not significantly different (*p* > 0.05).

**Table S9.** Means and standard deviations (SDs) of standard physical-chemical and CIELAB parameters of the 2021 wines, followed by the results of the Kruskal-Wallis (Chi-square, *df*, *p*-value) <sup>A</sup> and the Conover-Iman tests <sup>B</sup>.

Sample code *	Volatile acidity (g/L acetic acid)	Ethanol at 20°C (% <i>v/v</i> )	pH	Total acidity (g/L tartaric acid)	Free SO <sub>2</sub> (mg/L)	Total SO <sub>2</sub> (mg/L)	C*	H*
SB	4.79 ± 1.23 <sup>cg</sup>	8.60 ± 0.00 <sup>g</sup>	3.20 ± 0.03 <sup>i</sup>	18.35 ± 1.77 <sup>acd</sup>	34.00 ± 0.00 <sup>e</sup>	63.50 ± 2.12 <sup>hi</sup>	69.53 ± 0.27 <sup>h</sup>	30.98 ± 0.82 <sup>f</sup>
SE	0.92 ± 0.04 <sup>de</sup>	12.10 ± 0.00 <sup>h</sup>	3.29 ± 0.01 <sup>abd</sup>	11.40 ± 0.14 <sup>ghi</sup>	31.00 ± 1.41 <sup>de</sup>	60.00 ± 0.00 <sup>ghi</sup>	68.22 ± 0.20 <sup>hi</sup>	28.03 ± 2.84 <sup>fg</sup>
VB	4.16 ± 0.04 <sup>cg</sup>	10.20 ± 0.00 <sup>i</sup>	3.44 ± 0.00 <sup>cfg</sup>	13.35 ± 0.49 <sup>bgi</sup>	15.00 ± 0.00 <sup>acd</sup>	32.50 ± 3.54 <sup>dfgh</sup>	56.93 ± 0.26 <sup>dei</sup>	29.90 ± 0.01 <sup>fg</sup>
VE	4.33 ± 0.57 <sup>cfg</sup>	12.20 ± 0.00 <sup>j</sup>	3.55 ± 0.02 <sup>efh</sup>	11.25 ± 0.92 <sup>ghi</sup>	15.00 ± 1.41 <sup>acd</sup>	30.00 ± 0.00 <sup>bdfg</sup>	60.63 ± 1.04 <sup>ehi</sup>	28.75 ± 1.03 <sup>efg</sup>
MB	3.91 ± 0.02 <sup>efg</sup>	8.40 ± 0.00 <sup>d</sup>	3.05 ± 0.01 <sup>i</sup>	18.70 ± 0.28 <sup>acd</sup>	15.00 ± 0.00 <sup>acd</sup>	23.50 ± 2.12 <sup>abce</sup>	20.08 ± 0.49 <sup>fg</sup>	0.76 ± 0.36 <sup>abc</sup>
ME	1.88 ± 0.08 <sup>defg</sup>	9.80 ± 0.00 <sup>f</sup>	3.14 ± 0.02 <sup>ij</sup>	14.25 ± 0.35 <sup>abi</sup>	16.50 ± 2.12 <sup>cde</sup>	27.50 ± 3.54 <sup>abdf</sup>	23.08 ± 1.48 <sup>bf</sup>	-2.72 ± 1.43 <sup>a</sup>
BB	4.87 ± 1.12 <sup>acg</sup>	8.40 ± 0.00 <sup>d</sup>	3.70 ± 0.00 <sup>eh</sup>	14.20 ± 0.99 <sup>abi</sup>	16.50 ± 2.12 <sup>cde</sup>	30.00 ± 0.00 <sup>bdfg</sup>	47.80 ± 2.77 <sup>cd</sup>	1.43 ± 0.06 <sup>bcd</sup>
BE	0.55 ± 0.06 <sup>d</sup>	11.70 ± 0.00 <sup>e</sup>	3.86 ± 0.00 <sup>h</sup>	6.90 ± 0.14 <sup>f</sup>	18.00 ± 0.00 <sup>de</sup>	33.50 ± 2.12 <sup>fghi</sup>	52.63 ± 0.79 <sup>cde</sup>	2.35 ± 0.02 <sup>bcde</sup>
AB	6.16 ± 0.15 <sup>abc</sup>	10.00 ± 0.00 <sup>a</sup>	3.37 ± 0.00 <sup>abc</sup>	17.75 ± 0.64 <sup>abc</sup>	13.00 ± 0.00 <sup>abc</sup>	26.50 ± 2.12 <sup>abcd</sup>	30.11 ± 0.52 <sup>ab</sup>	-1.95 ± 0.31 <sup>a</sup>
AE	1.74 ± 0.08 <sup>def</sup>	11.20 ± 0.00 <sup>c</sup>	3.50 ± 0.01 <sup>efg</sup>	9.55 ± 0.21 <sup>fgh</sup>	13.00 ± 0.00 <sup>abc</sup>	25.00 ± 0.00 <sup>abc</sup>	28.66 ± 1.67 <sup>ab</sup>	-2.22 ± 0.40 <sup>a</sup>
ACB	13.12 ± 0.66 <sup>ab</sup>	6.90 ± 0.00 <sup>b</sup>	3.29 ± 0.01 <sup>ad</sup>	27.60 ± 0.57 <sup>de</sup>	12.00 ± 0.00 <sup>ab</sup>	19.00 ± 1.41 <sup>ace</sup>	31.52 ± 1.08 <sup>ac</sup>	-1.14 ± 0.05 <sup>ab</sup>
WAB	21.13 ± 6.26 <sup>b</sup>	2.30 ± 0.00 <sup>k</sup>	3.27 ± 0.01 <sup>dj</sup>	20.35 ± 0.92 <sup>cde</sup>	7.50 ± 0.71 <sup>b</sup>	16.50 ± 2.12 <sup>ce</sup>	12.62 ± 0.23 <sup>gj</sup>	5.48 ± 0.37 <sup>defg</sup>
WAE	8.11 ± 0.87 <sup>abc</sup>	6.50 ± 0.00 <sup>l</sup>	3.17 ± 0.08 <sup>ij</sup>	38.15 ± 9.12 <sup>e</sup>	7.50 ± 0.71 <sup>b</sup>	13.00 ± 0.00 <sup>e</sup>	13.60 ± 1.44 <sup>gj</sup>	1.86 ± 0.77 <sup>bcd</sup>
WAES	0.41 ± 0.08 <sup>d</sup>	11.50 ± 0.00 <sup>m</sup>	3.39 ± 0.01 <sup>bcg</sup>	8.20 ± 0.00 <sup>dh</sup>	17.00 ± 0.00 <sup>cde</sup>	193.50 ± 2.12 <sup>i</sup>	11.70 ± 0.28 <sup>j</sup>	2.70 ± 0.17 <sup>cddeg</sup>
Chi-square (X <sup>2</sup> ) <sup>A</sup>	26.249	27	26.726	26.534	25.603	26.294	26.808	26.32
<i>p</i> -value <sup>A</sup>	0.01574	0.01244	0.01356	0.0144	0.01921	0.01552	0.01322	0.01539

\* S, *V. sylvestris*; V, Vinhão; M, Melhorio; B, Branjo; A, Aragonéz; B, beaker fermentations; E, Erlenmeyer fermentations; C, clay beaker fermentations; W, white wine type fermentations.

<sup>A</sup> Degrees of freedom (*df*) = 13. Differences between treatment groups at the 5% significance level (*p* < 0.05).

<sup>B</sup> The means displayed in the same column with different lowercase superscript letters differ significantly at the *p* < 0.05 level of probability. The means with at least one common letter are not significantly different (*p* > 0.05).

**Table S10.** Analysis at the end of fermentation for the wines from the harvests of 2020 and 2021.

Sample (2020)	Malic Acid (g/L)	Lactic Acid (g/L)	Glucose and fructose (g/L)	Sample (2021)	Malic Acid (g/L)	Lactic Acid (g/L)	Glucose and fructose (g/L)
SB	4.0 ± 0.0	0.00 ± 0.00	4.4 ± 0.1	SB	2.7 ± 0.0	1.31 ± 0.04	1.8 ± 0.1
SE	n.a. <sup>a</sup>	n.a.	n.a.	SE	2.2 ± 0.0	1.44 ± 0.08	2.3 ± 0.7
VB	4.4 ± 0.2	0.00 ± 0.00	> 10	VB	0.3 ± 0.1	1.93 ± 0.01	47.1 ± 3.3
VE	3.9 ± 0.2	0.00 ± 0.00	> 10	VE	0.4 ± 0.0	1.87 ± 0.04	35.2 ± 0.7
MB	3.1 ± 0.3	0.00 ± 0.00	> 10	MB	5.9 ± 0.1	0.08 ± 0.06	0.7 ± 0.0
ME	2.2 ± 0.1	0.00 ± 0.00	> 10	ME	5.5 ± 0.0	0.15 ± 0.01	0.6 ± 0.1
CB	4.9 ± 0.2	0.50 ± 0.10	1.7 ± 0.4	BB	0.5 ± 0.1	1.79 ± 0.04	0.7 ± 0.0
CE	2.1 ± 0.1	0.50 ± 0.00	1.8 ± 0.2	BE	0.8 ± 0.1	1.90 ± 0.03	1.1 ± 0.5
WCB	6.9 ± 0.1	0.03 ± 0.06	6.2 ± 0.0	AB	3.1 ± 0.1	0.00 ± 0.00	1.8 ± 0.2
WCE	3.8 ± 0.0	0.00 ± 0.00	3.7 ± 0.2	AE	2.9 ± 0.1	0.03 ± 0.04	0.8 ± 0.7
WCES	3.5 ± 0.2	0.00 ± 0.00	3.0 ± 0.2	ACB	3.0 ± 0.1	0.01 ± 0.01	6.0 ± 0.3
–	–	–	–	WAB	3.1 ± 0.0	0.02 ± 0.00	0.3 ± 0.1
–	–	–	–	WAE	2.8 ± 0.0	0.01 ± 0.01	33.6 ± 15.7
–	–	–	–	WAES	3.3 ± 0.0	0.01 ± 0.01	1.5 ± 0.6

<sup>a</sup> "n.a." indicates not analysed.



**Table S11.** Means and standard deviations (SDs) of the 2020 wines' chromatic characteristics, followed by the results of the Kruskal-Wallis (Chi-square, *df*, *p*-value) <sup>A</sup> and the Conover-Iman tests <sup>B</sup>.

Sample code *	Intensity (I) (a.u.)	Shade (N) (a.u.)	Total phenol index	Anthocyanins (mg/L)	Total anthocyanins (mg L <sup>-1</sup> malvidin-3-O-glucoside)	Degree of ionization of anthocyanins (α) (%)	Ionized anthocyanins (mg L <sup>-1</sup> malvidin-3-O-glucoside)	Total pigments (a.u.)	Polymerization index (%)	Polymerized pigments (a.u.)
SB	27.33 ± 2.17 <sup>bd</sup>	0.44 ± 0.01 <sup>cgh</sup>	92.16 ± 8.16 <sup>de</sup>	698.08 ± 50.59 <sup>e</sup>	245.96 ± 175.70 <sup>abc</sup>	140.93 ± 93.19 <sup>d</sup>	264.77 ± 18.41 <sup>bde</sup>	19.25 ± 9.33 <sup>bd</sup>	24.09 ± 9.98 <sup>abcd</sup>	4.17 ± 0.33 <sup>be</sup>
SE	27.25 ± 1.34 <sup>bd</sup>	0.47 ± 0.00 <sup>acg</sup>	91.09 ± 4.04 <sup>de</sup>	666.15 ± 33.72 <sup>e</sup>	234.99 ± 26.45 <sup>abc</sup>	97.07 ± 4.15 <sup>cd</sup>	227.57 ± 15.92 <sup>bd</sup>	20.48 ± 1.32 <sup>bd</sup>	25.63 ± 1.66 <sup>bcd</sup>	5.24 ± 0.00 <sup>ef</sup>
VB	144.56 ± 0.31 <sup>d</sup>	0.32 ± 0.00 <sup>gh</sup>	142.15 ± 8.70 <sup>e</sup>	321.73 ± 29.21 <sup>ade</sup>	1160.77 ± 115.50 <sup>b</sup>	133.56 ± 15.53 <sup>d</sup>	1541.31 ± 26.00 <sup>de</sup>	96.26 ± 7.94 <sup>d</sup>	23.85 ± 0.62 <sup>abcd</sup>	22.93 ± 1.30 <sup>g</sup>
VE	139.86 ± 2.74 <sup>d</sup>	0.28 ± 0.02 <sup>h</sup>	144.90 ± 6.65 <sup>e</sup>	320.77 ± 9.14 <sup>acde</sup>	1196.04 ± 211.47 <sup>b</sup>	132.95 ± 23.88 <sup>d</sup>	1564.89 ± 4.41 <sup>e</sup>	96.06 ± 10.94 <sup>d</sup>	22.78 ± 2.37 <sup>abcd</sup>	21.76 ± 0.22 <sup>fg</sup>
MB	6.05 ± 0.53 <sup>ac</sup>	0.93 ± 0.01 <sup>ef</sup>	33.31 ± 1.15 <sup>ad</sup>	101.73 ± 6.36 <sup>bcfg</sup>	96.25 ± 7.78 <sup>acd</sup>	27.89 ± 0.28 <sup>abc</sup>	26.84 ± 1.90 <sup>ac</sup>	7.20 ± 0.56 <sup>acef</sup>	19.91 ± 0.14 <sup>abcd</sup>	1.43 ± 0.10 <sup>ac</sup>
ME	5.66 ± 0.37 <sup>ac</sup>	0.90 ± 0.00 <sup>de</sup>	34.17 ± 2.86 <sup>ad</sup>	96.96 ± 10.28 <sup>bfg</sup>	114.47 ± 8.34 <sup>acd</sup>	23.28 ± 0.71 <sup>ab</sup>	26.68 ± 2.76 <sup>ac</sup>	7.93 ± 0.46 <sup>abce</sup>	16.73 ± 0.62 <sup>abc</sup>	1.33 ± 0.03 <sup>cd</sup>
CB	7.63 ± 0.35 <sup>ab</sup>	0.60 ± 0.01 <sup>abc</sup>	27.30 ± 2.12 <sup>abc</sup>	291.46 ± 0.44 <sup>abcd</sup>	215.62 ± 27.80 <sup>abc</sup>	24.38 ± 1.84 <sup>ab</sup>	52.31 ± 2.80 <sup>ab</sup>	13.50 ± 1.43 <sup>abc</sup>	12.16 ± 1.12 <sup>ab</sup>	1.63 ± 0.02 <sup>ab</sup>
CE	7.79 ± 0.97 <sup>ab</sup>	0.63 ± 0.00 <sup>abd</sup>	30.05 ± 3.18 <sup>abd</sup>	335.46 ± 0.54 <sup>ae</sup>	268.64 ± 27.36 <sup>ab</sup>	17.84 ± 0.26 <sup>a</sup>	47.97 ± 5.59 <sup>ab</sup>	16.44 ± 1.76 <sup>abd</sup>	10.96 ± 0.27 <sup>a</sup>	1.80 ± 0.24 <sup>ab</sup>
WCB	3.38 ± 0.19 <sup>ce</sup>	0.94 ± 0.03 <sup>ef</sup>	15.50 ± 1.84 <sup>bc</sup>	63.85 ± 7.18 <sup>fg</sup>	27.60 ± 17.67 <sup>d</sup>	45.23 ± 20.20 <sup>bcd</sup>	10.70 ± 2.42 <sup>cf</sup>	2.99 ± 0.86 <sup>ef</sup>	33.81 ± 10.15 <sup>cd</sup>	0.97 ± 0.01 <sup>dh</sup>
WCE	2.74 ± 0.04 <sup>e</sup>	1.05 ± 0.03 <sup>f</sup>	22.65 ± 1.77 <sup>abc</sup>	32.50 ± 0.60 <sup>f</sup>	17.99 ± 1.78 <sup>d</sup>	41.28 ± 3.26 <sup>bcd</sup>	7.46 ± 1.32 <sup>f</sup>	2.19 ± 0.02 <sup>f</sup>	35.33 ± 2.21 <sup>d</sup>	0.77 ± 0.04 <sup>i</sup>
WCES	2.91 ± 0.08 <sup>ce</sup>	0.88 ± 0.01 <sup>bd</sup>	13.70 ± 0.85 <sup>c</sup>	105.54 ± 1.09 <sup>bcdg</sup>	50.25 ± 3.39 <sup>cd</sup>	19.38 ± 1.35 <sup>a</sup>	9.72 ± 0.02 <sup>cf</sup>	3.93 ± 0.14 <sup>cef</sup>	21.65 ± 1.19 <sup>abcd</sup>	0.85 ± 0.02 <sup>hi</sup>
Chi-square (X <sup>2</sup> ) <sup>A</sup>	20.609	20.775	20.324	20.348	19.945	20.04	20.609	20.324	18.308	20.798
<i>p</i> -value <sup>A</sup>	0.02399	0.02272	0.02633	0.02613	0.02978	0.02888	0.02399	0.02633	0.04998	0.02254

\* S, *V. sylvestris*; V, Vinhão; M, Marufo; C, Castelhão; B, beaker fermentations; E, Erlenmeyer fermentations; W, white wine type fermentations.

<sup>A</sup> Degrees of freedom (*df*) = 10. Differences between treatment groups at the 5% significance level (*p* < 0.05).

<sup>B</sup> The means displayed in the same column with different lowercase superscript letters differ significantly at the *p* < 0.05 level of probability. The means with at least one common letter are not significantly different (*p* > 0.05).

**Table S12.** Means and standard deviations (SDs) of the 2021 wines' chromatic characteristics, followed by the results of the Kruskal-Wallis (Chi-square, *df*, *p*-value) <sup>A</sup> and the Conover-Iman tests <sup>B</sup>.

Sample code*	Intensity (I) (a.u.)	Shade (N) (a.u.)	Total phenol index	Anthocyanins (mg/L)	Total anthocyanins (mg L <sup>-1</sup> malvidin-3-O-glucoside)	Degree of ionization of anthocyanins ( $\alpha$ ) (%)	Ionized anthocyanins (mg L <sup>-1</sup> malvidin-3-O-glucoside)	Total pigments (a.u.)	Polymerization index (%)	Polymerized pigments (a.u.)
SB	64.46 ± 2.66 <sup>ef</sup>	0.43 ± 0.01 <sup>bcg</sup>	209.25 ± 20.29 <sup>g</sup>	1210.38 ± 149.58 <sup>cdg</sup>	1082.98 ± 19.09 <sup>gik</sup>	58.63 ± 2.97 <sup>fg</sup>	634.63 ± 21.00 <sup>fg</sup>	70.27 ± 0.24 <sup>ij</sup>	13.77 ± 0.66 <sup>gh</sup>	9.67 ± 0.43 <sup>gh</sup>
SE	58.96 ± 8.19 <sup>def</sup>	0.42 ± 0.01 <sup>cg</sup>	189.40 ± 8.49 <sup>g</sup>	1282.69 ± 141.97 <sup>cdg</sup>	1016.72 ± 48.45 <sup>fgj</sup>	57.48 ± 6.08 <sup>efg</sup>	585.93 ± 89.65 <sup>dfg</sup>	65.09 ± 3.97 <sup>efi</sup>	13.12 ± 0.63 <sup>fgh</sup>	8.56 ± 0.93 <sup>fgh</sup>
VB	132.55 ± 0.42 <sup>f</sup>	0.23 ± 0.00 <sup>g</sup>	119.85 ± 1.77 <sup>fg</sup>	2260.77 ± 20.67 <sup>g</sup>	1768.23 ± 37.93 <sup>k</sup>	100.04 ± 1.76 <sup>g</sup>	1768.64 ± 6.90 <sup>g</sup>	107.69 ± 1.32 <sup>j</sup>	10.74 ± 0.45 <sup>efg</sup>	11.57 ± 0.35 <sup>h</sup>
VE	70.22 ± 7.78 <sup>ef</sup>	0.42 ± 0.01 <sup>bcg</sup>	103.80 ± 5.94 <sup>efg</sup>	1940.00 ± 153.39 <sup>dg</sup>	1531.94 ± 147.25 <sup>jk</sup>	45.05 ± 3.09 <sup>befg</sup>	692.38 ± 113.70 <sup>fg</sup>	92.47 ± 6.81 <sup>ij</sup>	10.34 ± 1.12 <sup>defg</sup>	9.52 ± 0.33 <sup>gh</sup>
MB	4.97 ± 0.15 <sup>bcg</sup>	0.63 ± 0.00 <sup>f</sup>	55.00 ± 1.27 <sup>bd</sup>	69.23 ± 5.44 <sup>e</sup>	47.90 ± 11.94 <sup>h</sup>	55.01 ± 0.34 <sup>efg</sup>	26.33 ± 6.41 <sup>beh</sup>	4.82 ± 0.20 <sup>g</sup>	30.30 ± 6.20 <sup>h</sup>	1.45 ± 0.24 <sup>de</sup>
ME	6.28 ± 0.87 <sup>abc</sup>	0.61 ± 0.03 <sup>ef</sup>	59.60 ± 3.68 <sup>bde</sup>	96.92 ± 14.14 <sup>bef</sup>	56.48 ± 10.64 <sup>hi</sup>	64.34 ± 2.83 <sup>fg</sup>	36.49 ± 8.44 <sup>bceh</sup>	5.53 ± 0.52 <sup>gh</sup>	29.50 ± 2.90 <sup>h</sup>	1.62 ± 0.01 <sup>de</sup>
BB	15.85 ± 1.66 <sup>ade</sup>	0.55 ± 0.01 <sup>ade</sup>	56.95 ± 9.55 <sup>bde</sup>	458.08 ± 21.21 <sup>ac</sup>	475.04 ± 58.32 <sup>cef</sup>	26.58 ± 0.53 <sup>abce</sup>	126.41 ± 18.03 <sup>acdf</sup>	28.46 ± 3.12 <sup>cde</sup>	9.96 ± 0.66 <sup>adef</sup>	2.82 ± 0.12 <sup>ef</sup>
BE	21.50 ± 1.38 <sup>adef</sup>	0.55 ± 0.01 <sup>adef</sup>	79.10 ± 0.14 <sup>def</sup>	683.46 ± 28.83 <sup>acd</sup>	663.17 ± 25.39 <sup>efg</sup>	25.29 ± 1.33 <sup>abcd</sup>	167.87 ± 15.23 <sup>adfg</sup>	39.51 ± 1.44 <sup>def</sup>	9.64 ± 0.10 <sup>defg</sup>	3.81 ± 0.10 <sup>efg</sup>
AB	6.73 ± 0.61 <sup>abc</sup>	0.51 ± 0.03 <sup>abc</sup>	28.87 ± 0.56 <sup>ab</sup>	213.00 ± 7.29 <sup>ab</sup>	231.00 ± 3.65 <sup>abc</sup>	26.46 ± 3.85 <sup>abcd</sup>	61.19 ± 9.86 <sup>abcd</sup>	13.29 ± 0.12 <sup>abc</sup>	7.84 ± 0.35 <sup>abc</sup>	1.04 ± 0.04 <sup>abc</sup>
AE	6.83 ± 0.72 <sup>abc</sup>	0.53 ± 0.01 <sup>abd</sup>	29.39 ± 1.34 <sup>ab</sup>	210.42 ± 8.21 <sup>ab</sup>	241.57 ± 12.82 <sup>ace</sup>	23.62 ± 1.58 <sup>acd</sup>	57.16 ± 6.84 <sup>abce</sup>	14.05 ± 0.81 <sup>acd</sup>	8.41 ± 0.25 <sup>abd</sup>	1.18 ± 0.10 <sup>ad</sup>
ACB	7.02 ± 0.47 <sup>abd</sup>	0.50 ± 0.01 <sup>abc</sup>	27.11 ± 0.05 <sup>ac</sup>	192.92 ± 53.20 <sup>ab</sup>	211.18 ± 13.46 <sup>abd</sup>	30.11 ± 0.74 <sup>abef</sup>	63.63 ± 5.61 <sup>abcd</sup>	12.43 ± 0.74 <sup>ab</sup>	9.03 ± 0.23 <sup>abde</sup>	1.12 ± 0.04 <sup>abd</sup>
WAB	2.50 ± 0.00 <sup>cg</sup>	0.61 ± 0.01 <sup>ef</sup>	13.24 ± 0.21 <sup>c</sup>	76.31 ± 0.98 <sup>ef</sup>	97.95 ± 6.28 <sup>dil</sup>	22.89 ± 1.11 <sup>cd</sup>	22.39 ± 0.35 <sup>eh</sup>	5.47 ± 0.31 <sup>gh</sup>	6.28 ± 0.43 <sup>bc</sup>	0.34 ± 0.00 <sup>bc</sup>
WAE	2.41 ± 0.13 <sup>cg</sup>	0.53 ± 0.02 <sup>abd</sup>	11.26 ± 0.11 <sup>c</sup>	75.96 ± 11.26 <sup>ef</sup>	92.22 ± 2.68 <sup>hil</sup>	25.45 ± 0.55 <sup>abcd</sup>	23.48 ± 1.19 <sup>beh</sup>	5.16 ± 0.20 <sup>gh</sup>	6.38 ± 0.52 <sup>bc</sup>	0.33 ± 0.04 <sup>c</sup>
WAES	2.26 ± 0.03 <sup>g</sup>	0.59 ± 0.00 <sup>def</sup>	16.87 ± 0.30 <sup>ac</sup>	124.88 ± 3.97 <sup>bf</sup>	154.55 ± 5.12 <sup>bdil</sup>	13.31 ± 0.64 <sup>d</sup>	20.56 ± 0.31 <sup>h</sup>	8.26 ± 0.26 <sup>bh</sup>	3.88 ± 0.11 <sup>c</sup>	0.32 ± 0.00 <sup>c</sup>
Chi-square (X <sup>2</sup> ) <sup>A</sup>	26.224	26.187	26.616	26.498	26.764	25.921	26.213	26.704	26.379	26.586
<i>p</i> -value <sup>A</sup>	0.01586	0.01604	0.01404	0.01457	0.0134	0.01742	0.01592	0.01365	0.01511	0.01417

\* S, *V. sylvestris*; V, Vinhão; M, Melhorio; B, Branjo; A, Aragonez; B, beaker fermentations; E, Erlenmeyer fermentations; C, clay beaker fermentations; W, white wine type fermentations.

<sup>A</sup> Degrees of freedom (*df*) = 13. Differences between treatment groups at the 5% significance level (*p* < 0.05).

<sup>B</sup> The means displayed in the same column with different lowercase superscript letters differ significantly at the *p* < 0.05 level of probability. The means with at least one common letter are not significantly different (*p* > 0.05).

**Table S13.** Volatile composition of the 2020 wines samples \*.

Compounds	Concentration (mg/L)										
	SB	SE	VB	VE	MB	ME	CB	CE	WCB	WCE	WCES
Acetaldehyde	43.9	130.4	47.0	43.3	43.0	37.2	12.6	171.8	47.5	24.0	32.3
Methanol	116.6	158.3	101.5	94.4	70.5	113.5	69.6	85.4	25.9	35.2	40.9
1-Propanol	44.8	77.4	12.9	29.5	15.5	31.7	37.1	43.9	15.7	25.8	24.3
Diacetyl	0.0	0.0	0.0	1.9	0.0	2.5	11.4	1.8	0.0	0.0	0.0
Ethyl acetate	42.6	142.2	154.3	106.1	196.5	148.8	750.5	161.6	875.9	285.3	151.5
Isobutanol	39.9	72.5	45.7	4.9	75.5	109.1	87.1	102.1	24.3	54.6	63.1
Acetoin	10.3	30.2	5.2	6.2	17.7	8.1	5.6	8.1	5.8	6.2	8.4
2-Methyl-1-butanol	150.6	219.7	103.2	138.8	142.4	218.2	97.8	138.4	54.6	82.9	94.1
3-Methyl-1-butanol	40.2	71.0	73.7	33.6	37.4	81.5	32.6	44.4	12.3	24.9	25.0
Isobutyl acetate	0.0	4.0	14.3	9.6	3.9	0.0	1.6	4.2	2.9	3.1	1.7
Ethyl lactate	55.9	94.8	0.0	9.4	15.4	11.1	14.1	47.3	14.6	5.8	16.5
2,3-Butanediol	1412.3	1353.4	1261.4	969.0	835.9	1004.3	1062.3	778.4	803.6	569.3	708.0
Isoamyl acetate	0.0	0.0	275.7	776.4	0.0	1.7	2.7	0.0	3.9	210.7	247.1
Hexanol	4.3	4.5	4.4	0.0	3.6	0.0	5.6	0.0	3.8	0.0	0.0
2-Phenylethanol	73.2	61.1	54.4	52.9	53.7	55.7	51.9	43.6	42.7	32.9	37.2
2-Phenylethyl acetate	8.2	7.4	128.6	70.1	63.5	47.9	12.0	23.2	24.5	12.4	11.2

\* S, *V. sylvestris*; V, Vinhão; M, Marufo; C, Castelão; B, beaker fermentations; E, Erlenmeyer fermentations; W, white wine type fermentations.

Note: The non-parametric Kruskal-Wallis test and the Conover-Iman test of post hoc pairwise comparisons were not performed for these measures as samples were reported without repetitions.

**Table S14.** Means and standard deviations (SDs) of the composition of volatile compounds in the analysed wines samples of 2021 \*, followed by the results of the Kruskal-Wallis (Chi-square, *df*, *p*-value) test <sup>A</sup> and the Conover-Iman test <sup>B</sup>.

Compounds	Concentration (mg/L)													
	SB	SE	VB	VE	MB	ME	BB	BE	AB	AE	ACB	WAB	WAE	WAES
Acetaldehyde	6.0±2.4 c	6.9±0.8 c	15.4±2.4 ac	17.6±1.3 ac	21.8±13.6 abc	20.1±4.7 abc	49.8±15.4 ab	24.7±6.1 abc	19.6±4.7 abc	52.3±7.8 ab	39.6±6.5 ab	26.6±9.8 abc	36.7±7.7 abc	98.5±49.4 b
Methanol	204.1±89.6 dhi	357.0±21.2 i	145.9±10.7 cdhi	167.3±14.1 dhi	60.1±3.4 befg	77.3±0.3 abef	98.2±3.0 abce	225.9±10.3 hi	108.6±9.6 abcd	121.4±2.1 acdh	75.3±24.2 abefg	6.6±0.5 g	57.8±4.3 efg	46.9±1.4 fg
1-Propanol <sup>†</sup>	18.9±2.8	28.3±0.4	21.5±30.4	38.7±23.2	22.2±3.0	26.8±2.2	15.5±4.0	43.5±2.5	20.0±2.6	27.5±1.2	15.5±0.6	5.8±0.0	21.7±0.1	20.6±2.9
Diacetyl	1.0±1.3 ab	1.8±0.1 ab	1.2±1.6 ab	8.4±6.2 b	1.7±0.1 ab	1.9±0.2 ab	2.5±0.2 ab	2.6±0.1 ab	3.1±1.0 ab	3.0±0.3 b	n.d.	n.d.	1.2±1.7 ab	3.1±0.5 ab
Ethyl acetate	432.5±267.6 abc	85.4±1.8 de	487.2±39.0 abc	396.2±70.2 acf	191.2±8.2 cdf	137.8±13.0 def	450.9±45.7 abc	105.8±6.4 de	611.0±31.3 ab	165.2±25.2 cdef	1570.6±123.2 ab	186.9±69.2 cdef	1794.7±59.6 b	33.6±13.1 e
Isobutanol	45.2±0.4 acd	64.4±4.3 ef	39.3±3.8 abc	28.0±5.0 ab	53.7±2.3 cde	55.3±3.5 de	46.1±7.6 acd	70.5±1.9 ef	42.0±3.0 abc	54.5±4.0 cde	29.3±1.4 ab	8.2±1.2 b	65.6±10.7 ef	126.1±8.3 f
Acetoin <sup>†</sup>	8.9±2.6	8.5±1.8	14.1±9.1	8.3±2.1	6.3±0.1	7.1±0.9	6.7±0.1	7.0±0.8	7.8±1.5	7.3±0.9	11.7±5.7	7.9±2.1	8.2±2.1	7.7±0.7
2-Methyl-1-butanol	43.0±2.0 cdef	57.3±9.4 def	59.6±12.4 de	34.5±7.6 abcf	40.4±2.5 bcd	46.3±1.2 cdef	33.5±7.2 abc	63.5±3.5 de	25.5±4.8 ab	32.9±0.8 abc	20.2±8.5 a	10.3±8.0 a	35.5±3.0 abcf	100.9±17.0 e
3-Methyl-1-butanol	114.9±5.9 dfg	153.2±14.8 gh	80.5±4.1 acde	82.9±14.8 acde	115.2±3.7 dfg	132.0±13.5 fgh	84.7±12.3 cde	170.0±3.6 gh	66.4±8.4 abc	95.4±3.7 def	42.8±2.6 ab	17.0±9.2 b	73.4±3.2 abce	245.9±17.2 h
Isobutyl acetate <sup>†</sup>	1.8±2.5	1.3±1.8	n.d.	2.8±3.9	2.6±3.6	1.2±1.7	n.d.	2.4±0.1	2.2±1.1	3.7±1.1	2.9±1.3	2.4±1.2	4.0±0.1	1.4±1.9
Ethyl lactate <sup>†</sup>	90.1±20.2	13.9±1.6	47.1±24.5	64.5±68.5	7.9±0.4	7.6±2.1	100.3±126.6	15.5±4.1	9.5±3.7	75.0±81.2	6.2±0.1	11.8±16.6	n.d.	9.9±4.2
2,3-Butanediol	808.5±62.3 bc	522.1±199.4 abc	997.0±267.6 b	917.4±43.3 b	609.9±3.0 abc	457.5±20.5 a	738.5±36.6 abc	718.7±122.0 abc	669.8±71.6 abc	611.6±28.4 abc	608.3±93.4 abc	557.9±88.0 abc	483.1±11.5 ac	386.0±28.6 a
Isoamyl acetate <sup>†</sup>	1.2±1.7	n.d.	n.d.	n.d.	n.d.	n.d.	1.0±1.3	n.d.	n.d.	n.d.	2.2±0.1	n.d.	3.0±0.1	1.0±1.3
Hexanol	4.6±0.6 ab	3.7±0.1 ab	5.4±0.0 b	2.6±3.7 ab	n.d.	n.d.	n.d.	3.9±0.0 ab	4.5±0.4 ab	3.6±0.1 ab	n.d.	1.9±2.7 ab	6.4±2.3 ab	n.d.
2-Phenylethanol	42.3±1.0 abcd	35.7±2.9 abcd	42.2±4.2 abcd	40.1±4.0 abcd	33.5±2.3 a	34.5±3.0 ac	48.5±2.0 bcd	56.4±1.1 bd	32.3±1.6 a	33.8±2.1 a	35.2±2.4 abc	42.1±2.5 abcd	34.6±1.7 ac	67.4±11.5 d

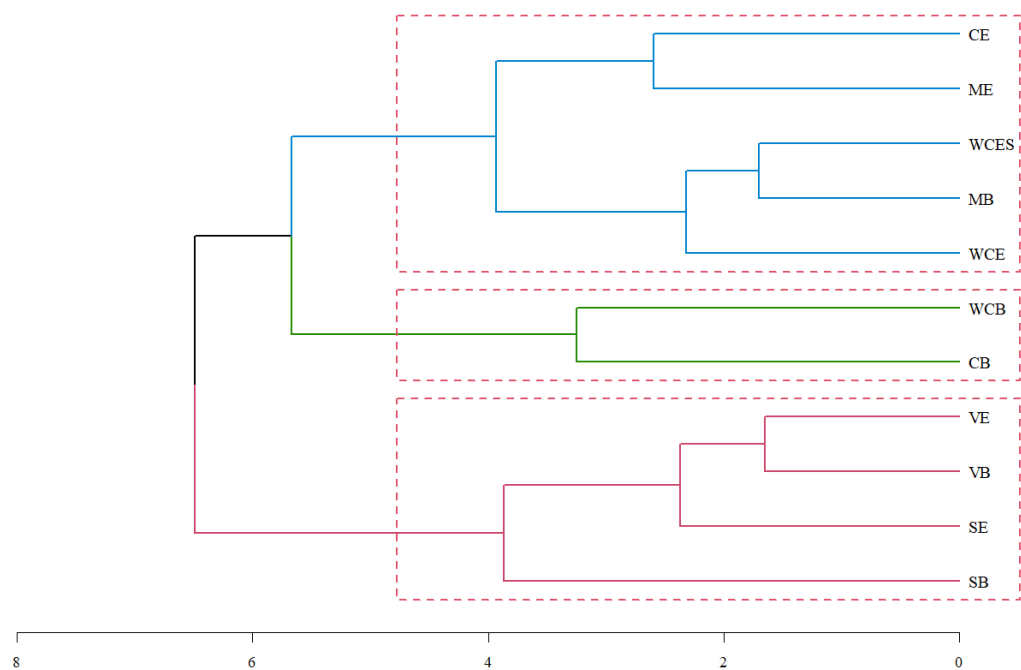
2-Phenylethyl acetate	5.9±0.6 ade	5.9±0.3 ade	62.2±3.1 b	50.4±5.8 bc	5.1±0.0 de	6.7±0.4 abcd	7.7±0.3 abc	4.9±0.1 e	7.5±0.9 abcd	5.7±1.1 ade	13.8±1.6 abc	5.8±0.1 ade	49.4±20.5 bc	6.3±0.1 acde
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\* S, *V. sylvestris*; V, Vinhão; M, Melhorio; B, Branjo; A, Aragonez; B, beaker fermentations; E, Erlenmeyer fermentations; C, clay beaker fermentations; W, white wine type fermentations.

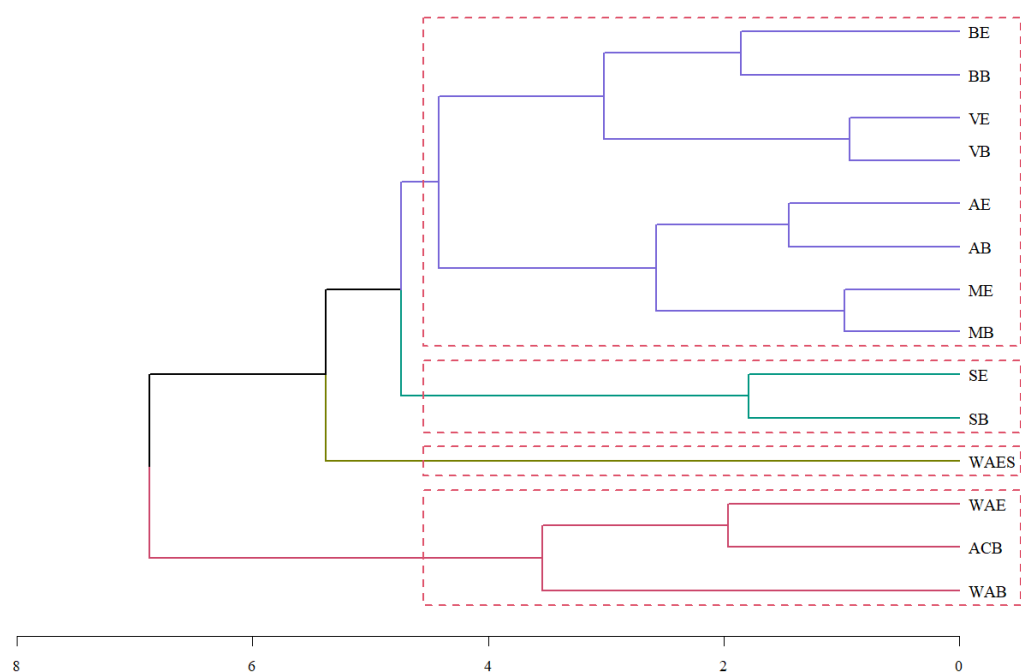
Note: Compounds marked with a superscript dagger (†) are not significantly different ( $p > 0.05$ ) according to the Kruskal-Wallis test, and the Conover-Iman test of post hoc pairwise comparisons wasn't conducted for these measures. "n.d." – indicates not detected.

<sup>A</sup> Differences between treatment groups at the 5% significance level ( $p < 0.05$ ). Acetaldehyde–Chi-square = 23.959,  $df = 13$ ,  $p$ -value = 0.03151, Methanol–Chi-square = 26.32,  $df = 13$ ,  $p$ -value = 0.01539, Diacetyl–Chi-square = 22.996,  $df = 13$ ,  $p$ -value = 0.04172, Ethyl acetate–Chi-square = 26.025,  $df = 13$ ,  $p$ -value = 0.01687, Isobutanol–Chi-square = 26.172,  $df = 13$ ,  $p$ -value = 0.01612, 2-Methyl-1-butanol–Chi-square = 25.677,  $df = 13$ ,  $p$ -value = 0.01878, 3-Methyl-1-butanol–Chi-square = 26.261,  $df = 13$ ,  $p$ -value = 0.01568, 2,3-Butanediol–Chi-square = 23.291,  $df = 13$ ,  $p$ -value = 0.03832, Hexanol–Chi-square = 22.926,  $df = 13$ ,  $p$ -value = 0.04258, 2-Phenylethanol–Chi-square = 24.018,  $df = 13$ ,  $p$ -value = 0.03097, 2-Phenylethyl acetate–Chi-square = 25.08,  $df = 13$ ,  $p$ -value = 0.02253.

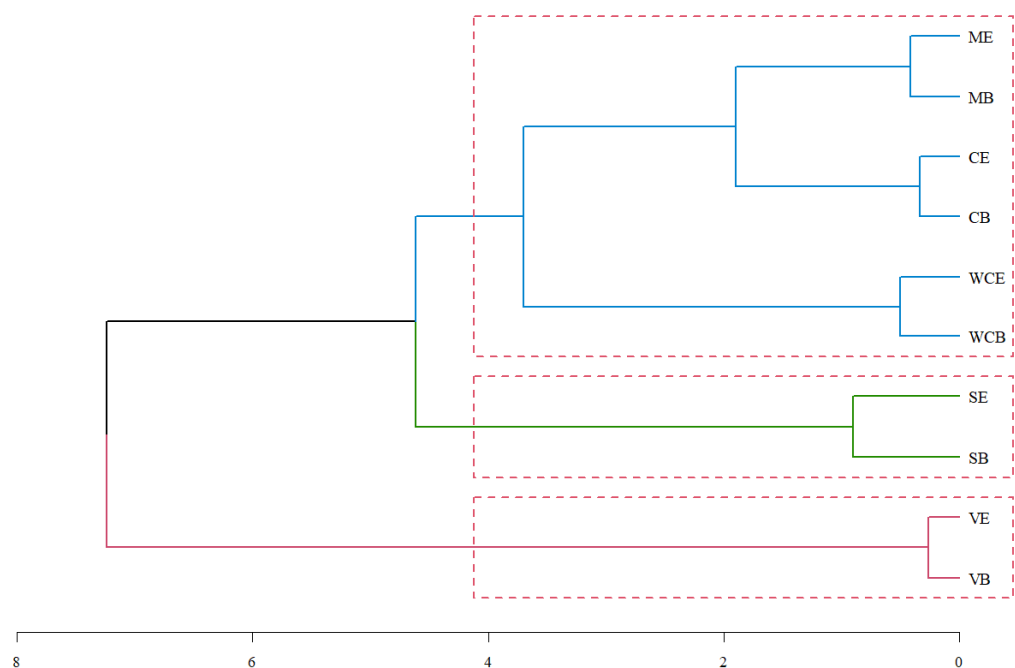
<sup>B</sup> The mean values displayed in the same row labelled with different lowercase letters differ significantly at the  $p < 0.05$  level of probability. The means with at least one common letter are not significantly different ( $p > 0.05$ ).



**Figure S1.** Dendrogram of the hierarchical clustering analysis (HCA) of the 2020 wine physical-chemical and CIELAB parameters (sample description in Table 1). The red-dashed rectangles around the branches show the corresponding clusters, marked by different colors. The height at which two branches are linked together reflects the distance between the wines/clusters, the smaller the height the more similar the wines/clusters are.

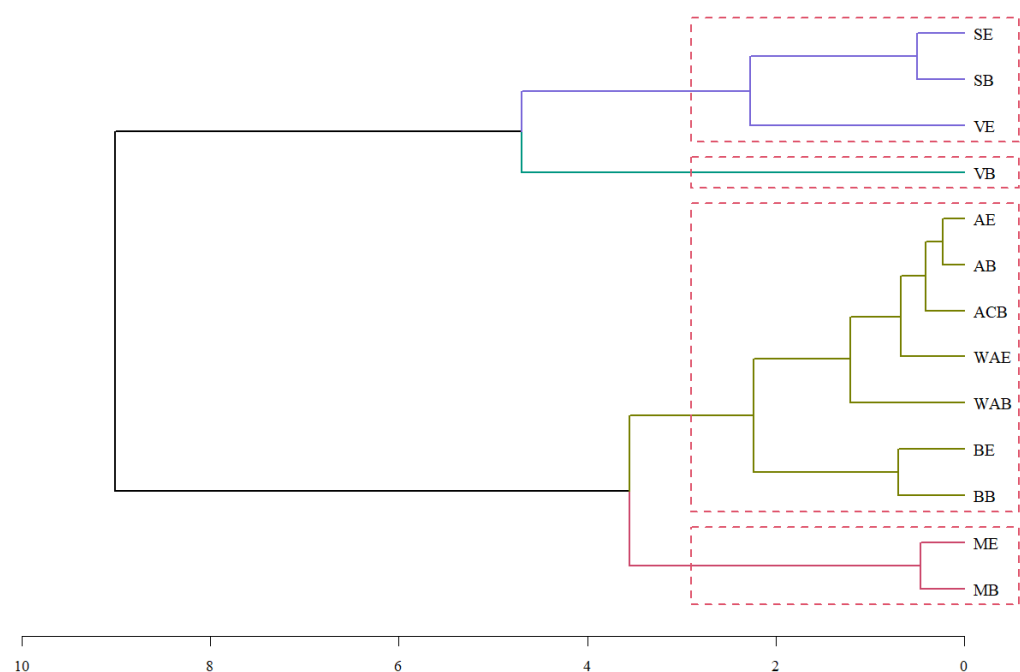


**Figure S2.** Dendrogram of the hierarchical clustering analysis (HCA) of physical-chemical analysis and CIELAB parameters of the 2021 wine samples (see Table 1 for sample description). The red-dashed rectangles around the branches show the corresponding clusters, marked by different colors. The height at which two branches are linked together reflects the distance between the wines/clusters, the smaller the height the more similar the wines/clusters are.

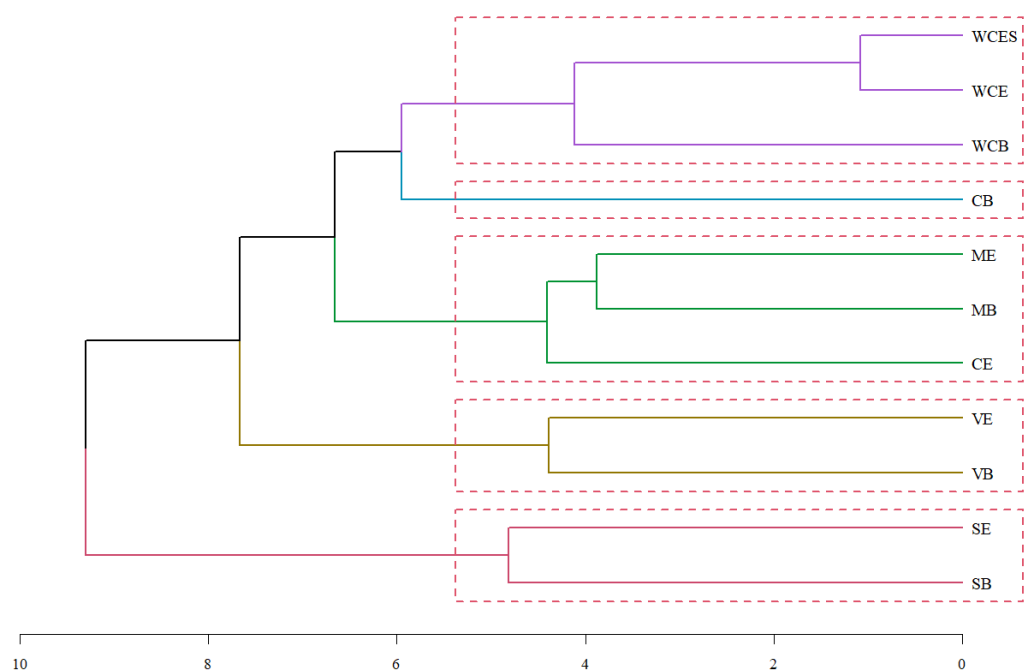


**Figure S3.** Dendrogram of the hierarchical clustering analysis (HCA) of chromatic analysis of the 2020 wine samples (sample description in Table 1). The red-dashed rectangles around the branches show the corresponding clusters, marked by different colors. The height at which two branches are linked together reflects the distance between the wines/clusters, the smaller the height the more similar the wines/clusters are.

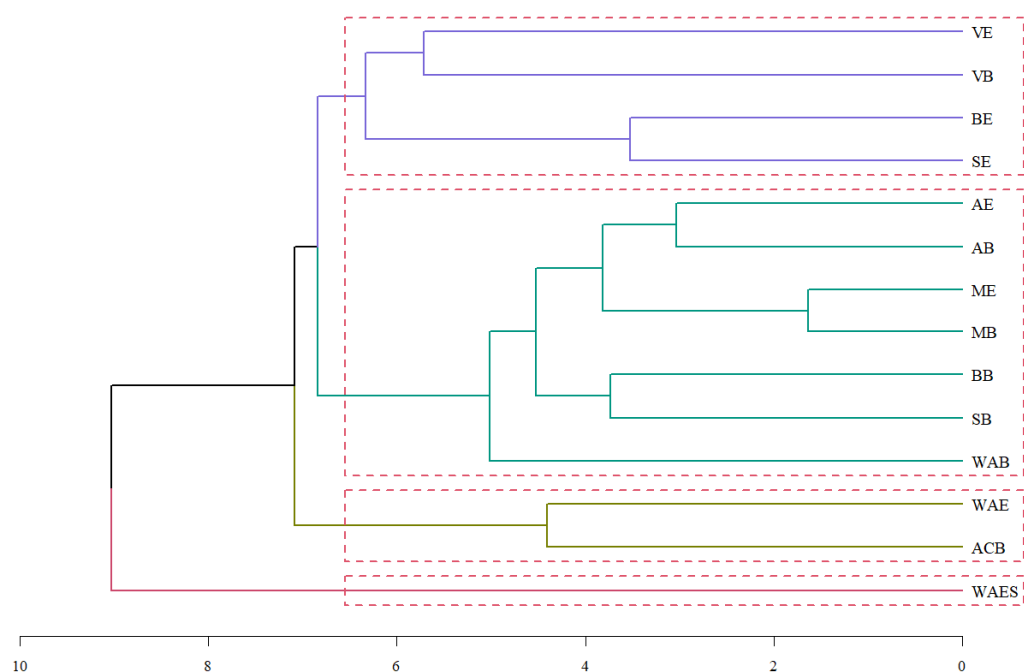




**Figure S4.** Dendrogram of the hierarchical clustering analysis (HCA) of the 2021 wine chromatic characteristics (see Table 1 for sample description). The red-dashed rectangles around the branches show the corresponding clusters, marked by different colors. The height at which two branches are linked together reflects the distance between the wines/clusters, the smaller the height the more similar the wines/clusters are.



**Figure S5.** Dendrogram of the hierarchical clustering analysis (HCA) of the volatile composition of the 2020 wine samples (sample description in Table 1). The red-dashed rectangles around the branches show the corresponding clusters, marked by different colors. The height at which two branches are linked together reflects the distance between the wines/clusters, the smaller the height the more similar the wines/clusters are.



**Figure S6.** Dendrogram of the hierarchical clustering analysis (HCA) of the volatile analysis of the 2021 wine samples (see Table 1 for sample description). The red-dashed rectangles around the branches show the corresponding clusters, marked by different colors. The height at which two branches are linked together reflects the distance between the wines/clusters, the smaller the height the more similar the wines/clusters are.