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SUPPLEMENTARY DATA

Table S1. Statistical significance values (*p*-values) obtained from a two-way ANOVA for the factors Vintage (V) and *Terroir* (T), and their interaction (V x T), of the most important oenological variables for the characterization of wines produced in three wineries of Moriles-Alto subzone. Values highlighted in red indicate non-significant differences at $p > 0.05$ level.

Compound/ Fraction	Vintage	Terroir	V x T
Ethanol (% *v/v*)	0.000	***0.159***	***0.159***
pH	0.000	0.000	0.000
Volatile acidity (g L^{-1})	0.000	0.000	0.000
Total acidity (g L^{-1})	0.000	0.000	0.000
Malic Acid (g L^{-1})	0.002	0.000	0.000
Lactic Acid (g L^{-1})	0.000	0.000	0.000
Density (g L^{-1})	ns	ns	ns
Reducing sugars (g L^{-1})	0.000	0.000	***0.167***
Absorbance 280 nm	0.000	0.000	0.000
Absorbance 420 nm	0.000	0.000	0.000

Table S2. Statistical significance values (*p*-values) obtained from a two-way ANOVA for the factors Vintage (V) and *Terroir* (T), and their interaction (V x T), for the major volatile compounds and polyols in the analyzed samples. Values highlighted in red indicate non-significant differences at $p > 0.05$ level.

Major Compounds (14)	**Vintage**	**Terroir**	**V x T**
Carbonylic (2)			
Acetaldehyde	0.000	0.000	0.000
Acetoin	0.000	0.000	0.029
Alcohols (6)			
Methanol	***0.438***	0.021	0.013
1-Propanol	0.000	0.004	0.000
Isobutanol	***0.305***	0.000	0.016
2-Methyl-1-butanol	0.006	0.000	0.000
3-Methyl-1-butanol	0.005	0.000	0.000
2-Phenylethanol	***0.864***	0.000	0.012
Ethyl esters (3)			
Ethyl acetate	0.000	0.000	0.000
Ethyl lactate	0.000	0.000	0.000
Diethyl succinate	0.000	0.000	0.000
Polyols (3)			
2,3-Butanediol (*levo*)	0.015	0.000	0.000
2,3-Butanediol (*meso*)	0.017	0.000	0.000
Glycerol	0.000	0.000	0.046

Table S3. Statistical significance values (*p*-values) obtained from a two-way ANOVA for the factors Vintage (V) and Winery (W), and their interaction (V x W), for the minor volatile compounds in the analyzed samples. Values highlighted in red indicate non-significant differences at $p > 0.05$ level.

Minor Compounds (51)	**Vintage**	**Winery**	**V x W**
Acetates of higher alcohols (8)			
Butyl Acetate	0.000	0.000	0.000
Isoamyl Acetate	0.000	0.000	0.000
Hexyl Acetate	0.000	0.000	***0.240***
Octyl Acetate	0.000	0.000	0.000
Ethyl Phenylacetate	0.000	0.000	0.000
2-Phenylethyl Acetate	0.000	0.000	0.000
Geranyl Acetate	0.000	0.000	0.000
Z-3-hexenyl Acetate	0.000	0.000	0.000
Ethyl esters (13)			
Ethyl Isobutyrate	0.000	0.000	0.000
Ethyl Butyrate	0.000	0.000	0.000
Ethyl 2-methylbutyrate	0.000	0.000	0.000
Ethyl 3-methylbutyrate	0.000	0.000	0.000
Ethyl Hexanoate	0.000	0.000	0.000
Ethyl Heptanoate	0.000	0.000	0.000
Ethyl Octanoate	0.000	0.000	0.000
Ethyl Decanoate	0.000	0.000	0.003
Ethyl Undecanoate	0.000	0.000	0.000
Ethyl Dodecanoate	0.000	0.000	0.000
Ethyl Tetradecanoate	0.000	0.000	0.000
Ethyl Hexadecanoate	0.000	0.000	0.001
Ethyl Benzoate	0.000	0.000	0.000
Other esters (5)			
Hexyl Hexanoate	0.000	0.000	0.000
Phenethyl Benzoate	0.029	***0.171***	***0.304***
Phenethyl Butyrate	0.000	0.000	0.000
Phenethyl Hexanoate	0.000	0.000	0.000

E-Methyldihydrojasmonate	0.000	0.000	0.000
Higher alcohols (5)			
Hexanol	0.006	0.000	0.000
2-Ethyl-1-hexanol	0.000	0.000	0.000
Octanol	0.000	0.000	0.000
Decanol	0.000	0.000	0.000
Dodecanol	0.000	0.000	0.003
Phenols (2)			
4-Ethylguaiacol	0.000	0.000	0.000
2-Methoxy-4-vinylphenol	0.000	0.000	0.000
Lactones (3)			
γ-Butyrolactone	0.000	0.000	0.000
γ-Nonalactone	0.000	0.000	0.000
β-Damascenone	0.000	0.001	0.002
Carbonylic (7)			
Hexanal	0.001	0.007	0.000
Benzaldehyde	0.000	0.000	0.000
Acetophenone	0.000	0.000	0.000
Octanal	0.003	0.014	0.028
E-2-Octenal	0.000	0.000	0.000
E-2-Nonenal	0.000	0.000	0.020
Decanal	0.000	0.000	0.000
Terpenes (5)			
(DL)-Limonene	0.000	0.000	0.000
E-Geranyl Acetone	0.002	0.000	0.005
Z-Geranyl Acetone	0.046	***0.152***	0.013
E-Citral	0.000	0.000	0.000
Z-Nerolidol	0.000	0.000	0.000
Furanic (3)			
Furfural	***0.157***	0.000	0.000
2-Furanmethanol	0.000	0.001	0.000
2-Acetylfuran	0.000	0.000	0.000

Table S4. Loadings of major volatile compounds and polyols obtained from principal component analysis (PCA), showing their contribution to the variance explained by the first two principal components.

Major Compounds	***Component 1 (40.18 %)***	***Component 2 (31.72 %)***
1. Acetaldehyde	**0.314**	0.240
2. Ethyl acetate	0.091	**–0.419**
3. Methanol	0.212	–0.043
4. 1-Propanol	0.080	–0.166
5. Isobutanol	**–0.376**	0.091
6. 2-Methyl-1-butanol	–0.166	**0.327**
7. 3-Methyl-1-butanol	0.043	0.220
8. Acetoin	**0.353**	0.254
9. Ethyl lactate	**0.324**	0.265
10. 2,3-Butanediol (*levo*)	0.250	**–0.355**
11. 2,3-Butanediol (*meso*)	0.256	**–0.351**
12. Diethyl succinate	**0.315**	0.270
13. 2-Phenylethanol	**0.366**	0.178
14. Glycerol	0.282	–0.292

Table S5. Loadings of minor volatile compounds obtained from principal component analysis (PCA), showing their contribution to the variance explained by the first two principal components.

	Component 1 (54.03 %)	*Component 2 (16.65 %)*
1. Ethyl Isobutyrate	0.186	0.058
2. Ethyl Butanoate	–0.111	0.168
3. Hexanal	0.080	0.118
4. Butyl Acetate	0.038	0.182
5. Furfural	–0.056	0.260
6. Ethyl 2-methylbutanoate	0.178	0.062
7. Ethyl 3-methylbutanoate	0.178	0.063
8. 2-Furanmethanol	–0.139	0.153
9. Hexanol	0.055	0.106
10. Isoamyl Acetate	–0.185	–0.035
11. 2-Acetylfuran	–0.103	0.038
12. γ-Butyrolactone	0.121	0.239
13. Benzaldehyde	–0.113	–0.249
14. Ethyl Hexanoate	–0.173	0.109
15. Octanal	–0.116	0.180
16. Z-3-Hexenyl Acetate	–0.185	–0.076
17. Hexyl Acetate	–0.179	–0.106
18. 2-Ethyl-1-hexanol	0.156	0.177
19. Limonene	–0.126	–0.178
20. E-2-Octenal	–0.103	0.037
21. Octanol	–0.110	0.246
22. Acetophenone	–0.051	–0.306
23. Ethyl Heptanoate	0.031	–0.098
24. E-2-Nonenal	–0.178	0.051
25. Ethyl Benzoate	0.076	–0.250
26. Ethyl Octanoate	–0.183	0.084
27. Decanal	–0.123	–0.236
28. Octyl Acetate	0.087	–0.114
29. Ethyl Phenylacetate	–0.179	–0.100

30. 2-Phenylethyl Acetate	–0.167	–0.082
31. Decanol	–0.114	0.113
32. E-Citral	–0.105	0.190
33. 4-Ethylguaiacol	0.120	0.089
34. 2-Methoxy-4-vinylphenol	–0.176	–0.076
35. γ-Nonalactone	0.168	0.046
36. Geranyl Acetate	0.104	0.016
37. Hexyl Hexanoate	–0.188	–0.034
38. β -Damascenone	–0.189	0.008
39. Ethyl Decanoate	–0.189	0.018
40. E-Geranyl Acetone	0.056	0.194
41. Phenethyl Butyrate	–0.175	0.123
42. Z-Geranyl Acetone	0.053	0.046
43. Dodecanol	–0.080	–0.183
44. Ethyl Undecanoate	–0.187	0.032
45. Ethyl Dodecanoate	–0.188	0.034
46. Phenethyl Hexanoate	–0.172	0.126
47. E-Methyldihydrojasmonate	–0.127	0.181
48. Z-Nerolidol	0.078	–0.005
49. Ethyl Tetradecanoate	–0.178	0.106
50. Phenethyl Benzoate	–0.105	0.147
51. Ethyl Hexadecanoate	–0.175	0.055