# Comprehensive study of variety oenological potential using statistic tools for the efficient use of non-renewable resources

(Applied Sciences)

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## Supplementary Material

### Materials and methods section

The sampling period was shown in Figure S1, which considering the 3 harvests, ranged from the end of July to middle of October. All the varieties revealed different maturation periods: for the 3 harvest years, the first sample collection performed at half-*véraison* on the 3 vineyards was made firstly for Sauvignon Blanc white variety, which has a precocious and short maturation, followed by Bical variety, and then by Arinto that exhibited a late and longest maturation process. Besides, considering the red varieties, Castelão exhibited the smallest maturation process, while Touriga Nacional exhibited the longest one. For each variety, 2011 was the year where the half-*véraison* started earlier due to the higher spring temperatures, allowing to accelerate grapes maturation process, while in 2012 this process started later since this was a cooler and fresh harvest. Moreover, the berry

weight, pH, sugar content, and titratable acidity, obtained during varieties maturation, were shown in XY graphs, where "0" in the x axis refers to the first sampling moment performed at half-*véraison* for each variety, on the 3 vineyard parcels and 3 harvests (Figures S2-S7).

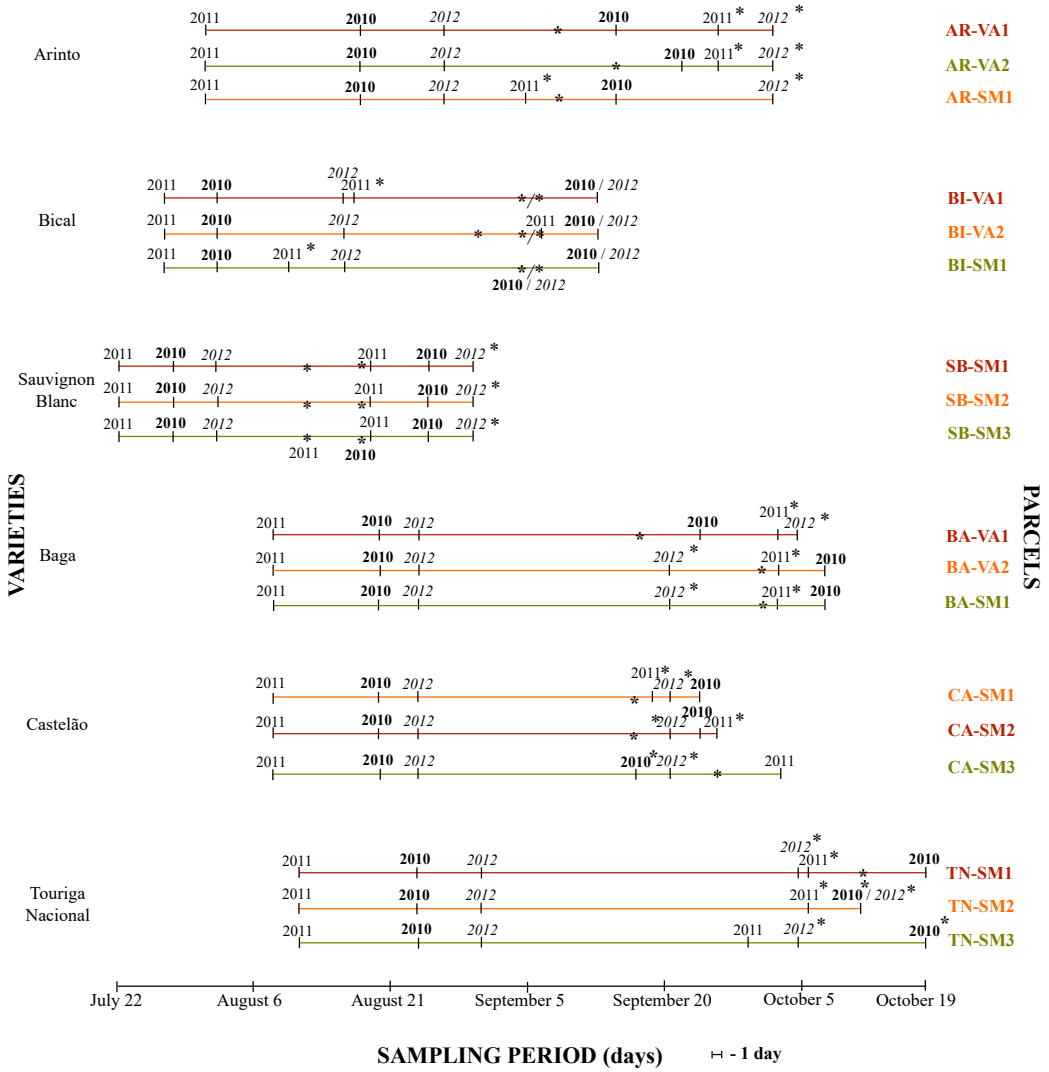


**Figure S1.** Sampling period performed for the 6 varieties under study, during maturation. For each variety, the sampling period was organized for each parcel (SM1 to SM3, VA1 and VA2) where the 3 harvest years (2010 to 2012) were represented. The first point for each variety, indicate grapes collection at half-*véraison* and * refers to technologic maturity state.

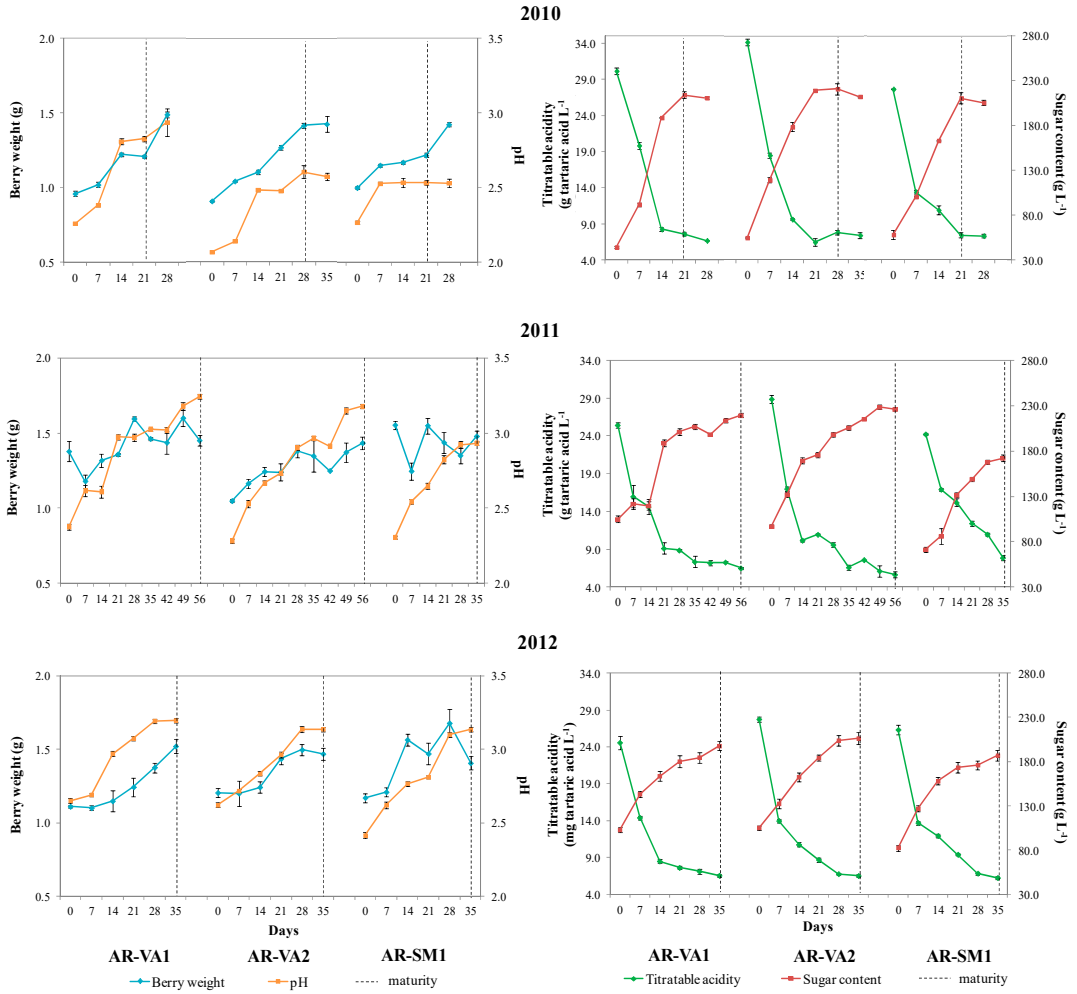


**Figure S2.** Berry weight, pH, sugar content, and titratable acidity of *V. vinifera* cv. Arinto, obtained during maturation, on the 3 parcels and 3 consecutive harvests. Technologic maturity is indicated with a dash line.

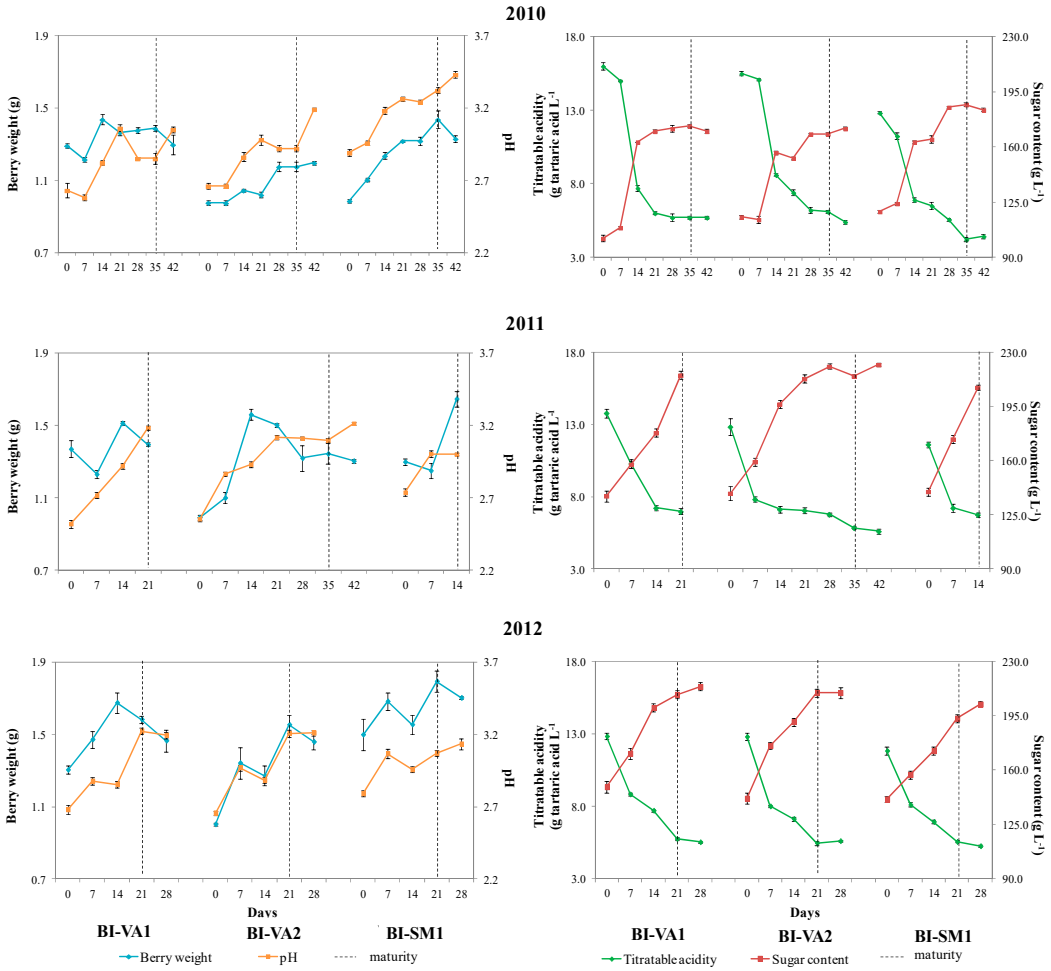


**Figure S3.** Berry weight, pH, sugar content, and titratable acidity of *V. vinifera* cv. Bical, obtained during maturation, on the 3 parcels and 3 consecutive harvests. Technologic maturity is indicated with a dash line.

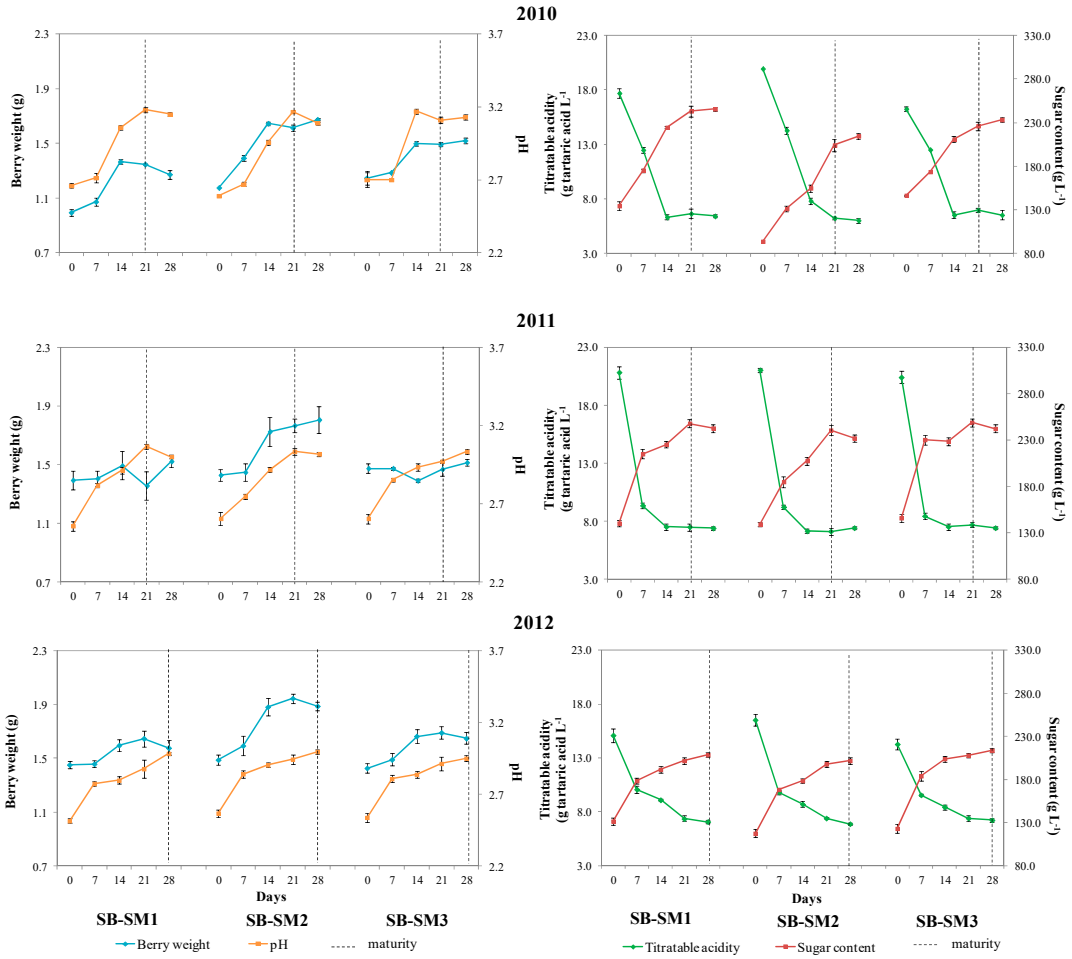


**Figure S4.** Berry weight, pH, sugar content, and titratable acidity of *V. vinifera* cv. Sauvignon Blanc, obtained during maturation, on the 3 parcels and 3 consecutive harvests. Technologic maturity is indicated with a dash line.

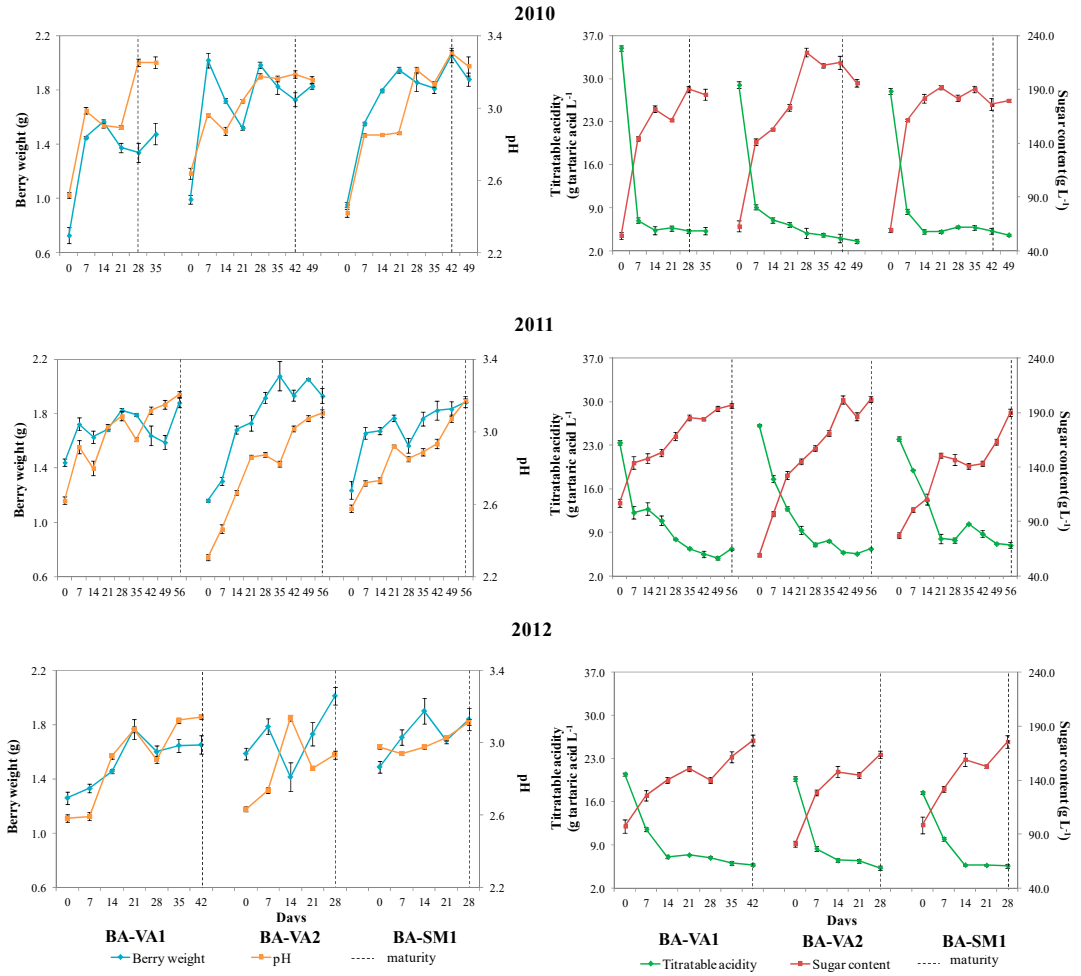


**Figure S5.** Berry weight, pH, sugar content, and titratable acidity of *V. vinifera* cv. Baga, obtained during maturation, on the 3 parcels and 3 consecutive harvests. Technologic maturity is indicated with a dash line.

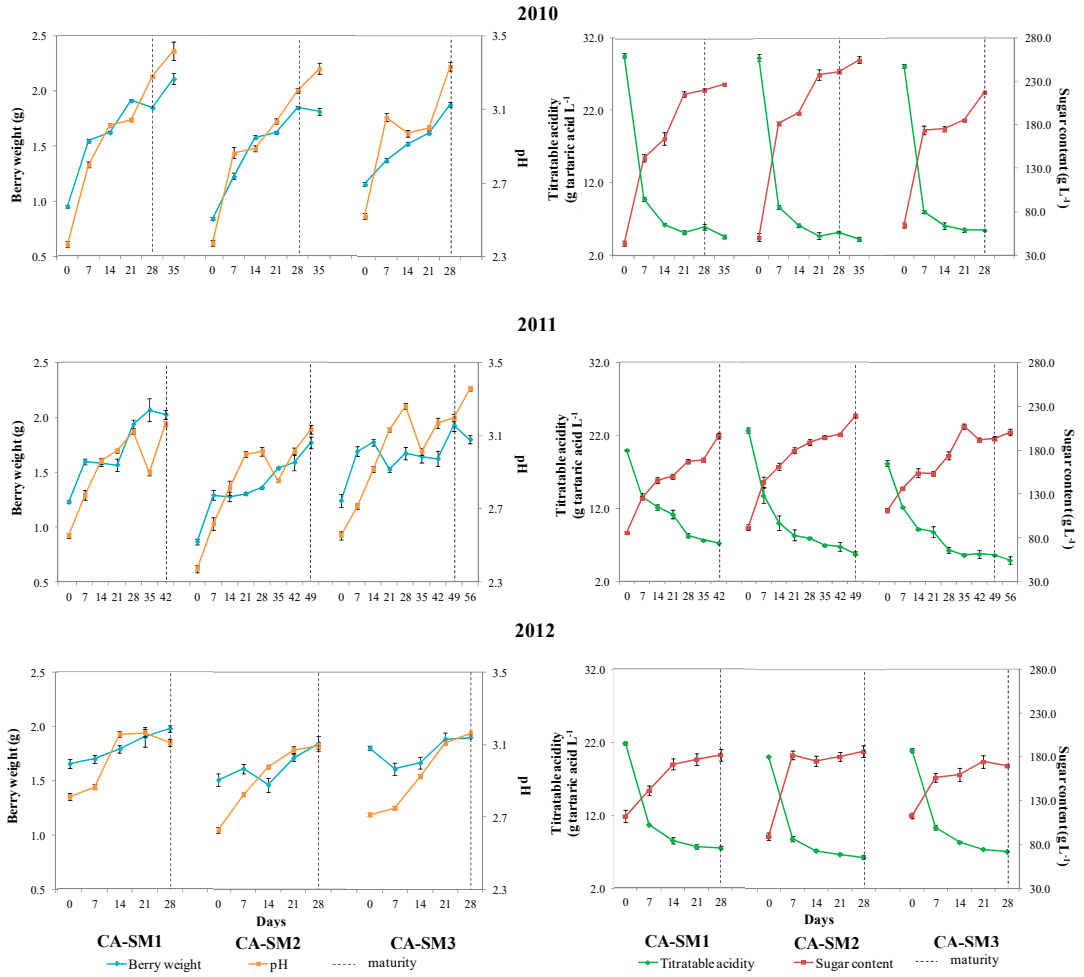


**Figure S6.** Berry weight, pH, sugar content, and titratable acidity of *V. vinifera* cv. Castelão, obtained during maturation, on the 3 parcels and 3 consecutive harvests. Maturity is indicated with a dash line.

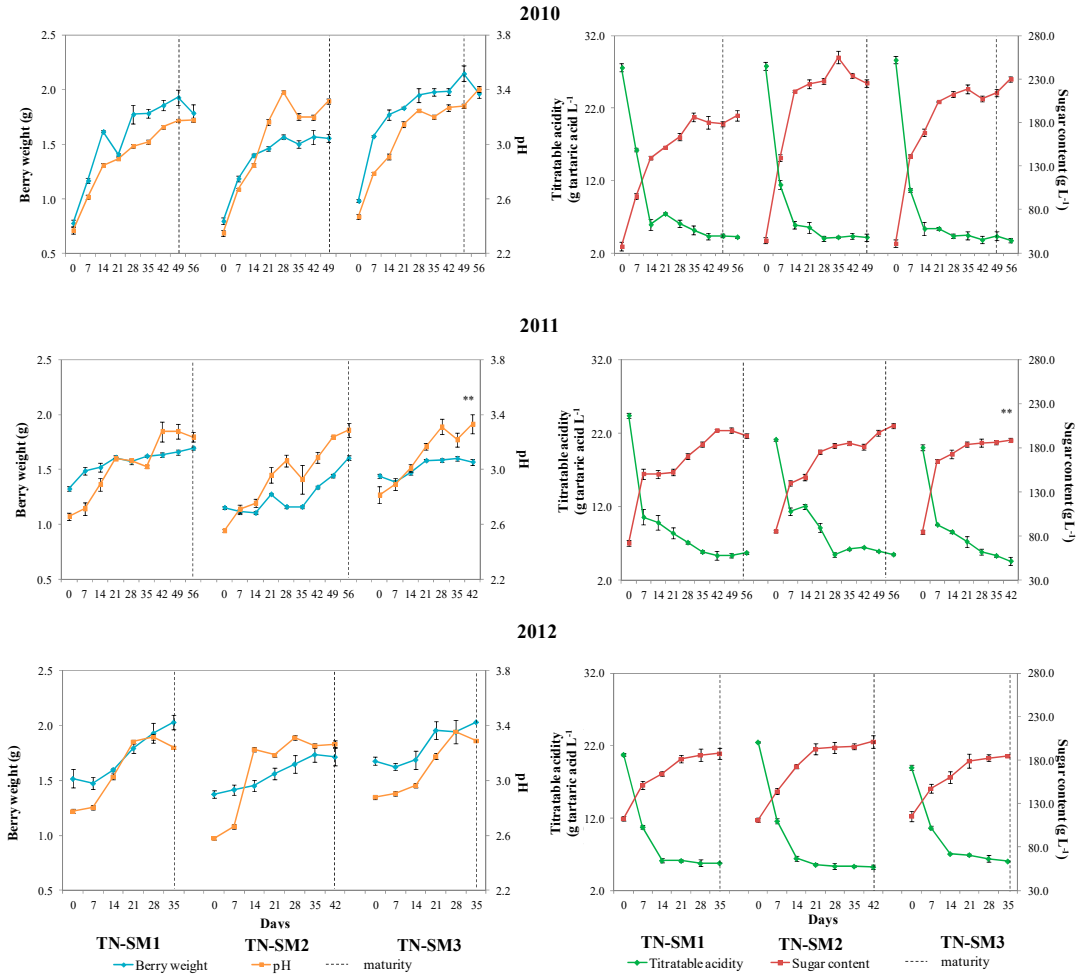


**Figure S7.** Berry weight, pH, sugar content, and titratable acidity of *V. vinifera* cv. Touriga Nacional, obtained during maturation, on the 3 parcels and 3 consecutive harvests. Technologic maturity is indicated with a dash line. ** Overripe grapes.

### *2.5. GC×GC-ToFMS analysis*

An Equity-5 column (30 m x 0.32 mm I.D., 0.25 µm film thickness, Supelco, Inc., Bellefonte, PA, USA) was used as first dimension ($^1$D) column and a DB-FFAP (0.79 m x 0.25 mm I.D., 0.25 µm film thickness, J&W Scientific Inc., Folsom, CA, USA) was used as a second dimension ($^2$D) column. Helium was at a constant flow rate of 2.50 mL/min. The primary oven was at 40 ºC (hold 1 min) and raised to 230 ºC (10 ºC min$^{-1}$, hold 2 min), while the secondary oven 30 ºC offset above the primary one. The MS transfer line temperature was 250 ºC and the MS source was 250 ºC. A modulation time of 6 s was used, and the modulator was at 20 ºC offset (above secondary oven).