



Front face fluorescence spectroscopy and visible spectroscopy coupled with chemometrics have the potential to characterise ripening of Cabernet Franc grapes

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The potential of front-face spectroscopy for grape ripening dates discrimination was investigated on Cabernet Franc grapes from three parcels located on the Loire Valley and for six ripening dates. The 18 batches were analysed by front-face fluorescence spectroscopy and visible spectroscopy. The excitation spectra (250–310 nm, emission wavelength = 350 nm) were characterised by a shoulder at 280 nm. Grapes spectra were classified by factorial discriminant analysis (FDA). Ripening dates were well predicted by fluorescence spectra: grapes before veraison were separated from grapes after veraison and almost every ripening date was identified. The common spectroscopic space obtained by CCSWA showed that wavelengths corresponding to anthocyanin absorption in the visible were correlated to fluorescence wavelengths around the starting and ending points of the shoulder (263 and at 292 nm). Then, regression models were investigated to predict total soluble solids (TSS), total acidity, malvidin-3G, total anthocyanins and total phenolics content from visible and fluorescence spectra. To predict technological indicators (TSS and total acidity), the PLS model with visible spectra (RMSECV = 0.82°Brix or 0.96 g L⁻¹ H₂SO₄) was better than those with fluorescence one (RMSECV = 1.39°Brix or 2.06 g L⁻¹ H₂SO₄). For malvidin-3G and total anthocyanins, all R² and R^{cv2} were superior to 0.90 and RMSECV were low. Visible and fluorescence spectroscopies succeeded in predicting anthocyanin content. Concerning total phenolic, the best prediction was provided by fluorescence spectroscopy.

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