

A New In-Line System to Monitor Total Phenolic Content in Juice Fractions for Sparkling Wine

Rocco Longo¹; Bob Dambergs^{1,2}; Hanna Westmore¹; David Nichols³ and Fiona Kerslake¹
¹Horticulture Centre, Tasmanian Institute of Agriculture, University of Tasmania, Prospect, Tasmania
²WineTQ, Monash, South Australia
³Central Science Laboratory, University of Tasmania, Hobart, Tasmania

Introduction

- Press fractioning influences juice phenolic content, therefore, colour and flavour of sparkling base wines.
- Volumetric fractioning and sensory analysis are used to discriminate juice quality, primarily on phenolic content.
- Volumetric press fractioning is based on standardised protocols that do not allow for seasonal changes.
- Sensory analyses for phenolic 'pick-up' are limited by the unreliability of human senses and the amount of time this requires during busy vintage time.
- The feasibility of a new in-line system was tested at a commercial scale for Pinot Noir sparkling wine press fractions.

Aims

- To propose a real-time and objective analytical approach that enables the quantitation of phenolics in sparkling wine press juice fractions (Figure 1).
- To calibrate UV-VIS spectra collected in-line against UPLC total phenolics (g/L) using chemometrics.

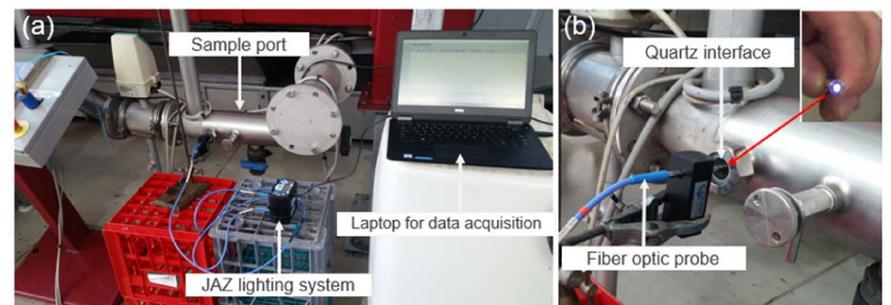


Figure 1. (a) Experimental set up of the in-line system; (b) Press outlet set-up.

Results

- Calibrations for total phenolics (g/L) were prepared from press fraction spectral data (Figure 2) using partial least square regression (PLSR) with a large number of wavelengths (230-700 nm) (Figure 4a) and multiple linear regression (MLR) using a small number of key wavelengths (Figure 4b).
- The calibration with the best performance used reflectance spectra ($R^2_{val} = 0.95$).

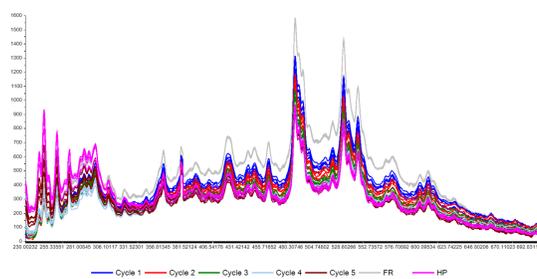


Figure 2. UV-VIS spectra of Pinot Noir press fractions collected in-line: free run (FR), Cycles 1-5 and hard press (HP).

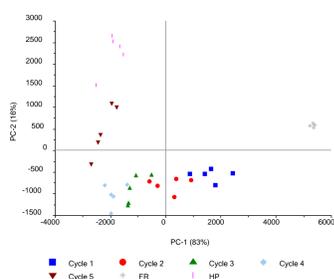


Figure 3. PCA of Pinot Noir press fractions from UV-VIS spectra in reflectance mode in-line.

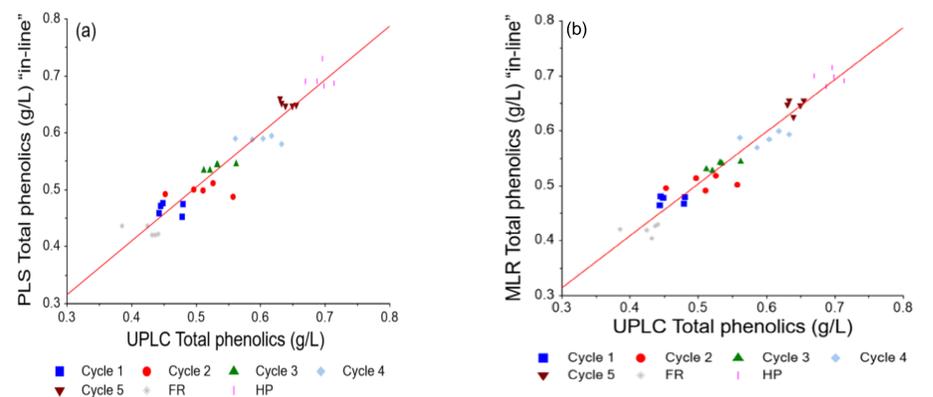


Figure 4. Correlation between total phenolics (g/L) by UPLC and total phenolics (g/L) predicted with (a) PLS using 230-700; and with (b) MLR using key wavelengths.

Conclusions

- This study proved that in-line UV-VIS spectroscopy can quantify total phenolics (g/L).

Reflectance spectroscopy can be used in-line to predict total phenolics in grape juice with an acceptable accuracy and to discriminate press fractions