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Effect of variety, vintage and winery on the prediction by visible and near infrared spectroscopy of the concentration of glycosylated compounds (G-G) in white grape juice

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• Fruit quality is currently assessed by monitoring Brix, pH, and TA in white wines, and Brix, pH, TA and color in red wines. But the need for more sophisticated methods of assessing berry potential for quality wine production has become increasingly evident.

• Flavor precursors accumulate in berries as non-volatile, flavorless, glycosylated compounds that are cleaved during fermentation to release aromatic compounds. In 1995, a method to quantify these glycosides, called the **G-G assay** (G-G- stands for glycosyl glucose), became a great addition to the assessment of fruit quality. But the G-G assay is complex and time-consuming and therefore impractical when many samples are involved.

• Since preliminary data suggested that visible and near infrared spectroscopy (Vis-NIRS) could be used for a more rapid G-G determination, in this study the authors examine the application of Vis-NIRS as a rapid tool for the measurement of glycosylated compounds (G-G), and look closely at the effect of variety, vintage, and winery (origin of the juice) on the G-G calibration.

• The authors sampled clarified juices of 3 varieties (Chardonnay, Riesling, Sauvignon blanc) from 3 regions of South Australia (Barrosa Valley, Adelaide Hills, and McLaren Vale) during 3 vintages (2004-2006). Juices were scanned by Vis-NIRS (FOSS NIRSystems6500) using 400-2500 nm wavelengths. The samples were also analyzed for G-G using the classic G-G assay. Then the authors developed a set of statistical parameters to study the relationship between the two types of measurement.

• **Results.** The authors used principal component analysis (PCA) to compare the NIRS spectra with the G-G assay results. They noticed that data tended to cluster based on *vintage* (that is, spectra from juices from a given vintage were different from those from other vintages), probably due to ripeness differences across vintages. They also detected certain clustering due to *winery*, which they attributed to the influence of different winery practices. Next, the authors studied whether splitting the data by variety, by winery, or by vintage could improve the calibration. They found that this was indeed the case when they split the data by vintage or by winery and performed separate calibrations. In brief, even though the calibration models were reliable, the accuracy of the method was only good enough to allow a rough classification of juices based on quality (low, medium, and high- quality).

In summary, even though the Visual-Near Infrared spectroscopy method was <u>not</u> able to quantify glycosylated compounds, the method allowed a rough classification of juices into low-, medium, and high-quality. The authors believe this method may be valuable in the winery to allocate juices to different programs based on "aroma potential".