ally to SO₂ exposure. The gas tube method was initially calibrated against A-O using model wines containing 5 to 40 mg/L SO₂. The method accuracy was then evaluated by measuring free SO₂ in commercial wines (n = 16) using both the gas tube and A-O methods, and measurements between the two methods were within ±2 mg/mL for all wines. The limit of detection of the SO₂ tube method was slightly worse than A-O (3.3 mg/L in wine), and the major source of imprecision appeared to be determining the start and stop of darkening.

*Funding support: Saltonstall Endowment Funds, John S. Dyson Endowment Funds

---

**Inline Multispectral Colorimeter for Real-Time Color and Total Phenolic Analysis during Red Wine Fermentations**

Nicholas L. Shrake, Rajeevan Amirtharajah, Roger Boulton, Charles Brenneman, and André Knoesen*

*Department of Electrical and Computer Engineering, University of California, Davis, CA 95616 (aknoesen@ucdavis.edu)

A phenolic sensor was developed for inline determination of color and total phenolics during red wine fermentations. The colorimeter uses multiple light emitting diodes (LEDs) spanning the ultraviolet and visible spectrum. The performance of the colorimeter was tested on red wine fermentations during the fall 2012 season at UC Davis Robert Mondavi Institute. Inline measurements were performed during the complete fermentation period of two Cabernet Sauvignon and one Pinot noir wines. Manual samples were also taken during the fermentation and benchmarked against two instruments. These samples were immediately refrigerated and subsequent to fermentation were centrifuged and measured. One measurement was with a commercial UV-Vis spectrometer and the other with the LED colorimeter. In an independent experimental study, manual samples were taken from a diverse set of nine fermentations and characterized by the UV-Vis spectrometer and the LED colorimeter. The studies show that the inline LED colorimeter can measure the color and total phenolics during fermentation. A strong correlation exists between inline LED measurement and the off-line UV-Vis colorimetric measurements. The study demonstrated the validity of the inline colorimetric approach in the presence of wine samples with suspended particles.

*Funding support: Rodgers University Fellowship in Electrical and Computer Engineering*

*indicates corresponding author