SENTIA™

Sentia free SO_2 test:

Comparison to the FOSS WineScan™ SO_2 method

The FOSS WineScan SO_2 unit is an automated analyzer which utilises Fourier Transform Infrared (FTIR) technology. Samples tested for free SO_2 are acidified, before a micro-distillation is performed. The free SO_2 is subsequently converted to a gas phase and measured via a detector.

The Sentia free SO_2 wine analyzer is a hand-held device which utilises square wave technology to give rapid results for free SO_2 from a single drop of wine. When wine is added to the test strip, it dissolves dried down reagents and hydrogen sulphite converts to sulphur dioxide. This becomes directly reduced at the electrode when the square wave waveform is applied. The subsequent data obtained contains a peak, with the height directly correlating to the free SO_2 concentration in the wine sample.

A technical and cost comparison

	Sentia free SO_2	FOSS WineScan free SO_2
Time to test one sample	<1 minute	1 minute
Sample size	≥8 µL	>4 mL
Calibration required	no	yes
Equipment required	Sentia device	FOSS WineScan
Typical cost of equipment	$1,950 AUD	$180,000 AUD
Annual maintenance required	no	yes
Cost of annual maintenance	none	>$2,000 AUD
Spare parts required	no	yes
Consumables & reagents required	free SO_2 test strip	sample cups, phosphoric acid, cleaning solution
Cost of consumables	$3.50 AUD	$0.32 AUD
Dangerous & hazardous chemicals	none	phosphoric acid
Equipment & reagent checks required	none	daily (standard check, start up and shut down procedures)

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Correlation between Sentia and FOSS WineScan methods

Figure 1 shows the correlation between Sentia and the FOSS WineScan in a study of 203 red and white wines. Wines which were low in free SO_2 concentration were similar in results when compared between the two methods. With increasing SO_2 levels however, the line of best fit become much steeper than the ideal fit, indicating that the FOSS WineScan is farther off at these higher SO_2 levels.

Therefore, it is expected that Sentia will give higher results than the FOSS WineScan and this is thought to be as a result of SO_2 loss during the micro-distillation process in the FOSS method.

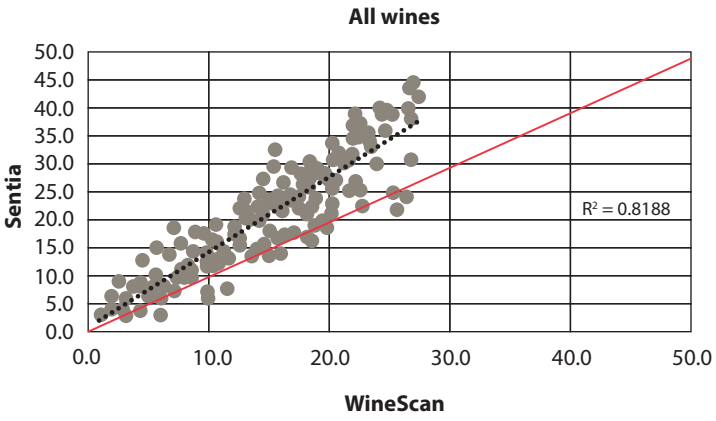

Figure 1: Sentia and FOSS WineScan™ SO_2 comparison for free SO2 in red and white wines (n=203). (Source: Sommer, S. Sotto Method Comparison Validation Study. Fresno State Viticulture and Enology Research Center. 2020 p. 8)

Troubleshooting extreme Sentia and FOSS WineScan method result discrepancies

Low Sentia results and high FOSS WineScan results?	High Sentia results and low FOSS WineScan results?
Conduct testing on the Sentia device first and then on the WineScan analyzer immediately after. Limit the amount of air the sample is exposed to between analyses.	Do not delay testing on the WineScan unit after testing is conducted on the Sentia device.
When comparing methods, ensure that the sample for each analysis is taken from the same area of the sample holding vessel.	When comparing methods, ensure that the sample for each analysis is taken from the same area of the sample holding vessel.
Confirm the WineScan unit is measuring accurately by analysing a known free SO_2 standard. Checking a sample on an alternative reference method at the same time (such as the aspiration oxidation method) is also a good option.	Confirm the WineScan unit is measuring accurately by analyzing a known free SO_2 standard. Checking a sample on an alternative reference method at the same time (such as aspiration oxidation method) is also a good option.
Ensure sample taken for testing on the Sentia device has minimal exposure to air during the pipetting process. If unsure, compare results when a 20 µL micropipette (with full amount drawn) is used.	