SENTIA™

Sentia free SO_2 test:

Comparison to the Ripper method

The Ripper titration method is based on the reducing power of SO_2 in an acidic environment, where iodine is gradually added to an acidified sample containing a starch indicator. Free SO_2 within the sample reduces the iodine to iodide and becomes oxidised in the process. Once all the SO_2 is oxidised, excess iodine interacts with the starch indicator to form a purple colour change indicating the end point of the titration. The amount of titrant used to reach the end point correlates to the amount of free SO_2 within the sample.

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 of the peak directly correlating to the free SO_2 concentration in the wine sample.

A technical and cost comparison

	Sentia free SO_2	Ripper free SO_2
Time to test one sample	<1 minute	10 minutes
Sample size	>8 µL	20 mL
Result calculation	automatic	manual
Data base storage	yes	no
Equipment required	Sentia device	Erlenmeyer flasks, pipette and pipette filler, burette, dosing devices, dispenser
Cost of equipment	$1,950 AUD	$200 AUD
Consumables and reagents required	free SO_2 test strip	starch (indicator), iodine, sulphuric acid
Cost of consumables (per test)	$3.50 AUD	$0.50 AUD
Hazardous & dangerous materials	none	sulphuric acid
Equipment & reagent checks required	none	weekly (titrant standardisation)

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Correlation expected between Sentia and Ripper methods

White wines

Figures 1a and 1b show the correlation between Sentia and the Ripper titration results in 103 white wines analyzed. When samples with ascorbic acid were removed, the correlation between Sentia and Ripper results increased from 83% to 92%.

However, the line of best fit still shows a slight offset at lower free SO_2 concentrations, indicating the Ripper titration is losing accuracy at the lower end.

Due to inaccuracies in the Ripper method, customers comparing with Sentia may therefore expect more variation in samples containing ascorbic acid and in samples with SO_2 levels below 20 ppm.

Red wines

Figure 2 shows the correlation between the Sentia and Ripper titration results in 100 red wines analyzed. Data shows a high bias on the Ripper results, due to the interference of phenolic compounds within red wines on this method.

Therefore expect that when testing red wine samples on the Sentia device a lower result will be obtained in comparison to the Ripper method. Sentia is not impacted by phenolic materials.

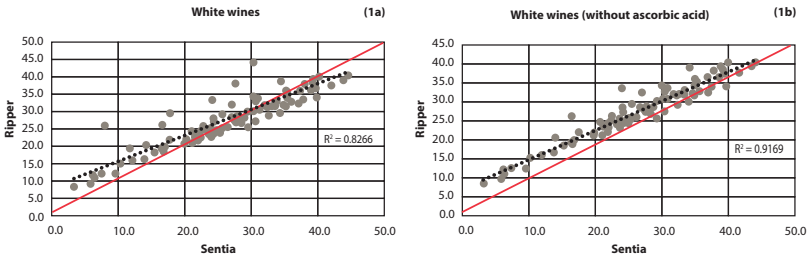

Figure 1: Sentia and Ripper comparison for free SO_2 in white wines with and without ascorbic acid (n=103 in 1a and n=98 in 1b). (Source: Sommer, S. Sotto Method Comparison Validation Study. Fresno State Viticulture and Enology Research Center. 2020 pg. 8)

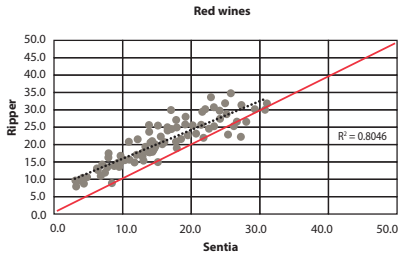

Figure 2: Sentia and Ripper comparison for Free SO_2 in red wines (n=100). (Source: Sommer, S. Sotto Method Comparison Validation Study. Fresno State Viticulture and Enology Research Center. 2020 p. 9)

Troubleshooting Sentia and Ripper method result discrepancies

Low Sentia results and high Ripper result?	High Sentia results and low Ripper results?
Reducing compounds such as ascorbic acid are known interferences in the Ripper method, causing a high bias. Measure and remove these reducing compounds from the overall Ripper result.	When comparing the methods, ensure that the sample for each analysis is taken from the same area of the sample holding vessel and at the same time.
When comparing methods, ensure that the sample for each analysis is taken from the same area of the sample holding vessel and at the same time.	Do not delay testing on the Ripper method after testing is conducted on the Sentia device.
Conduct testing on the Sentia device first and then on the Ripper method immediately after.	Check that the Ripper method is measuring SO_2 accurately. For example, standardise the titrant or analyse a known free SO_2 standard.
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Ensure that the sample taken for testing on the Sentia device is not exposed to excessive air during the pipetting process. If unsure, compare results when a 20 µL micropipette (with the full amount drawn) is instead used.	