

# Sentia free SO<sub>2</sub> test:

## Comparison to the Ripper method

**The Ripper titration method** is based on the reducing power of SO<sub>2</sub> in an acidic environment, where iodine is gradually added to an acidified sample containing a starch indicator. Free SO<sub>2</sub> within the sample reduces the iodine to iodide and becomes oxidised in the process. Once all the SO<sub>2</sub> 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<sub>2</sub> within the sample.

**The Sentia free SO<sub>2</sub> wine analyzer** is a hand-held device which utilises square wave technology to give rapid results for free SO<sub>2</sub> 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<sub>2</sub> concentration in the wine sample.



## A technical and cost comparison

	Sentia free SO <sub>2</sub>	Aspiration Oxidation free SO <sub>2</sub>
<b>Time to test one sample</b>	<1 minute	10 minutes
<b>Sample size</b>	>8 µL	20 mL
<b>Result calculation</b>	automatic	manual
<b>Data base storage</b>	yes	no
<b>Equipment required</b>	Sentia device	Erlenmeyer flasks, pipette and pipette filler, burette, dosing devices, dispenser
<b>Cost of equipment</b>	\$1,950 AUD	\$200 AUD
<b>Consumables and reagents required</b>	free SO <sub>2</sub> test strip	starch (indicator), iodine, sulphuric acid
<b>Cost of consumables (per test)</b>	\$3.50 AUD	\$0.50 AUD
<b>Hazardous &amp; dangerous materials</b>	none	sulphuric acid
<b>Equipment &amp; reagent checks required</b>	none	weekly (titrant standardisation)

# Correlation expected between Sentia and Ripper methods

## White wines

Figures 1c and 1d 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<sub>2</sub> 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<sub>2</sub> levels below 20 ppm.

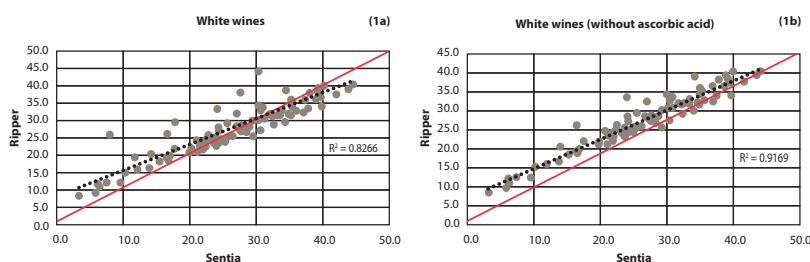


Figure 1: Sentia and Ripper comparison for free SO<sub>2</sub> in white wines with and without ascorbic acid (n=103 in 1a and n=98 in 1b). (Source: Sommer, S. Sotto Method Comparison Validation Study. Fresno State Viticulture and Enology Research Center. 2020 pg. 8)

## 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.

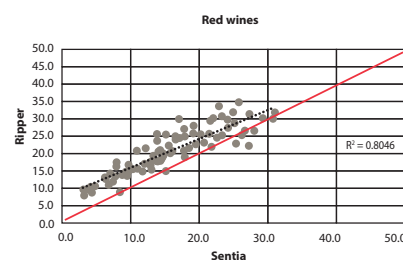


Figure 2: Sentia and Ripper comparison for Free SO<sub>2</sub> in red wines (n=100). (Source: Sommer, S. Sotto Method Comparison Validation Study. Fresno State Viticulture and Enology Research Center. 2020 p. 9)

# Trouble-shooting Sentia and Ripper method result discrepancies

## Low Sentia results and high Ripper result?

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 methods, ensure that the sample for each analysis is taken from the same area of the sample holding vessel and at the same time.

Conduct testing on the Sentia device first and then on the Ripper method immediately after.

Check that the Ripper method is measuring SO<sub>2</sub> accurately. For example, standardise the titrant or analyze a known free SO<sub>2</sub> standard.

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 uL micro-pipette is instead used.

## High Sentia results and low Ripper results?

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.

Do not delay testing on the Ripper method after testing is conducted on the Sentia device.

Check that the Ripper method is measuring SO<sub>2</sub> accurately. For example, standardise the titrant or analyse a known free SO<sub>2</sub> standard.