SO_2 completes the picture

Quality controllers at Portugal's Adega Borba winery have always made good use of routine analysis technology in the production of their many vintages. Now the technology has been extended to include rapid tests of that all important parameter - sulphur dioxide ($S0_2$). The breakthrough in routine testing is allowing complete control of the winemaking process and a more rational use of SO_2 in line with legal and consumer demands.

The view from the rooftop terrace of Adega Borba's smart new winery reveals much about the wine of the region. The eye is met with a pleasant combination of olive groves, vineyards and emerald pasture shaded by dark cork oak tree canopies. Even the local marble quarry adds an interesting industrial touch. Likewise the palate has much to discover from the many grape varieties from the Alentejo area including gems such as Trincadeira, Aragonez and Touriga Nacional.

The varieties are used to create over 50 wines in the Adega Borba cellar with a volume of around 17 million litres a year. But no matter how hectic the activity during winemaking every move is tracked and traceable including the use of $S0_2$ at any stage in the process, from must to bottling.

Keeping track of the most important parameter

Keeping an eye on it all is a WineScan $S0_2$ analyser located in the winery laboratory. The WineScan has been used at the winery for over ten years for testing multiple quality parameters of must and wine. Now, the new WineScan $S0_2$ is giving results for free

Quality control manager Helena Ferreira keeping a close eye on S02 with the FOSS WineScan

and total sulphur dioxide in parallel with the other parameters and within a much shorter time than existing methods for rapid $S0_2$ testing. It all adds up to better control over sulphur dioxide to delight of the winery and to the benefit of consumers. "We add less sulphur during the process because we understand what is going on and what we achieve is greater control of the process," says Quality control manager Helena Ferreira.

Ferreira explains how $S0_2$ is the most important parameter to analyse for an enologist, because, while it is an

"The accuracy is the same or even better than the reference method,"

effective way to avoid undesired microorganisms, no one wants to use too much of the chemical and it must be controlled very accurately for legal requirements. "We only use it in minimal amounts," she says. "The enologist always needs to know what the concentration is in the product - just enough to avoid oxygenation in grapes, but not too much to spoil fermentation for example."

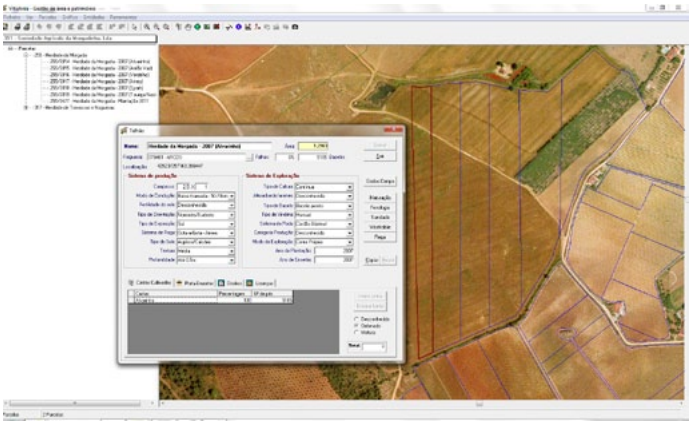
Tracking 100 tanks

Around 100 tanks are in use during the main production period and the winemakers need a lot of test results to track them effectively. Before, the laboratory used the official reference method in combination with an automatic titration method that takes at least fifteen minutes to set up. At about 90 seconds for free Sulphur dioxide and four minutes for free and total sulphur dioxide, the WineScan is much faster.

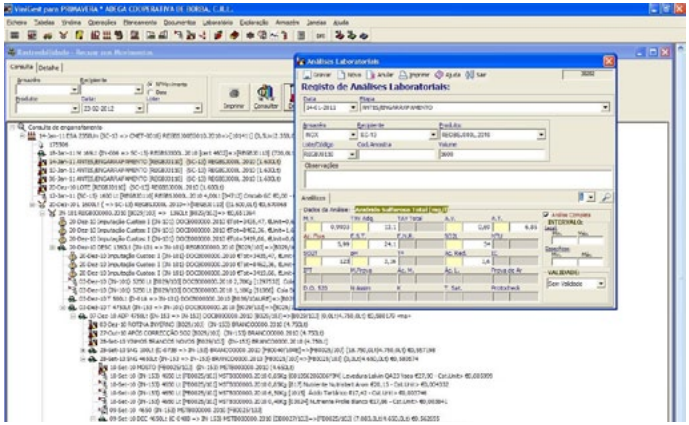
Ferreira explains how the impractical nature of the previous analysis methods often meant long intervals without vital analytical information so that it was often necessary to be on the 'safe side' with dosage levels. Now, the improved speed of analysis allows a higher volume of tests and closer control of the wine. "We can use just enough sulphur dioxide because we can test today, tomorrow or whenever we need to. We can follow the wines much better and this helps us to achieve our goals," she says.

As good as reference methods

Not only is the WineScan faster, it's more accurate than



Tracebility starts in the vineyard: Geographical Information System (GIS) images of the the Portuguese Alvarinho vines are integrated with grape must analysis results.



The traceability continues in the winery all the way through to bottling as shown in this management software image that includes details of wine analysis, pre- bottling.

other rapid methods for testing SO_2. "The equipment effectively reproduces the reference method- it's the same principle," says Ferreira. "The other rapid technologies do not use the same principle and the repeatability of these methods is not so good."

The observations are backed by results from monthly ring tests with other laboratories under the ALABE association of Portuguese wine laboratories of which the sulphur measurements have been a part since mid 2011.

Traceable wine

The rapid SO_2 measurements are adding yet more valuable data to a rich database of measurements that Adega Borba has acquired over years of routine testing of must and wine with the WineScan instrument.

The data includes results on grapes sourced from around 2,000 hectares of vineyards with some samples traceable to individually marked plants in the field. Grapes are tested from mid July onwards and, during the harvest, around 10,000 samples will be tested. "We can trace back to understand the evolution and see exactly the quality of the grapes for any particular wine - I know how the grapes work and what I need to do to reach our goals," says Ferreira.

After getting the wines off to a good start, the WineScan tests help to manage fermentation, track maturation and control bottling while ensuring a minimal use of SO_2 at every stage. The instrument software makes it easy to look into different aspects of data for instance with all sorts of user definable views for example, showing all parameters or just Free SO_2.

Data from previous years add to the understanding about what to expect from grapes and how to handle

the production. Examples of good recent years are 2008, 2009 and in particular, 2011. Usually, the summer can see temperatures up to 40 degrees causing vines to stop photosynthesis. Last year though, temperatures were a pleasant 25 – 30 degrees helping the grapes to achieve high sugar concentrations and great colour. "There are many things determining the characteristics of the wine, but for us, it is the conditions during the year that is most important," says Ferreira. "But of course, it is the one factor you cannot control," she adds with a smile.

Forward thinking

Besides the use of new analytical technology, there are other interesting aspects of the winemaking at Adega Borba. The fermentation tanks, for instance, harness naturally generated CO_2 to circulate the must without the use of electric power. And a lawn of Sedum plants acts as a 'green roof' for the winery offering natural insulation and yet another touch of colour to the Borba landscape.

It is a logical approach, harnessing innovative technology to work smarter. Likewise, the use of modern analytical technology ensures the quality and traceability of the many Adega Borba wines, exploiting the many interesting grape varieties while rationalizing the use of SO_2 in the process.

You can discover a lot with Portugeuse wine, but the one thing you're unlikely to find is too much SO_2.

By Richard Mills, rim@foss.dk

Learn more about WineScan™

Smart roof: a lawn of Sedum plants acts as a 'green roof' for the winery offering natural insulation

Adega Borba

Located in Borba in Portugal's Alentejo region, the Adega Coop. de Borba brings together 300 associates whose vineyards cover a total area of 2,200 hectares. The winery adopts modern equipment and thinking to exploit the wealth of traditional local grape varieties as well as major international varieties that thrive in the area. In this way, Adega Borba combines the best of old and modern approaches, resulting in an interesting and diverse range of wines.

www.adegaborba.pt