Claristar®

WHAT ARE ISS TECHNOLOGIES FOR CLARISTAR?

Tartaric stabilisation represents a key stage in winemaking and for the quality as perceived by the consumer. There are several methods for obtaining wine stability in terms of potassium bitartrate precipitations: refrigeration, electrodialysis, ion-exchange resins or the addition of mannoproteins, carboxymethylcellulose, polyaspartate or metatartaric acid. Whichever technique is used or tested, it is important for producers to evaluate the risks of tartaric acid precipitation in the laboratory. Several analytical methods exist for determining the level of wine instability and checking stability afterwards. At present the most used methods for determining stability are the cold test (freezing or long-term refrigeration), the degree of tartaric instability (DTI), the mini contact test and the measurement of saturation temperature (Tsat).

Overview of the existing tests

Cold test: for white wines, the most frequently used and most effective method is cooling the wine sample at -4 °C for six days. Fairly precise, but only qualitative, the method indicates whether the wine is stable. The main drawback is the duration of the test, even though it is possible to evaluate a wine's degree of instability after just 48 hours. Freezing the wine is however a very severe measure, as the colloidal structure can not interact in any way.

Measuring of the DTI is a predictive analysis developed by INRA; it is based on the measurement of conductivity over time in crystallisation conditions. This method allows highly unstable wines to be identified (DTI of over 20%).

Mini contact test determines the wine's conductivity by using low temperatures, with the addition of cream of tartar. It can be carried out in different ways, specifically in terms of duration: from a minimum of four minutes to a few hours. This test provides valid answers for white and rosé wines, but it is rather limited for red wines and especially for short completion times since it tends to exclude the protective properties of colloids.

Saturation temperature (Tsat) expresses the lowest temperature value at which added potassium bitartrate dissolves in wine. This parameter provides good indications concerning wine instability, especially if associated with other methods and with the observation of the graphs from -4 °C to + 32 °C as indicated in this article.

Why was ISS technologies for Claristar mannoproteins developed?

All the tests have unique features and consequently advantages and disadvantages. The cold test is difficult to manage for red wines because of the colour precipitation and the difficulty in seeing crystal formation. The other tests using conductivity can in some cases, overestimate the instability of the wine and give false negatives or can demonstrate false positive results of stabilisation with **Claristar** mannoproteins. The mini-contact analysis provides an absolute value. E.g. the conductivity drop of a stable wine is 30-40 µS in four minutes or forty-five minutes or three hours. The wine is considered stable or unstable according to this threshold, but it does not provide a measurement and evaluation of the effect of the protective colloids of this specific wine.

Claristar mannoproteins can stabilise white, rosé and red wines against tartrate crystals by inhibiting the growth of potassium bitartrate crystals; this effect depends on the wine's degree of instability and preparation for bottling. That is why a specific method has been developed and validated thanks to extensive laboratory tests.

Oenobrands, with the support of Dario Montagnani/Enolab, and Checkstab Instruments by Delta Acque collaborated to develop a unique and standard reference method named **ISS Technologies**. This analysis allows fast interpretation of wine instability and acquisition of the precise dosage of Claristar to achieve tartaric stability.

Description of the ISS Technologies

The method is the result of Dario Montagnani's intuition and precise comparisons based on the study of the graph of saturation temperature analysis (T° sat) as indicated on the Checkstab Instruments. 160 wine samples were analysed to set up the method in 2015, of which 70% were red wines. Since then, many laboratories worldwide have started using it and the method has been continuously improved to obtain the current and fully operational **ISS Technologies** for **Claristar**. For equal values of the decrease in conductivity at the mini-contact, different wines had different distances between the straight line and the curve,

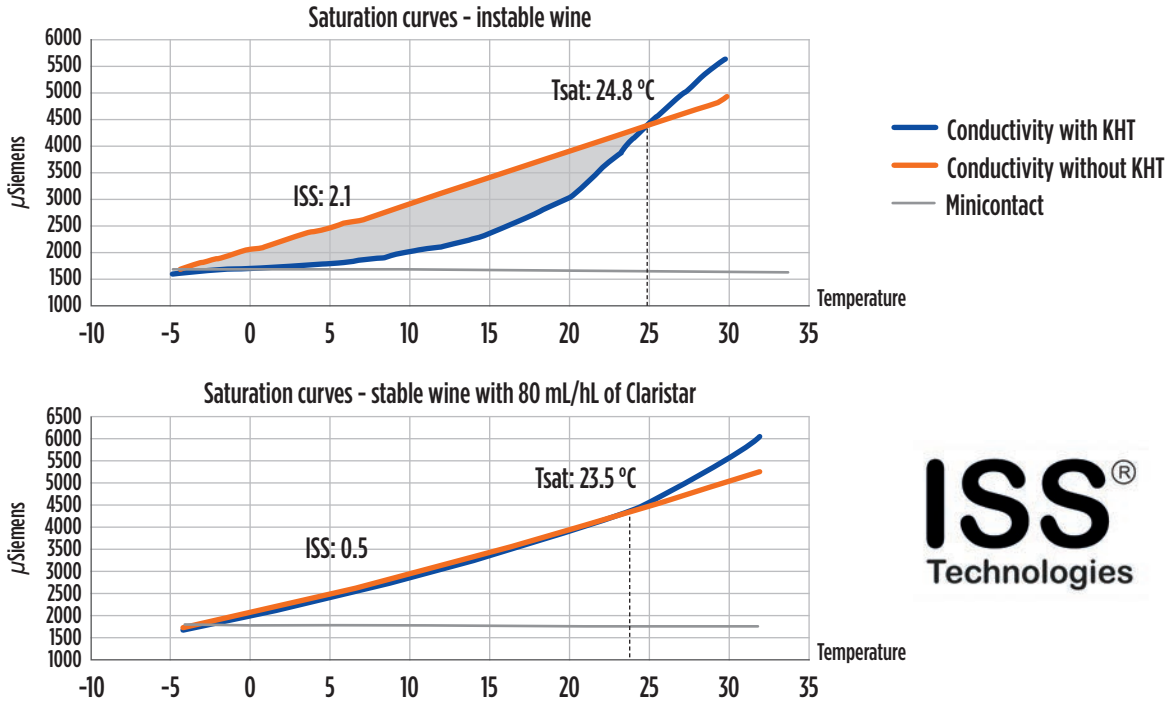
formed by the temperature/conductivity plot, and therefore different Tsat graphs. The Tsat value alone cannot confirm the positive effect of using mannoproteins in the wine, as the parameter does not evolve as a result of the addition of Claristar.

When interpreting a Tsat measurement, the distance between the straight line and the curve - practically the area that is formed between the straight line of wine without KHT and the curve of the wine with KHT - has been related to the action of the protective colloids and has proved to be an important analytical tool for testing and measuring **Claristar** with speed and repeatability.

This area has been called ISS (Index of Stable Supersaturation) and can be visualised with Checkstab Instruments. The attached graphs explain the ISS zone.

We have consistently found that the shorter the area between the straight line and the curve, the higher the stability of the wine. This means that the more similar the behaviour of wines are with or without KHT, the more stable the wines are.

ISS Technologies means that running a Tsat will provide an ISS value, directly related to the zone between the straight and the curved lines that go from zero to four and more.



ISS® Technologies

The method itself and the successive steps

Depending on the ISS result, we can describe the level of instability of the wine; according to the result and if mannoprotein usage is suitable, the laboratory will recommend an effective dose of **Claristar**.

This is why the method involves performing Tsat twice.

- The first ISS value obtained will indicate whether the wine is suitable with values of ISS below 2.9 and if yes, what **Claristar** dose can be recommended from 40 to 120 mL/hL.
- The second ISS value obtained will be done on the wine treated with Claristar at the recommended dose. It will confirm the stability of the wine.

Each Tsat runs for 45 minutes, meaning **Claristar** evaluation can be done on a wine sample within 24 hours.

What about the colour?

Regarding red wine and white/rosé wine matured with wood, we recommend that our laboratory partners perform a colour test at the same time. The laboratory can initially, and quite rapidly, send a **Claristar** dose rate recommendation. After the colour stability test has also been performed, a final report is sent which will indicate if a wine is colour stable, potentially unstable, or unstable based on the delta turbidity obtained.

Laboratories

The analysis method described here is based on the results of practical experiments. Also many comparisons to the cold test have been performed in order to corroborate that wines with low ISS (<1.2) had no crystals after six days at -4°C and vice versa. Adapting this method to your particular needs may require calibration.