

Q&A

TARTRATE STABILITY

1. What does tartrate instability look like?

Tartrate instabilities are almost always clear or translucent, or occasionally white crystalline deposits, a mix of potassium bitartrate and tartaric acid, and sometimes also calcium tartrates. They may also be found bound to other compounds, for example phenolics when color instability is also present.

Tartrate instability occurs because of super-saturation of Potassium Bitartrate (KHT) within a wine that precipitates out in the form of crystals as the temperature drops, reducing the wine's ability to retain the salt in solution.

2. What are the options for stabilizing tartrates?

Tartrates can be stabilized by either traditional subtractive or newer inhibitive methods. Subtractive methods force tartrates to fall out of solution from the wine. Inhibitive methods prevent tartrates from falling out of solution by the addition of a protective colloid that blocks the crystal nucleation sites.

Using reduced temperatures of 25 to 32°F (-4 to 0°C) for days or even weeks, the subtractive technique shifts the saturation curve, forcing the potassium bitartrate to be super-saturated, allowing precipitation to occur and the resulting precipitate to be removed. Seeding with KHT powder is optional and helps speed up the process of crystal formation as the powder provides ample nucleation sites. Still, this method can take weeks, require large amounts of energy, be expensive, oxidize the wine, reduce the wine's natural acidity and may be a hurdle for wineries reducing their carbon footprint or applying for Green certifications.

Inhibitors are substances that prevent crystallization. Carboxymethylcellulose (CELSTAB®) and mannoprotein (MANNOSTAB® LIQUIDE 200) are the two most common and trusted non-subtractive inhibitors. They result in a faster, less expensive, more energy-friendly process that has the additional benefit of not altering the acid levels or pH of the wine.

3. Is color instability the same as tartrate instability?

No, they are not the same although they do form under similar circumstances of cold temperatures. If they present themselves concurrently, the tartrate crystals may be colored. Color instabilities are often found with tartrate instabilities and one may increase the likelihood of the other causing problems.

4. Which laboratory tests are recommended for cold stability?

Contact your LAFFORT® Technical Representative to discuss the simple and efficient options of lab testing for tartrate and all other instabilities.

One important consideration for laboratory testing when using CELSTAB® is the need for the wines to be protein stable and note that the 60°C / 140°F test is not consistent. It may give correct results for the tendency of the wine to throw a haze from protein but is not sufficiently robust to make sure residual protein does not interact with CELSTAB®. When testing for protein stability to validate the use of CELSTAB®, the 80°C / 176°F test is required. See the Protein Stability section on page 106 for more information.

5. MANNOSTAB® is a dark brown liquid. What will happen to the color of my wine?

MANNOSTAB® LIQUIDE 200 will not darken a white wine or rosé. Its purity allows it to remain neutral when added to a wine at the low doses necessary to stabilize.

6. Should I still 'seed' with potassium bitartrate when using an inhibitor?

No. If using an inhibitor, then seeding with KHT is not necessary.

7. Should I use CELSTAB® or MANNOSTAB®?

CELSTAB® and MANNOSTAB® LIQUIDE 200 are differentiated depending on the goals of the winemaker. Additionally, they both have limitations that can dictate which one should be used.

CELSTAB® is great for whites that are heat-stable and rosés that are both heat-stable and color-stable (see the test on page 103). CELSTAB® is not recommended for use with red wines unless supplemented with STABIMAX®, see below.

MANNOSTAB® LIQUIDE 200 allows for cold stabilization on whites and rosés that have not been heat-stabilized. MANNOSTAB® can also be used in color stable red and rosé wines.

*8. Do I add **CELSTAB®** or **MANNOSTAB® LIQUIDE 200** before or after crossflow filtration?*

Addition of **CELSTAB®** or **MANNOSTAB® LIQUIDE 200** is made after clarification filtration, including crossflow and pad filters.

It should be the last addition made to a wine, except for **STABIVIN® SP** (arabic gum), SO_2 , gas adjustments, and ascorbic acid. When added to a wine with an acceptable filtration Clogging Index (<20 for **CELSTAB®** and <50 for **MANNOSTAB® LIQUIDE 200**) that is within all parameters for addition, both products do not raise the Clogging Index significantly and will fully integrate. It should be noted that if sterile filtration differential pressure goes above 0.8 bar, the filtration should be stopped and the membrane changed as colloidal stripping may occur; the protective colloids may be retained on the filter media, allowing the unstable tartrates to pass through the filter and decrease stability.

*9. Can **CELSTAB®** and **MANNOSTAB®** be used in sparkling wines?*

Both **CELSTAB®** and **MANNOSTAB® LIQUIDE 200** can be added prior to tirage bottling.

*10. I added **CELSTAB®** without following the protocol and now I have a haze; can I start over and add more?*

Do not add more **CELSTAB®**. Contact your **LAFFORT®** Technical Representative to receive guidance on how to proceed to recover the wine.

11. Is there a sensory impact from these products?

Both products are neutral regarding mouthfeel, flavor, aroma, pH, and color. Some winemakers report an improvement in mouthfeel, although the difference is slight and should not drastically change a wine.

*12. What is the interaction between **CELSTAB®** and tartrates?*

CELSTAB® is a negatively charged molecule that binds with the positively charged surface layer of potassium bitartrate crystal nuclei, preventing growth beyond the microscopic. Specifically, **CELSTAB®** binds to the 010 face of the crystal and prevents further attachment of potassium bitartrate crystals.

*13. Can **CELSTAB®** be used on red wines?*

CELSTAB® is not advised for use on any red wines without additional treatment due to its affinity for non-polymerized color compounds. A specific arabic gum, **STABIMAX®**, will allow use of **CELSTAB®** on more reds, including younger ones. Contact your **LAFFORT®** Technical Representative for more details. Alternatively, a mannoprotein stabilizer such as **MANNOSTAB® LIQUIDE 200** may be used on red

wine, although, again, color stabilization may still be required prior to addition.

*14. Why has my NTU increased after adding **CELSTAB®**?*

There may be a slight change in turbidity after the addition of **CELSTAB®** but remember that turbidity does not equal filterability. The change in turbidity, if it occurs, will not directly affect filterability.

15. Are all mannoprotein stability products the same?

Certain mannoproteins can interfere with the nucleation and crystallization of super-saturated KHT. Of these mannoproteins, those with molecular weight of around 40 kDa were determined by **LAFFORT®** research in France to be the best at stabilization, known as MP40. Found in yeast walls, this stabilizing compound is isolated by a **LAFFORT®** patented enzymatic and filtration process to purify and concentrate it. **MANNOSTAB® LIQUIDE 200** is a homogenous solution of MP40 and will cold stabilize the wine for long periods of aging.

16. What are the overall costs of using these products?

CELSTAB® and **MANNOSTAB® LIQUIDE 200** both offer substantial cost savings per bottle versus traditional cold stabilization. **CELSTAB®** is far less expensive, generally with a treatment cost of 1/3 to 1/10 of the cost of **MANNOSTAB® LIQUIDE 200**.

The greatest monetary savings are the lowered requirements in terms of energy, time, labor, and water. Using Celstab or Mannostab can help wineries reduce carbon footprints and work towards 'Green' certificates.

17. Are these products utilized in an organic, biodynamic, or natural winemaking program?

MANNOSTAB® LIQUIDE 200 is authorized for use by the European Organic legislation N°. 889/2008 and the National Organic Program of the USDA. For any other programs, it is the winery's duty to ensure compliance with and authorization by each program prior to product usage.

18. What about calcium instability?

While **CELSTAB®** and **MANNOSTAB® LIQUIDE 200** are excellent stabilizers for tartrates, they will not correct for calcium instability. For this reason, it is important to ensure wines treated with these products are below 60 mg/L calcium, otherwise calcium tartrates may occur.

19. Is metatartaric acid legal in the USA?

The U.S. wine industry has never expressed an interest in metatartaric acid. It is widely available in many other countries. Contact your **LAFFORT®** Technical Rep if you are interested in working with this.