Solutions for winemaking
LAMOTHE-ABIET

THE ESSENTIALS FOR COLD STABILITY

The presence of crystals in a bottle is commonly perceived as a fault by consumers. These are generally tartrate crystals which are formed when tartaric acid complexifies with potassium or calcium, then precipitates due to cold temperatures. This instability does not have an impact on the wine's intrinsic qualities but many consumers reject wines with tartrate crystals in the bottle, judging them as faults.

TO KNOW… Stable wine + stable wine ≠ stable blend

Two wines that are individually stable might not be stable together. Blending leads to the creation of a new matrix with different chemical-physical characteristics. It is important to check stability and start the stabilization process after the blend and wine adjustments are made.

Methods used to prevent potassium bitartrate crystals precipitation in the bottle:

- **Subtractive techniques**, such as cold treatment, rely on the removal of tartaric acid and/or potassium from wine. These methods can be expensive, require a lot of water, a lot of energy, impact wine organoleptic quality, and might need more time than expected.
- **Inhibitive techniques**, based on the addition of protector colloids which inhibit the formation of tartrate crystals, are more respectful of wine quality than subtractive methods, speed up wine preparation and dramatically reduce labor, wine losses, and energy and water consumption. However, some of these methods have specific limits under certain circumstances.

Focus on Inhibitive methods:

Despite the differences among protective colloids, the stabilizing effect depends on their capability of opposing the growth of the nuclei around which crystals are formed.

Yeast Mannoproteins for wine stability

Ageing on lees for an extended time period naturally improves wines' stability; Bordeaux's University's Institute of Enology showed that yeast mannoproteins play an important role in this stabilization effect of the lees. Crystal nucleation is inhibited by the association between tartrates and mannoproteins. Mannoproteins are colloïdal protectors that inhibit the nucleation process and slow down the crystallisation of tartaric acid salts.

STAB K®: Mirroring the mechanisms of lees ageing, STAB K® is a natural and lasting solution for tartaric and color stabilisation of any type of wines (red, rosé, white and sparkling wines).STAB K® is a liquid solution of specific mannoproteins (MP40) from *Saccharomyces Cerevisiae* cell walls. It has been carefully selected by Lamothe-Abiet for its high ability to inhibit potassium bitartrate salts formation, while preserving the wine's organoleptic properties. STAB K® will not create any instabilities and is fully filtrable. Its usage does not require energy consumption, as opposed to other subtractive inhibitory treatments and is extremely easy, quick, and convenient.

- Wine Requirements: Filtrable.
- Type of wine: Red, Rosé, White, and Sparkling
- Application: 50-150 ml/hL. Still wines: 24-72 hrs before final filtration or bottling. Sparkling wines: At tirage.

SB, high instability

	CONTROL	STABK 150 mL/hL
CRYSTALS PRESENCE	YES	NO
FILTRABILITY INDEX	2	1

Figure 1: Effect of STAB K at 150ml/hL for white wines tartrate stability. The addition of STAB K stabilized the wines and improved the filtrability index.

MEDOC (medium instability)

	CONTROL	STABK 150 mL/hL
CRYSTALS PRESENCE	YES	NO
COLD HOLD (ΔNTU)	65	10
FILTRABILITY INDEX	27	14

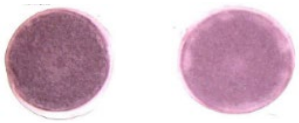

Figure 2: Efect of STAB K on red wines color and tartrate stabilization. Cold Hold (wine considered stable if ΔNTU<20). The addition of STAB K prevented the formation of tartrate crystals, color precipitation and improved the filtrability index.

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CarboxyMethylCellulose (CMC) for wine stability

CMC is a long-chain cellulose gum with carboxymethyl groups. CMC functions as an inhibitor of potassium tartrate crystal growth by eliminating nucleation sites, restricting further crystal growth.

CMC, unlike mannoproteins, are reactive with wine proteins due to their high negative charge, causing haziness or sediment if used in a wine with unstable proteins. Note that lysozyme is a protein and can generate a haze if present with CMC. For this reason, it is imperative to check wine protein stability. Preliminary lab addition trials can easily be performed and are very useful for preventing problems. If haziness appears, bentonite fining is necessary. CMC can also cause color precipitation, for this reason, it is not recommanded to use CMC in red wines. The addition of CMC causes no known changes in pH, titratable acidity (TA), tartaric acid concentrations, or organoleptic effects. Not all CMC polymers are created equal and differ among suppliers, especially regarding their degree of polymerization (DP), degree of substitution (DS) and the hydrolysis level of the cellulose chain, which impact the filtrability and efficiency of the product.

VINOPROTECT®: High efficiency, Low viscosity CMC solution at 50 g/L.

Lamothe-Abiet has selected an effective, neutral tasting, and easy-to-use cellulose gum in the composition of VINOPROTECT®. This product, specifically made for use on wine, has been selected with respect to two constants: its degree of substitution (DS) and its degree of polymerisation (DP). These two parameters determine the product's efficiency and viscosity. VINOPROTECT® is an efficient colloid protector with a strong ability to inhibit the nucleation of potassium tartrate crystals, thus blocking the development of tartrate microcrystals and their subsequent precipitation and has high filtrability.

- Wine Requirements: Protein Stable. Filtrable. Turbidity < 5 NTU
- Type of wine: White, Sparkling, Light Rosé. Not on red wines
- Application: 100-300 ml/hL. Still wines: 24-72 hrs before final filtration or bottling. Sparkling wines: At tirage.

A bit more about protein stability

Proteins responsible for wine instability are produced by grapes. Their content varies with every vintage, grape variety, soil, climate, and vineyard practices. For this reason, wines need to be checked every year individually to determine the correct dosage of bentonite. Furthermore, changes in wine temperature, alcohol content, or pH impact protein solubility and can lead to their precipitation and haze formation. That is why protein stability must be checked in the finished blend.

Treatments for protein stability

Protein stability can be improved early in the winemaking process utilizing tannins, but bentonite still remains the most effective available tool. Nevertheless, bentonites are not all equal and some can be more effective than others in removing proteins. Their enological properties and application mainly depend on the nature of the main exchangeable cation: sodium bentonites are the most effective in removing proteins; calcium bentonites have a better clarifying effect.It is essential to run preliminary bentonite fining trials in the with the same bentonite that is intended to be used in the cellar.

BENTOSOL POUDRE: Natural sodium bentonite, selected among the purest natural bentonites, specifically for its **strong deproteinizing ability**, **compacting properties** (small amount of lees) and the **preservation of wines' aromas** (little loss of aromas).

BENTOSOL FT: Purified calcium-sodium bentonite, graded and poor in crystalline silica, specifically developped for protein stability and crossflow filtration usage. Its purity and the defined particle size avoids both filter blockage and residual micro-particles post filtration to prevent damage to cross-flow filters pumps and membranes. **It is now possible to clarify and stabilize wine in a single step.** Bentosol FT enables enables wineries to reduce bentonite consumption, eliminate settling time after bentonite fining, and reduce wine waste and lees volumes. Additionally by reducing the turn around time for fining and filtration, wineries can even increase their total production capacity.