



**TECHNICAL NEWSLETTER**

**BOTTLE WITH CONFIDENCE WITH ENARTIS – TOTAL WINE STABILITY**

Today’s wine market requires that wines be visually appealing to consumers, meaning that wines need to be clear, free of sediment, with no off-colors, flavors or aromas. Wine stabilization is an important part of winemaking and includes microbial, protein, tartrate, color and oxidative stability. Just prior to bottling, post final blend, is the last chance a winemaker has to ensure wine is stable.

*Table 1: STABILITY CHECKLIST*

STABILITY	CONSEQUENCES	TEST	WHITE/ROSÉ	RED
PROTEIN STABILITY	Haze, Sediment	Bentonite Fining Trial	✓	
		Heat Test	✓	
TARTRATE STABILITY	Sediment, Tartrate crystals	Tartrate Stability Test	✓	✓
COLOR STABILITY	Sediment, Loss of color	Color Stability Test		✓
MICROBIAL STABILITY	Off-flavors, Haze, Sediment, Re-fermentation, Oxidation	PCR Panel for Yeast and Bacteria	✓	✓
OXIDATIVE STABILITY	Browning, Pinking, Off-flavors, Loss of identity, Loss of balance	Pinking Potential	✓	
		Oxidative Stability	✓	
FINAL QC		Haloanisoles Panel in Cork	✓	✓
		Bottled Wine Sterility	✓	✓
		TPO (Total Packaged Oxygen)	✓	✓

**Colloidal Stability (Protein, Tartrate, Color)**

**1. PROTEIN STABILITY**

The majority of proteins found in wine are produced by grapes; their content in grapes varies with vintage, grape variety, soil, climate and vineyard practices. Changes in wine temperature, alcohol content or pH impact protein solubility and can lead to their precipitation and haze formation.

**How can we protein stabilize wine?** Unstable proteins are commonly removed by using bentonite.

Protein stability can be improved early in the winemaking process utilizing tannins, enzymes with secondary protease activity and mannoproteins to dramatically reduce the amount of bentonite required for stability later in the process.

Based on its composition, bentonites can have different properties:

- Sodium bentonites are the most reactive with proteins
- Calcium bentonites are commonly used to compact lees
- Calcium bentonite sodium activated have good reactivity with proteins and good lees compaction properties.

*Table 2: Enartis bentonite applications*

FUNCTION	ENARTIS PRODUCT
CLARIFICATION	Pluxcompact > Pure Bento > Pluxbenton N
LEES COMPACTION	Pluxcompact > Pure Bento > Pluxbenton N
PROTEIN REMOVAL	Pure Bento > Bentolit Super > Pluxbenton N
ORGANOLEPTIC IMPACT	Bentolit Super > Pluxbenton N > Pure Bento

**How to determine the appropriate dosage of bentonite to achieve stability:** Bentonite Fining Trials offered by Vinquiry Laboratories by Enartis USA determine the amount of bentonite needed to stabilize a wine. It is important to test with the bentonite you will be using in the winery. Vinquiry Labs offers free re-checks after winery treatment.

**2. TARTRATE STABILITY**

The presence of potassium bitartrate (KHT) crystals in wine is one of the first causes of rejection by the consumer. To reduce the risk of KHT precipitation, various techniques can be used. Subtractive techniques rely on removal of tartaric acid and/or potassium from wine.



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Additive techniques, based on the addition of protective colloids which inhibit the formation of tartrate crystals, are more respectful of wine quality than subtractive methods, and dramatically reduce production costs, energy used for chilling and water waste.

Table 3: Enartis Protective Colloid Range. \*KPA: Potassium Polyaspartate

EFFECT	CELLOGUM LV20	CITROGUM®	CLK+	STAB MEGA	ZENITH® UNO	ZENITH® COLOR
COMPOSITION	CMC (CARBOXYMETHYL CELLULOSE)	ARABIC GUM	YEAST MANNOPROTEIN	CMC, ARABIC GUM, YEAST MANNOPROTEIN	KPA*	KPA*, ARABIC GUM
TARTARIC STABILITY	+++	++	++	+++	++++	++++
LENGTH	+++	+++	++	+++	+++	+++
FILTERABILITY	+++	+++	+	+	++++	+++
COLOR STABILITY	-	0	+	++	0	+++
COLLOID STABILITY	- - -	0	0	0	0	0
MOUTHFEEL	0	++	+++	++	0	+

**What is potassium polyaspartate (KPA)?** KPA is a poly-amino acid produced from L-aspartic acid, an amino acid present in grapes. Enartis created a revolutionary range of products that harness the synergy and power of potassium polyaspartate and colloids for both tartaric and color stabilization.

**How to test for tartaric instability:** Vinquiry Laboratories by Enartis USA offers a fast and reliable Mini-Contact Test, the reference test in the USA. This test measures the change in conductivity over time and relates it to a level of stability. Wines are considered cold stable if  $\Delta\mu S < 3\%$ . It is important to test the efficacy of CMC, arabic gum and yeast mannoproteins on each wine to determinate the dosage required to ensure full stability. Vinquiry Laboratories by Enartis USA offers CMC Panels for white, rosé, red and sparkling wines.

### 3. COLOR STABILITY

Color precipitation in the bottle usually happens simultaneously with tartare precipitation in young red wine. Just before bottling, winemakers can utilize Maxigum, Enartis Stab Mega and Zenith Color to stabilize color.

**How to test color stability:** Vinquiry Laboratories offers a Color Stability test that includes the observation of color matter precipitation and decrease in color intensity after cold hold at  $-4\text{ }^{\circ}\text{C}$  for 24 hours.



Figure 1: Stabilizing effect of Zenith® Color on tartrates and color

### Microbial Stability

To limit any off-flavor development, re-fermentation in the bottle, gas production and increase in turbidity, it is important to ensure wine will be stable microbiologically after bottling. Vinquiry Laboratories by Enartis USA offers the following analysis for microbial monitoring:

- PCR Panels and Culture Plating to detect and quantify spoilage microorganisms in wine
- Unfiltered Bottling Panels, which assess the risk associated with bottling a wine unfiltered, considering residual sugar, malic acid and the presence and activity of spoilage yeast and bacteria
- Bottled Wine Sterility to control the quality of your filtration, bottling line and stability of the final product



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### Oxidative Stability

Mainly caused by oxidation, premature ageing in wine is characterized by browning, pinking, loss of varietal and fresh aromas and loss of complexity, balance, identity and terroir.

Vinquiry Laboratories by Enartis USA offers several tests to understand the oxidative sensitivity of a wine:

- Pinking, caused by phenolic instability, may occur in conjunction with rapid exposure to air during bottling. Certain varieties, and especially wines made under reductive winemaking techniques, are prone to these alterations, and in most cases these changes are not reversible. The Pinking Potential test evaluates the presence of precursors that can lead to color issues in the bottle, particularly for white and rosé wines.
- The Oxidative Stability test evaluates the sensitivity of wine to oxidation and browning.
- The CaOX indicates the antioxidant capacity of a wine, its resistance to oxidation and its ageing potential.

**How to improve oxidative wine stability:** The Enartis SLI program consists of adopting strategies that block or slow down oxidation reactions to elongate and improve wine shelf life.

- Reduce and protect substrates of oxidation (catechins) via fining.
- Remove metals ( $\text{Cu}^+$  and  $\text{Fe}^{3+}$ ), catalysts of oxidation with Enartis Claril HM: This fining agent benefits from the synergistic actions of chitosan and PVI/PVP to reduce the concentration of iron, copper, hydroxycinnamic acids and catechins, which are key players in the process of oxidation.
- Scavenge radicals and protect against oxidation with Tan SLI.
- Stabilize redox potential, essential to 'slow down' oxidation reactions and preserve wine freshness over time. Citrostab rH (ascorbic acid, citric acid,  $\text{SO}_2$  and gallic tannin) is a pre-bottling coadjunct that stabilizes redox potential and protects wine from undergoing oxidation alterations, pinking and premature ageing.



*Figure 2: Effect of Enartis Stab SLI in protecting wine against oxidation and browning over time. Picture after six months on the shelf.*