Q&A

STABILITY

Consumers buy wine that is clear and appropriately colored, and they like the wine to stay that way. Instabilities, amorphous deposits, cloudiness, and crystals are all negatively perceived, and can be prevented with appropriate practices.

1. What are the most common instabilities?

The three most common instabilities are Protein (Heat), Tartrate (Cold), and Microbial. Often overlooked yet still important is Color instability, and there are also the less common issues such as quercetin instability, ellagic acid instabilities in wines with late tannin additions, phenolic instabilities causing pinking in white wines, and premature aging.

Failure to address potential instability can cause hazes, precipitates, gasses, and even exploding bottles! Consumers see these flaws as reasons to not repurchase, thus making stabilization a critical winemaking process.

2. How do I know which instability my wine has?

To find the precise cause of the instability, laboratory analyses is required, including filtration, microscopy, and chemical assays. Wine labs, both in-house and commercial, can be set up to test for all instabilities. Protein and Tartrate instability testing are easiest to do in-house. Microbial testing ranges from easy (microscopy) to medium (plating) to expensively complex genetic testing (Polymerase Chain Reaction, or qPCR).

3. What would make a stable wine become unstable?

Stable wines may become unstable if subjected to conditions that alter the chemical make-up of the wine or re-introduce microbes. The most common way to change the wine chemistry which may cause instability is to add an acid, a carbonate, sugar, or tannins. Any one of these can cause cold, heat, and/or color instabilities to return.

Cellar cleanliness is paramount to preventing microbially stable wines from being re-contaminated, including thorough cleaning and sterilization of all vessels and equipment, cross-contamination vigilance, regular checks of topping material, regular vessel integrity inspections, and elimination of materials that may harbor substrates useful to microbes (e.g., Chlorine treated wood that leads to TCA).

4. Will blending two stable wines make one stable wine?

No. A common way of making wine(s) unstable is by blending different lots. Even if both lots are independently stable, this does not guarantee the resulting blend will be stable.

The unpredictable nature of how wine chemistry shifts is due to the myriad ways compounds interact in different wines. For this reason, it is advised to make a final blend before embarking on the stabilization of the wine.

5. Can filtration increase or decrease stability?

Filtration will not stabilize a wine for most instabilities. For example, filtration can remove tartrate crystals from stable wine that is cold filtered, but in this case only maintains the stability, rather than creating the stability.

Filtration can certainly stabilize wines from a microbial sense, although even then, only provided the wine is never re-exposed to recontamination in the cellar. When bottling, filters that have been breached can allow microbes into the wine, which then take advantage of a wide-open medium in which to colonize and grow. As few as 1 cell per 750 mL has the potential of growing over time and creating spoilage.

Clogging filters on the bottling line may make a stable wine unstable; they can strip protective colloidal compounds from the wine that passes through, for example, Celstab colloids may be stripped from their protective role around the nuclei of a tartrate crystal. The Celstab can remain upstream of the filter and the unstable wine pass downstream.

Exacting protocols and observations during bottling are critical to maintaining stability into the bottle.

6. Does barrel aging or lees aging improve my stability as a whole?

Aging wine on lees can certainly improve protein stability and it is often found that the amount of bentonite needed to stabilize for proteins is reduced after aging when coupled with stirring on yeast lees. Aging alone will not fully stabilize a wine.

7. What causes pinking and how do I prevent it?

In certain circumstances with white wines, highly reductive protocols combined with fruit damaged by frost (although not always necessarily) can cause a phenomenon called "pinking" in which latent precursors transform to a salmon pink hue upon sudden exposure to oxygen when the bottle is opened. Removal of these precursors is possible with PVPP (**VINICLAR® P**) or careful additions of ascorbic acid may help mitigate the reaction by intercepting oxygen before it can react with the precursors.

8. Which heavy metals in wine can cause instability?

Iron, copper, and other heavy metals exist in trace amounts in wine, sometimes coming naturally from the grapes and other times from exposure to equipment or winemaking processes. These metals can combine with proteins and precipitate, called a casse. The most common incidence involves copper since extremely low amounts (sometimes no more than 0.5 ppm) have been observed to cause instability combined with many known chances for introduction such as foliar sprays, winery equipment, and direct additions to remove sulfur-based aromas. Most other metals have lower introduction rates and consequently lower chances of forming casses. Iron and Copper instabilities can form a white haze, and copper can also produce a reddish-brown amorphous deposit.

Care should be taken to minimize the introduction of metals into wine by examining protocols and equipment. Additionally, using wine lees or a purified lees product like **OENOLEES®** can help by fining out the metal ions prior to filtrations and bottling.

STABILITY PRODUCT APPLICATIONS

OBJECTIVE	JUICE OR WINE TYPE	STABILITY PRODUCT	DOSE
Cold stabilization	Rosé - Heat and Color Stable	**CELSTAB®**	1 mL/L
Cold stabilization	White - Heat Stable	**CELSTAB®**	1 mL/L
Cold stabilization	Heat unstable White and Rosé as well as color-stable Red wines.	**MANNOSTAB®LIQUIDE 200**	50 - 150 mL/hL
Cold and Color stabilization	Red	**CELSTAB® + STABIMAX®**	1 mL/L + 100 mL/hL
Color stabilization	Rosé and Red	**STABIVIN®**	70 - 150 mL/hL
Colloidal stabilization, softer mouthfeel	White, Rosé, and Red	**STABIVIN® SP**	100 - 300 mL/hL
Protein (heat) stabilization	White and Rosé - Juice	**MICROCOL® FT**	30 - 80 g/hL (300 - 800 ppm)
Protein (heat) stabilization	White and Rosé - Finished Wines	**MICROCOL® ALPHA**	10 - 80 g/hL (100 - 800 ppm)
Yeast elimination and inhibition	White, Rosé, and Red	**SORBISOL K**	10 - 25 g/hL
Lactic acid bacteria elimination and inhibition	White, Rosé, and Red	**LYSOZYM®**	10 - 50 g/hL (100 - 500 ppm)
Brettanomyces elimination and inhibition	White, Rosé, and Red	**OENOBRETT®, OENOBRETT® ORG**	4 - 10 g/hL (40 - 100 ppm)
General microbial protection during aging, SO_2 reduction strategy	White, Rosé, and Red	**MICROCONTROL®**	5 g/hL (50 ppm)