

## ENARTIS NEWS

### POST-BOTTLING WINE DEFECTS: WHAT TO CHECK AND HOW TO PREVENT

#### PART 1: WHITE AND ROSÉ WINES

*The appearance of a problem in wine after bottling can be a big economic problem and damage your image. That is why it is recommended to take the time necessary to check wine and stabilize it before bottling. This is much less expensive and risky than having to recall faulty bottles, open them, treat the wine and bottle again. The following are the most common problems that may appear in bottled white or rosé wines and how to prevent them.*

#### HAZE & SEDIMENT

##### PROTEIN HAZE

**Appearance:** Whitish haze or amorphous sediment. Microscope observation helps identification.

**Causes:** Wine exposure to high temperatures can cause protein insolubilization; addition of negatively charged colloids like metatartaric acid, CMC or KPA or late tannin addition can react with wine proteins; presence of residual lysozyme or fining proteins.

**Prevention:** Run preliminary bentonite fining trials and check the results with a protein stability test. If a wine is going to be treated with stabilizing colloids or tannins, adopt a stricter stability limit.

##### MICROBIAL CONTAMINATION

**Appearance:** Whitish haze or amorphous sediment. Sometimes presence of CO<sub>2</sub> and off-flavors. Microscope observation helps identification.

**Causes:** Bad/insufficient microfiltration and presence of a growth substrate, mainly sugar or malic acid.

**Prevention:** Microfiltration suitable for wine composition; use antimicrobials: chitosan during wine preparation for reducing wine microbial contamination, potassium metabisulfite and potassium sorbate at bottling.

##### POTASSIUM BITARTRATE

**Appearance:** White crystals, sandy precipitate. Potassium bitartrate salt dissolves in hot water.

**Causes:** Wine exposure to low temperatures.

**Prevention:** Test for wine tartrate stability by Minicontact test (wine conductivity measurement)

and/or cold test (we suggest 6 days at -4°C). If wine is unstable, use stabilizing colloids or a physical stabilization system.

In the case of stabilization by physical systems (cold treatment, electro dialysis, cation exchange resins), re-check the stability of the wine at the end of treatment.

In the case of stabilizing colloids use (CMC, mannoproteins, metatartaric acid, KPA), run preliminary lab trials reproducing the process that the wine will undergo in the winery (clarification, sequence of filtration, etc.) to test the efficacy and determine the correct addition rate.

##### CALCIUM TARTRATE

**Appearance:** White crystals, sandy precipitate. Calcium tartrate salt does not dissolve in hot water. The presence of calcium tartrate crystals can induce the precipitation of potassium bitartrate.

**Causes:** Excessive calcium content: commonly, concentrations above 80 mg/L in white wine is considered risky. Use of racemic tartaric acid: the calcium salt of the racemic form is much more insoluble than the one formed by L-tartaric acid. In presence of racemic tartaric acid, the risky concentration of calcium is much lower than the 80 mg/L mentioned above. In any case, calcium tartrate precipitation is unpredictable and may happen after years of ageing.

**Prevention:** Temperature has little effect on calcium tartrate precipitation. For this reason, cold test and Minicontact test are not effective for predicting calcium instability and cold stabilization is not a reliable method to prevent it. A way of reducing wine calcium content when above the risky limit consists of seeding micronized calcium tartrate. This accelerates the formation of crystals and their precipitation. Calcium tartrate seeding does not require chilling: treatment can be done at 10-15°C.

## PINKING

**Appearance:** Salmon-red, blush color appearance in white wines.

**Causes:** Light oxidation that may happen during bottling. Recent studies conclude that the compound responsible for the appearance of pinking in white wines is the anthocyanin malvidin-3-O-glucoside present in small concentrations (~ 0.3 mg/L) in white wines produced under reductive conditions.

**Prevention:** The first step is to check if wine can develop the defect. By forcing wine oxidation through hydrogen peroxide addition, it is possible to estimate, visually or by measuring the increase of optical density around 500 nm, wine pinking susceptibility. In case of a positive result, removal of pinking precursors from wine can be achieved by fining with PVPP or carbon (high pinking susceptibility). At bottling, addition of ascorbic acid in conjunction with SO<sub>2</sub> and other antioxidant compounds is another effective solution. It is also possible that pink color can be reversed by exposure to UV light.

## SULFUR OFF-AROMAS

**Appearance:** Off-aroma that, depending on the responsible molecules, can be described as rotten egg, burnt rubber, skunky, burnt match, asparagus, onion or garlic.

**Causes:** Formation of sulfur compounds, namely H<sub>2</sub>S, mercaptans and disulfides, due to low wine redox potential.

**Prevention:** Contrary to conventional wisdom, pre-bottling copper addition is not the solution. In fact, it reacts with H<sub>2</sub>S and mercaptans but copper-mercaptan complexes are reversible and may be responsible for sulfur off-aroma appearance after a few months. Moreover, copper catalyses reactions of oxidation leading to loss of aromatics and premature ageing. The addition of tannins with the ability to buffer wine redox potential helps to limit the decrease of redox and the appearance of the defect.

## ATYPICAL AGEING

**Appearance:** Loss of fresh and fruity aromas. Appearance of an unpleasant sweetish aroma (mothballs, soap, floor polish, antique wax, jasmine, acacia blossom, foxy) together with a yellow-orange color.

**Causes:** Formation of 2-aminoacetophenone by chemical oxidation of indole-3 acetic acid (phytohormone present in grapes and intermediate of yeast tryptophan metabolism).

**Prevention:** Use of antiradicalic and antioxidant compounds, particularly ascorbic acid.

## LIGHT STRUCK

**Appearance:** Loss of aromatics, discoloration and appearance of unpleasant notes of garlic, onion and boiled cabbage.

**Causes:** Exposure of wines containing more than 100 µg/L riboflavin to light. In particular, blue light waves create a condition of energetic overexcitation in the riboflavin that transfers this energy to sulfur amino acids causing their degradation and the appearance of the off-flavor.

**Prevention:** Treatment with decolorizing carbon and specific bentonites can reduce wine riboflavin content below the risky limit.

## OXIDATION

**Appearance:** Color becomes gold yellow, brown. Varietal and fresh aromas are lost, and wine becomes evanescent. Bitterness appears.

**Causes:** First oxygen is solubilized into wine during bottling, second oxygen is converted into free radicals by action of metals like Cu<sup>+</sup> and Fe<sup>2+</sup>, then free radicals oxidize wine aromatic and color compounds.

**Prevention:** during wine preparation for bottling, use oxygen scavenger like ascorbic acid and hydrolyzable tannins that rapidly react with oxygen and convert it into harmless forms before it can damage wine compounds.

		Protein haze	Microbial contamination	K bitartrate	Ca tartrate	Pinking	Reduction	Atypical ageing	Light struck	Oxidation
<b>Bentolit Super</b>	Powdered calcium bentonite sodium activated	✓							✓	
<b>Pluxbenton N</b>	Natural sodium bentonite in granular form	✓								
<b>Pluxcompact</b>	Sodium calcium bentonite	✓							✓	
<b>Pharmabent</b>	Bentonite of pharmaceutical quality	✓							✓	
<b>Enoblack Perlage</b>	Compact pellet form decolorizing carbon					✓			✓	
<b>Claril AF</b>						✓				
<b>Sorbosol K</b>	Preparation of potassium sorbate, potassium metabisulfite and L-ascorbic acid		✓							
<b>Winy</b>	Pure potassium metabisulfite		✓							
<b>EnartisStab Micro (M)</b>			✓							
<b>EnartisStab Cellogum LV20</b>	20% solution of 20% low viscosity CMC			✓						
<b>AMT Plus</b>	Metatartaric acid			✓						
<b>Zenith Uno</b>	10% solution of A-5D K/SD potassium polyaspartate			✓						
<b>Enocrystal Ca</b>	Pure micronized calcium tartrate				✓					
<b>Citrostab rH</b>	Formulation made of ascorbic acid, citric acid, potassium metabisulfite and tannin					✓		✓		✓
<b>Citrosol rH</b>								✓		✓
<b>EnartisTan SLI</b>	Untoasted American oak tannin						✓	✓		✓

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