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ENARTIS NEWS

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

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 evaluate wine and stabilize it before bottling. This is much less expensive and safer 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; additions of negatively charged colloids like metatartaric acid, CMC or KPA or late tannin additions 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.

Vinquiry Laboratories Analysis: Sediment ID, Heat Stability, Bentonite Fining Trials

MICROBIAL CONTAMINATION

Appearance: Whitish haze or amorphous sediment. Sometimes presence of CO_2 and off-flavors. Microscope observation helps identification.

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

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

Vinquiry Laboratories Analysis: PCR Panel for Yeast and Bacteria, Plating for Bacteria, Plating for Yeast, Plating for *Brettanomyces*

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, electrodialysis, cation exchange resins), re-check the stability of wine at 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.

Vinquiry Laboratories Analysis: Cold Stability by Minicontact, CMC Panel, Zenith Panel, Citrogum Panel

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: calcium salt in 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.

Vinquiry Laboratories Analysis: Calcium, Calcium Stability Panel

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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_2 and other antioxidant compounds is another effective solution. It is also possible that pink color can be reversed by exposure to UV light.
Vinquiry Laboratories Analysis: Pinking Potential

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_2S, 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_2S and mercaptans but copper-mercaptan complexes are reversible and may be responsible for sulfur off-aroma appearance after a few months. Moreover, copper catalyzes 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.
Vinquiry Laboratories Analysis: Volatile Sulfur Compounds Removal Trial

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 anti-radical 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-favor.
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^+ and Fe^{2+}, then free radicals oxidize wine aromatic and color compounds.
Prevention: During wine preparation for bottling, use an oxygen scavenger such as ascorbic acid and hydrolyzable tannins that rapidly react with oxygen and convert it into harmless forms before it can damage wine compounds.
Vinquiry Laboratories Analysis: Fining Trial for Oxidation, Browning Test

For more information, please call us at (707) 836-2451 or contact your technical sales representative.