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ENARTIS NEWS

POST-BOTTLING WINE DEFECTS: WHAT TO CHECK FOR AND HOW TO PREVENT THEM
PART 2: RED WINE

This second document on post-bottling defects is dedicated to red wines. Many of the potential defects that can appear in bottled red wine can also be found in white wines and have been described in part one of this newsletter series; therefore, we will focus on a problem specific to reds: color and tannin precipitation.

COLOR INSTABILITY

***Appearance*:** Dark red amorphous sediment mainly formed by anthocyanins, tannins and polysaccharides in young wines. Potassium bitartrate crystals can be found as well, precipitated in consequence of color colloids sedimentation.

Picture 1 from left to right: color matter sediment, potassium bitartrate crystal sediment, color matter and potassium bitartrate crystal sediment.

In older wines, dark layers coating the side of the bottle, mainly from tannins and anthocyanins.

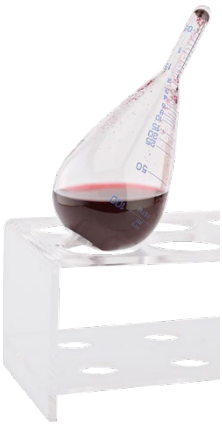
***Causes*:** Red wine exposure to low temperatures can cause the precipitation of colloidal coloring matter. In young wines, colloidal complexes are made of anthocyanins, tannins and polysaccharides. These compounds tend to polymerize and pass from the soluble state to the colloidal state by forming big aggregates that in time precipitate and form a sediment on the bottom of the bottle. Polymerization is faster in summer, favored by high temperatures, while color precipitation happens more frequently during winter, favored by low temperatures. Wines rich in colloidal coloring matter and more prone to color precipitation are wines obtained from moldy grapes, high-temperature fermentation or strong mechanical action (rough crushing, pumping, excessive pump-over, stirring lees, etc.).

In old red wine, colloidal coloring matter precipitate is mainly caused by tannins that polymerized by oxidative condensation. The process takes time, depending on the quantity of oxygen that can permeate through the cork. Exposure to cold temperatures help color sedimentation.

Color Stability Test

For checking wine color stability, running a simple test is recommended:

a) Filtering 100 mL of wine through a 0.45 micron membrane.
b) Measuring turbidity (T1) with a nephelometer (turbidimeter).
c) Placing 100 mL of wine in the drop shaped flask (Picture 2) or in a 125 mL clear glass bottle.
d) Store the sample at -4°C.
e) After 24 hours, check for the presence/absence of sediment. Presence of an amorphous dark red sediment indicates that wine is color unstable.



Picture 2

Prevention: There are two possibilities to avoid color precipitation.

1) *Addition of Gum Arabic.*
Gum Arabic's protective effect is attributed to a coating of the colloid particles that prevents them from agglomerating. In fact, gum is adsorbed by the colloidal color particles and its hydrophilic part spread in the solution maintaining a separation between the various colloidal particles. Stability is assured when there is a sufficiently high concentration of protective colloids to cover the entire surface of all the unstable colloid particles. In fact, if gum Arabic addition is insufficient, it cannot prevent colloids precipitate. Preliminary laboratory trials to test the stabilizing effect of different dosages, with the help of the color stability test, are crucial to find the correct addition rate.

2) Bentonite Fining

With its negative charge, bentonite is able to react with the positive unstable colloids involved in color precipitation (proteins and anthocyanins in the form of flavylium) and pull them down. Compared to the use of gum Arabic, bentonite fining is an operation that is more time and labor consuming, can attenuate wine color and does not have a permanent effect: colloidal coloring matter is known to form regularly during aging and a wine may again be unstable at cold temperatures only a few months after fining. Nevertheless, bentonite can be used to reduce the instability of very color unstable wines and to prepare them for complete and long-lasting stabilization by addition of gum Arabic.

Vinquiry Laboratories Analysis: Color/Colloid Stability – 24 hr, Color Colloid Stability – 6 day

SOLUTION		PROBLEM					
		Color Precipitation	**Microbial Contamination**	**K Bitartrate**	**Ca Tartrate**	**Reduction**	**Oxidation**
Maxigum	20% solution of gum Arabic Verek	●					
Zenith Color	5% solution of A-5D K/SD potassium polyaspartate (KPA) and gum Arabic Verek	●					
Pluxcompact	Sodium calcium bentonite	●					
Claril ZR	Bentonite, plant protein enhanced with chitosan	●				●	
Sorbosol K	Preparation of potassium sorbate, potassium metabisulfite and L-ascorbic acid		●				
Winy	Pure potassium metabisulfite		●				
EnartisStab Micro (M)	Preparation of activated chitosan		●				
EnartisStab Cellogum LV20	20% solution of low viscosity CMC			●			
Zenith Uno	10% solution of A-5D K/SD potassium polyaspartate			●			
Citrostab rH	Formulation made of ascorbic acid, citric acid, potassium metabisulfite and tannin						●
EnartisTan SLI	Untoasted American oak tannin					●	●

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