Inspiring innovation.

ENARTIS NEWS

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

This second document on post-bottling defects is dedicated to red wines. Many of the potential defects that may appear in a red wine bottle are the same that can be found in a white wine and that have been described in the previous part one. For this reason, here we'll focus on a problem that is specific to reds: color and tannin precipitation.

COLOR INSTABILITY

Appearance: in young wines, dark red amorphous sediment mainly formed by anthocyanins, tannins and polysaccharides. Crystals of potassium bitartrate can be found as well, precipitated in consequence of color colloids sedimentation (Picture 1).

Picture 1: from left to right: coloring matter sediment, potassium bitartrate cristal sediment, coloring matter and potassium bitartrate cristal sediment.

In old wines, dark layers coating the side of the bottle, made mainly of tannins and anthocyanins.

Causes: red wines exposition 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 richer 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 pumping-over, stirring the lees, etc.).

In old red wine, colloidal coloring matter precipitate is mainly made by tannins that polymerized by oxidative condensation. Process takes time, depending on the low quantity of oxygen that can permeate through the cork. Exposition to cold temperature helps color sedimentation.

Color stability test

For checking wine color stability, it is recommended to run a very simple test that consist in:

a) Filtering 100 mL of wine on a 0.45 microns membrane.
b) Placing 100 mL of wine in the drop shaped flask (picture 2) or in a 125 mL white glass bottle.
c) Putting the sample in the fridge at -4°C.
d) After 24 hours, checking 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 protective effect is attributed to a coating of the colloid particles that prevents them from agglomerating. In fact, gum is adsorbed by the colloidal coloring particles and then, 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, in which 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, 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 the complete and long-lasting stabilization by addition of gum Arabic.

SOLUTION		PROBLEM					
		Color precipitation	Microbial contamination	K bitartrate	Ca tartrate	Reduction	Oxidation
MAXIGUM	20% solution of gum Arabik 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 bostered by 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			●			
AMT PLUS QUALITY	Metatartaric acid			●			
ZENITH UNO	10% solution of A-5D K/SD potassium polyaspartate.			●			
ENOCRISTAL Ca	Pure micronized calcium tartrate				●		
CITROSTAB rH	Formulation made of ascorbic acid, citric acid, potassium metabisulfite and tannin						●
CITROSOL rH	Blend of potassium metabisulfite, citric and ascorbic acid						●
EnartisTan SLI	Untoasted American oak tannin					●	●

Via San Cassiano 99, - 28069 San Martino Trecate NO, Italia - www.enartis.com