

ENARTIS NEWS

COLOR STABILIZATION: ITS RELEVANCE IN THE EARLY STAGES OF WINEMAKING

Color is one of the main features that defines red wines. It is the first attribute that consumers identify and it is a strong indicator of the overall quality of a wine. Until recently, sulfur was the most used tool to protect and stabilize wine. Currently, consumers are more discerning regarding wine quality standards, so loss of intensity, color changes during storage or ageing, and precipitates in the bottle are undesirable to winemakers and consumers alike.

Common questions include: **Why have precipitates formed in the bottle? Why has color intensity decreased in just a few months after fermentation or when adding sulfur? Why has the initial color of the wine changed?** These are typical occurrences when color stabilization was not achieved during the early stages of the winemaking process.

Enartis recommends a specific color stabilization strategy to avoid undesirable changes and defects to finished red wines.

SOME IMPORTANT CONSIDERATIONS REGARDING COLOR

Anthocyanins are responsible for the red color of wine. These pigments are mainly found in grape skins and their level of extraction and stabilization can vary depending on winemaking practices.

The color of these red pigments is susceptible to wine physicochemical changes that occur during production, especially in the first stages of vinification. Here, the pigments are in free form (red flavylum cation) and, therefore, can be easily compromised by different factors causing color to change or be lost.

ESSENTIAL STEPS FOR EFFECTIVE COLOR STABILIZATION

To maintain quality standards for red wine, it is necessary to protect, extract, and stabilize color as soon as possible.

1. ANTIOXIDANT PROTECTION during transport or grape reception

Anthocyanins are water-soluble, so it is important to provide early antioxidant protection as soon as there is a minimum extraction of juice to prevent their degradation.

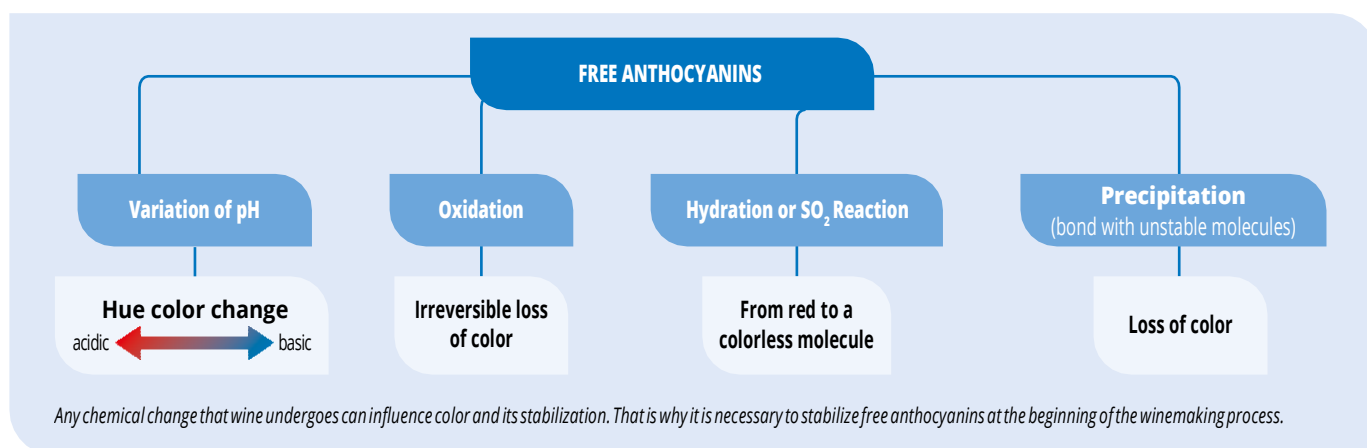
During transport or grape reception, Enartis recommends the use of **AST**. A specific blend of ascorbic acid, potassium metabisulfite, and gallic tannin, AST ensures fast and complete antioxidant and antimicrobial protection, as well as reduces future SO₂ additions.

2 GRAPE COMPOUND EXTRACTION

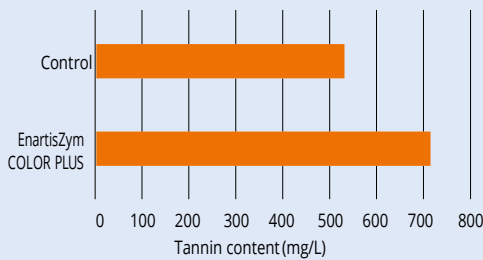
Accelerate and maximize phenolic extraction from berry skins using maceration enzymes.

The higher the concentration of tannins in the early stages of fermentation, the greater the formation of complex anthocyanin-tannin structures, and therefore, the better the long-term color stability.

EnartisZym COLOR PLUS has been formulated for this purpose. Its various activities ensure the diffusion of anthocyanins and acceleration of tannin extraction in must (Graph 1).



EnartisZym COLOR PLUS Increases Grape Tannin Extraction



Graph 1. Tannin content in red wine after 48h of maceration. 1.5 g/100 kg EnartisZym COLOR PLUS increases the extraction of grape tannins by 25% compared to the untreated control.

3. PRESERVATION OF GRAPE COMPOUNDS AND THEIR STABILIZATION

Maintain the extracted anthocyanins and grape tannins with the use of sacrificial tannins and other cofactors such as yeast derivatives. These are essential for the formation of stable color compounds, as well as improving the structure and mouthfeel of the final wine.

At crushing, when filling the maceration tank or during cold soak, the addition of sacrificial tannins such as **EnartisTan FERMCOLOR** helps to protect anthocyanins from oxidation and precipitation. It will:

- ▶ React with oxygen and free radicals.
- ▶ Inhibit the activity of oxidative enzymes, such as laccase and tyrosinase.
- ▶ Precipitate grape proteins, thus preventing the loss of freshly extracted skin tannins (some of the most effective tannins for color stability).
- ▶ Participates in stabilization reactions to form more stable color pigments.

During the first stage of alcoholic fermentation, anthocyanins are extracted much more rapidly than tannins. Therefore, it is necessary to increase the tannin concentration to promote color stabilization reactions from the beginning. This increase is possible with:

- ▶ **EnartisTan V** and **EnartisTan XC**: Highly reactive and efficient tannin in color stabilization reactions.
- ▶ **EnartisPro TINTO** and **INCANTO NC Range**: Combinations of inactive yeast and selected tannins which improve color intensity and stability, as well as structure and mouthfeel.

4. FINAL STABILIZATION

A final stabilization treatment prior to bottling is necessary to maintain the color matter that has been formed but could become unstable due to various chemical changes in the wine.

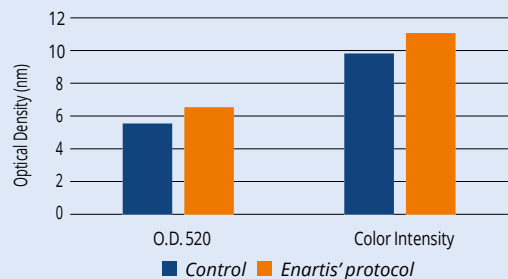
The **MAXIGUM Range** is designed to meet this objective. Unlike other Verex gum Arabic, **MAXIGUM F** and **MAXIGUM PLUS** don't interfere with the filtration process, while maintaining color stability.

Another option is to use **ZENITH COLOR**, comprised of potassium polyaspartate and Verex gum Arabic, to achieve potassium bitartrate and color stability at the same time.

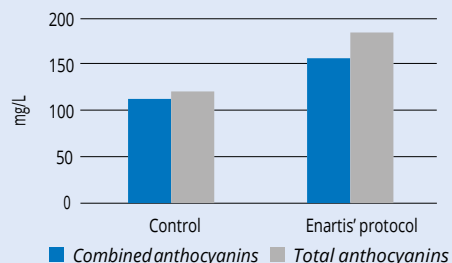
WHAT TO EXPECT FROM ENARTIS' RECOMMENDATIONS

The effectiveness of color stabilization protocols could vary depending on the polyphenolic composition of the grape variety but, in general, the following can be expected (Graph 2,3):

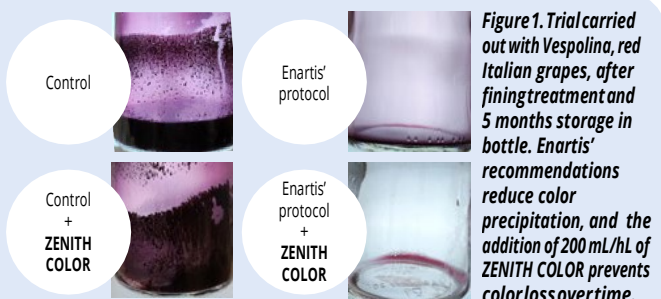
- ▶ Increased color intensity (IC nm).
- ▶ Higher Optical Density (OD) at wavelength 520 nm, which characterizes red color.
- ▶ Increased total anthocyanins due to lower anthocyanin loss or higher anthocyanin extraction.
- ▶ Higher concentration of combined anthocyanins, resulting in greater stability over time.
- ▶ Less color loss over time (Figure 1, 2).



Graph 2. Trial carried out with Vespolina, red Italian grapes. Enartis' recommendations preserve and enhance color intensity.



Graph 3. Trial carried out with Vespolina, red Italian grapes. Enartis' recommendations preserve and stabilize free anthocyanins.



ENARTIS PROTOCOL

The sooner anthocyanins are protected and stabilized, the better! It is recommended to follow this protocol throughout the entire winemaking process.

WINEMAKING STAGE	OBJECTIVES	GENERAL RED WINE PROTOCOL	PREMIUM RED WINE PROTOCOL
HARVEST TRANSPORT GRAPE RECEPTION	Prevent oxidation of color/phenolic compounds.	10-15 g/100 kg AST	10-15 g/100 kg AST
CRUSHER/ TANK FILLING	Sacrificial tannin to protect grape tannins and begin stabilizing color.	15-20 g/100 kg EnartisTan ROUGE	15-20 g/100 kg EnartisTan FERMCOLOR
	Enhance color intensity and stability of the entire spectrum while improving structure and mouthfeel.	20 g/hL INCANTO NC Range	20 g/hL EnartisPro TINTO
	Maceration enzymes to improve grape skin tannin extraction, favoring anthocyanin-tannin reactions and stabilizing pigments.	1.5 g/100 kg EnartisZym COLOR PLUS	1.5 g/100 kg EnartisZym COLOR PLUS
ALCOHOLIC FERMENTATION	Increase the concentration of tannin to encourage anthocyanin stabilization.	10 g/hL EnartisTan XC	10 g/hL EnartisTan UVA
POST-ALCOHOLIC FERMENTATION (Optional but recommended)	Last chance to stabilize color compounds while improving mouthfeel. Preserve desired color during ageing.	8 g/hL EnartisTan E + 30 g/hL SURLI Range	8 g/hL EnartisTan E + 30 g/hL SURLI Range
PRE-BOTTLING	Final color stabilization. Ensure color stability in the bottle.	100-200 mL/L MAXIGUM Range or 200 mL/L ZENITH COLOR	100-200 mL/L MAXIGUM Range or 200 mL/L ZENITH COLOR

For more information, please call Enartis USA's technical services at (707) 838-6312.

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