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ENARTIS NEWS

OXYGEN IN WINE: FRIEND OR FOE?

Oxygen causes important transformations as early as the moment grapes are harvested, and these changes continue throughout the winemaking process until ageing and bottling.

Oxygen is present in about 20% of the air we breathe and **is essential** for all organisms that inhabit this planet. Without this element, life on Earth would not be possible and, for this reason, everyone benefits.

This rule applies to everyone, or almost everyone, because in the world of winemaking, this is not always the case.

Oxygen management must be carefully monitored to prevent excessive oxidation reactions that can negatively impact the final quality of wine. It is important to apply specific tools and techniques that allow for proper and natural ageing, **while maintaining and preserving quality.**

Oxygen is the key player in oxidative reactions.

Oxidation reactions can deteriorate the sensory profile leading to aromatic losses, taste imbalances, and effects on the final color:

White wines tend to take on more golden hues until they turn brown,

while red wines will turn to a brick/brown color.

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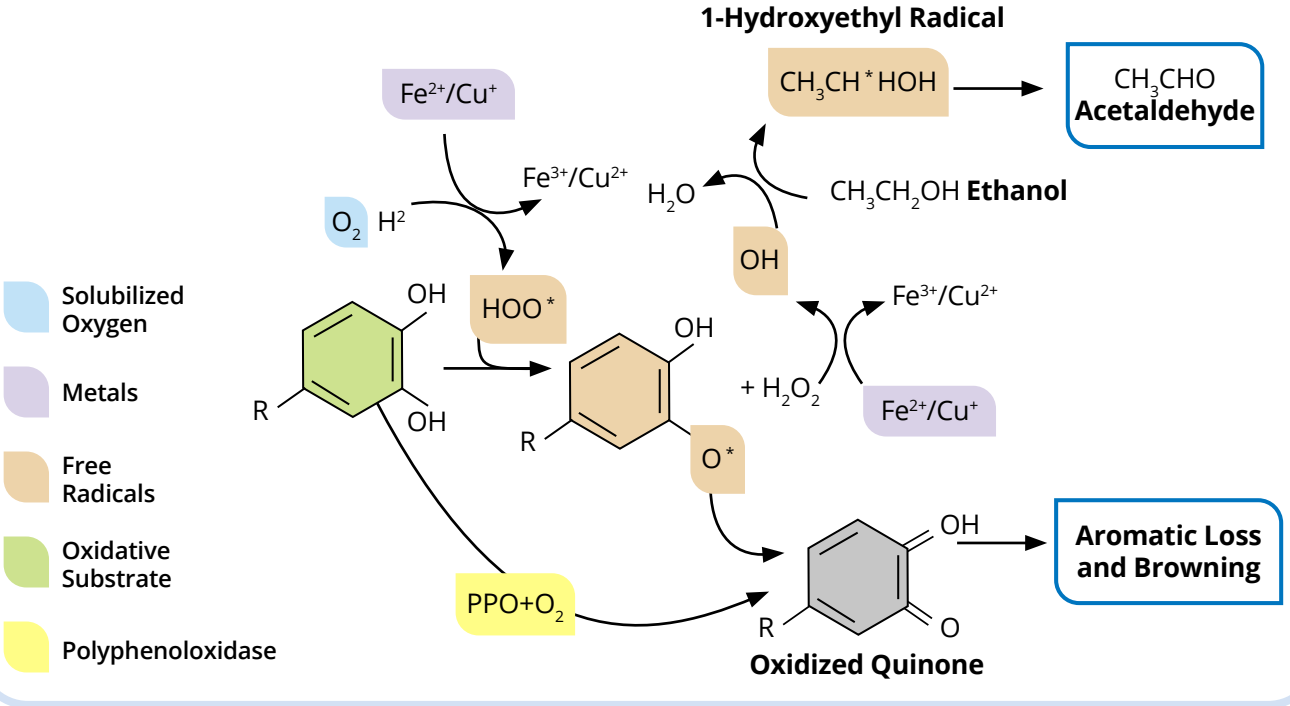
Which Type of Oxidation Is It?

Enzymatic Oxidation: Occurs mainly in must by **polyphenoloxidase**. The most important are tyrosinase and laccase (in the case of grapes affected by *Botrytis cinerea*). These enzymes catalyze oxidation of ortho-diphenols by transforming them into ortho-quinones, from which color changes (browning) are generated.

Chemical Oxidation: The presence of O_2, with metals such as iron and copper, can lead to the appearance of **free radicals** capable of oxidizing ethyl alcohol to acetaldehyde leading to oxidized aromas. In addition, free radicals are capable of rapidly oxidizing SO_2 and thiols, leading to a disappearance of the aromatic forms, resulting in a loss of aromatic freshness.

Chemical Oxidation Mechanism of Color and Aromas in Wine



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How to Manage Oxidation

Both targeted clarification and the use of yeast derivatives and tannins can be used to manage oxygen-related issues.

- **Yeast derivatives** create a reductive environment due to their ability to consume oxygen.
- **Tannins** interact directly with the oxidation process by inhibiting radical reactions.

Oxidation management can be a **curative approach**, i.e., removing oxidized compounds and the reduction of yellow hue (O.D. 420nm), indicative of oxidative evolution of must and wine; or a **preventive approach**, intervening early by preventing potential oxidation reactions.

Enartis offers a winning strategy to protect your wine.
Our targeted products work in synergy to prevent spoilage, preserving the aromatic richness and quality of your wine.

Selective Fining Agent: a New Alternative to PVPP

Catechins are not the only polyphenols responsible for oxidation.

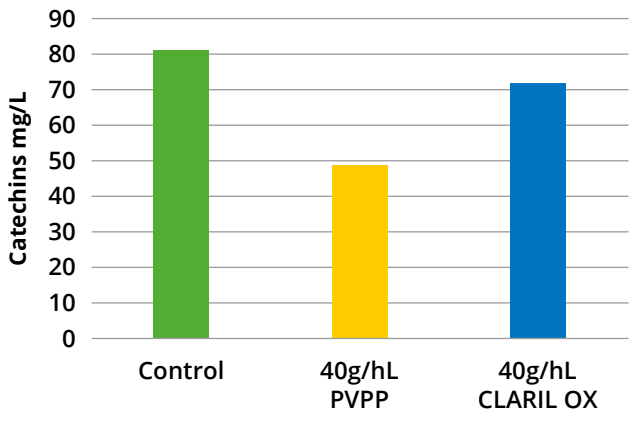
It should not be forgotten that there are other compounds that tend to oxidize very rapidly once exposed to oxygen, such as phenolic acids: hydroxybenzoic and hydroxycinnamic, including caffeoyltartaric acid and para-cumaroyltartaric acid. The resulting quinones are responsible for darkening must and subsequent loss of aromatic quality.

CLARIL OX is a new, organic alternative solution to PVPP developed to prevent and reduce potentially oxidizable compounds in white and rosé musts.

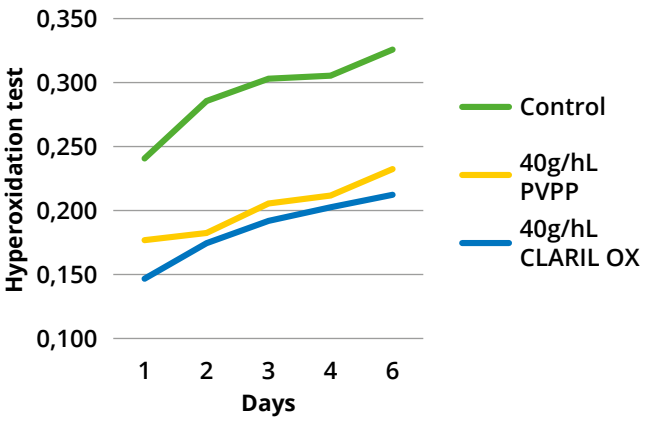
Its composition of pea and potato plant proteins, chitosan, and bentonite allows it to perform **multiple actions during ageing** due to its effectiveness in selectively removing phenolic compounds and metals involved in oxidation reactions.

Its use is recommended during both pre-fermentation and alcoholic fermentation for protection during the first phase of winemaking, which is when must is most subjected to oxidative agents.

Our research has shown that with the same catechin content, treated wines are cleaner, brighter, fresher and longer-lasting.



Concentration of catechin content after treatment with PVPP and CLARIL OX.



Measurement of absorbance at 420nm (yellow hue) of the same wine treated with PVPP and CLARIL OX.

Yeast Derivatives: Natural Allies Against Oxidation

Inactive yeast are also known to be viable alternatives for protecting wine from undesirable oxidative mechanisms. In fact, they contain natural antioxidant compounds, such as glutathione and mannoproteins, that neutralize free radicals responsible for oxidation. They can also chelate metals responsible for oxidative reactions.

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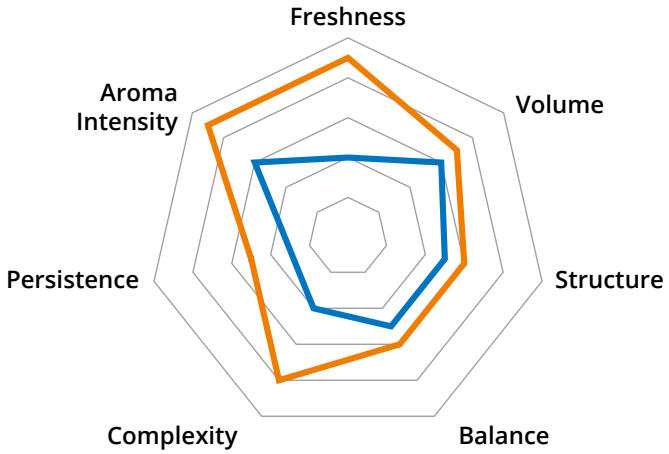
EnartisPro BLANCO is a yeast derivative rich in readily soluble mannoproteins. Addition during pre-fermentation and fermentation releases sulfur amino acids that protect aromatic compounds from oxidation, thus, resulting in wines with a younger, more intense, and fresher color tone.



Tasting Vermentino treated with 20g/hL EnartisPro BLANCO during fermentation.

Beyond Fermentation...

Enartis has developed a targeted strategy to provide protection over time, even after alcoholic fermentation.

EnartisTan SLI is a tannin extracted from untoasted American oak using a unique process that avoids exposure to high temperatures. This enables it to maintain **high antioxidant efficacy** capable of stabilizing redox potential and preventing oxidation and the possible appearance of reduced odors as early as the end of alcoholic fermentation.

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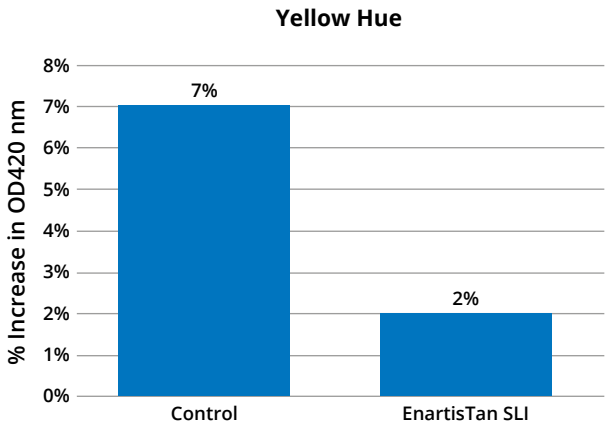
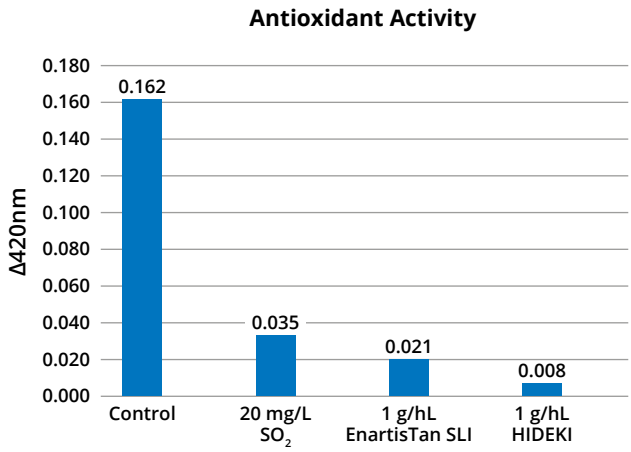


EnartisTan SLI protects wine from oxidation by limiting the increase of the yellow hue. (White wine containing 5 ppm iron and free SO_2. Measurement taken six days after two days in open air rackings).



White wine exposed to air for 10 days at room temperature (25°C) with high catechin content and low SO_2. Measurement of optical density (OD) at 420nm after 10 days (Δ420nm).