TECH POINT

POLYPHENOL MANAGEMENT

FINING SOLUTIONS AND GOALS

The soaring cost of raw materials – particularly PVPP – as well as their origin are currently a topic of debate. Many wineries have used PVPP up to now due to its low cost and high reactivity with polyphenols. However, it is now necessary to think of **possible alternatives**. Whether for must or for wine, fining with PVPP can have a number of oenological goals – to control color parameters, to prevent or treat oxidation phenomena, or for organoleptic improvement. **The choice of an alternative fining agent will depend on these technical goals and on the winery's regulatory, economic and logistic constraints**.

HOW PVPP WORKS

PVPP is a synthetic fining agent **oftentimes used in association** with another fining agent. By interacting with polyphenols via low-energy bonds (hydrogen, hydrophobic, van der Waals), it **adsorbs them and removes them by sedimentation**.

PREVENTING WINE OXIDATION

Handling the oxidation of must and wine is a major issue for winemakers. With musts, enzymatic biochemical reactions are involved – phenolic acids, which are the polyphenols most sensitive to oxidation, are transformed into quinones. These mechanisms can **be detrimental to the wine's aromatic potential and longevity**. In fact, quinones will:

- React with flavonoids to form heavier and heavier complexes, leading to brown casse;
- Induce the loss of natural glutathione in wine by forming GRP2 complexes that precipitate (glutathione - phenolic acid interactions).

Yeast protein-based solutions such as **OENOVEGAN® EPL** enable the **removal of oxidized polyphenols (quinones) and easily oxidizable polyphenols (phenolic acids)**, thus preventing premature oxidation of the must.

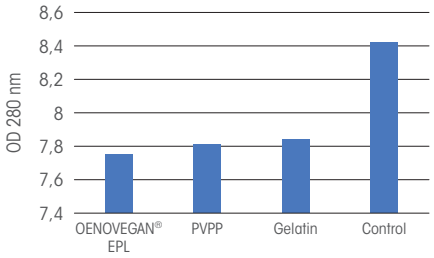

Figure 1: Impact of different fining products on the concentration of polyphenols in white and rosé wines. Tracking absorbance by measuring OD at 280 nm. **Doses:** OENOVEGAN® EPL (6.5 g/hL), PVPP (20 g/hL), Gelatin (5 cL/hL).

WHAT ABOUT MUSTS WITH HIGH LEVELS OF HEAVY METALS?

The presence of heavy metals in musts leads to the **disruption of** alcoholic and malolactic **fermentation**. It also induces an increase in **oxidation phenomena** (brown casse) because copper is an essential cofactor.

PVP/PVI-based tools such as **DIWINE® 2+/3+** remain **essential for neutralizing them**. They are eliminated by chelation, thus preserving wine quality (Figure 2).

One other property of this range is an essential tool for controlling and managing oxidation: **PVP/PVI is also able to adsorb phenolic acids**.

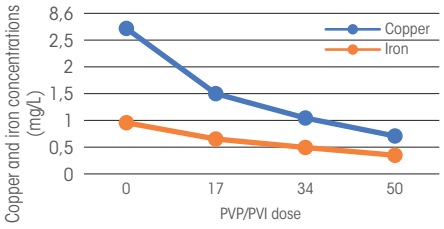

Figure 2: Copper and iron concentrations obtained in rosé musts after treatment with different doses of DIWINE® 2+/3+.

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MASTERING WINE **COLOR**

One of the goals of fining can be to **adjust the color of the musts that are obtained after the first steps of the vinification process** (crushing, pressing, maceration, etc.). This correction of the color may also be necessary if the must or wine is oxidized. Fining agents can impact color in different ways – some have more impact on red, others on yellow. One last category is more versatile, since it affects both yellow and red colors (Figure 3).

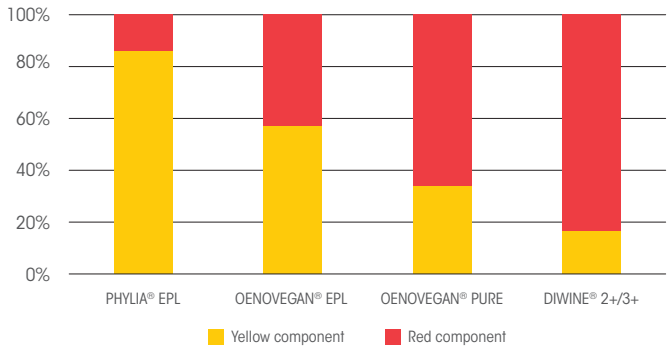


Figure 3. Proportional impact of different fining agents on the color components of a rosé wine. The bar percentage represents the fining agent's impact on its associated component.

PVPP is effective for adjusting red coloring in rosé wines. It can be replaced by PVP/PVI-based solutions such as **DIWINE® 2+/3+**.

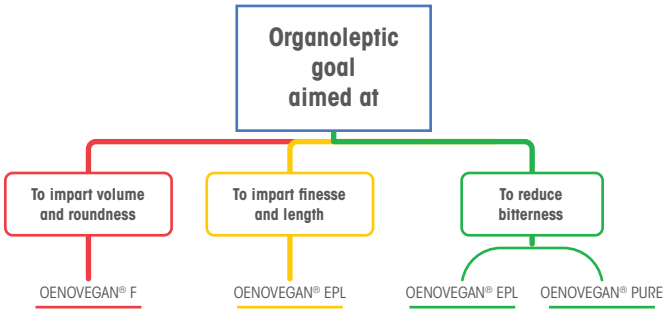
OENOVEGAN® PURE, a preparation formulated exclusively from plant protein, eliminates oxidized and oxidizable phenolic compounds. So this **doubles as a preventive and a curative** product.

EPL-based solutions such as **OENOVEGAN® EPL** are the most effective in reducing yellow coloring.

PRESERVING AND IMPROVING WINE **AROMAS**

Eliminating bitterness and vegetal aromas, enhancing the aromatic palette or varietal characteristics, imparting finesse or length – these are all organoleptic goals that winemakers can aim for and achieve by fining. Again, **choosing and thinking through any addition is essential in order to preserve and improve the aromatic qualities of the wines**. PVPP, which is used to reduce bitterness, can result in a hollow midpalate or a loss of fruitiness. **There are other products that are more wine-friendly**.

EACH FINING AGENT HAS ITS OWN «ORGANOLEPTIC SIGNATURE»:



OTHER TOOLS FOR SPECIFIC SITUATIONS OR PROCESSES

OENOFRANCE® also offers a range of products combining **PVPP with other active ingredients such as bentonite or oenological carbon. These can be used to address extreme situations or particular processes**.

GOALS	VINIFICATEUR SR	VINIFICATEUR SR 3D	FORMULE 1-CF
Over-oxidized musts	●	●	●●
Too-intense colors		●●	
High levels of unstable protein (hot vintages)	●●	●	
Poor sanitary state	●		●●

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