

HOW TO OPTIMIZE AROMATIC EXPRESSION OF WINES?

Grape varieties, fermentation management, yeast selection, and yeast nutrition all have crucial role in aromatic expression of wines. The first points to consider in wine aromatic expression are to limit the production of negative aromas by preventing yeast stress, microbial contamination, and preserve aromas from oxidation.

⇒ Extraction of Varietal Aromas from Grapes

Grape varieties and terroir define the wine potential, content in aromatic precursors and the type of aromas present. To optimize the wine aromatic expression, it is important to extract these compounds, mostly present in the skins, using maceration, crushing, and extraction enzymes such as **Oenozym Crush White** (Figure 1) and **Oenozym Crush Red**.

⇒ Expression and Production of Wine Aromas

Expression of varietal aromatic precursors and production of fermentation aromas, such as esters, ethyl esters and acetates esters, happen mostly during fermentation and depend strongly on the fermentation conditions and yeast genetic.

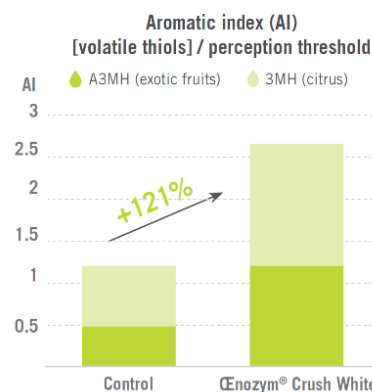


Figure 1: Oenozym Crush White used on grapes increase the content in varietal aromas in finish wines, thus increasing aromatic intensity, freshness, and complexity of the wine.

Fermentation conditions: Temperature, turbidity, oxygen presence can impact greatly the metabolism of the yeast and aromatic expression of the wine. Management the fermentation is essential to ensure its completion without off-aromas and define a wine style.

- Low temperatures of fermentation (~52-59°F) favor the production of esters while higher temperatures (62-68°F) favor varietal aromas expression.
- Higher turbidity juices (>150 NTU) contain more aromatic precursors from grapes skin, thus promoting the production of varietal aromas while lower turbidity juices (<80 NTU) tend to be best for esters production.

Yeast selection can impact strongly aromatic expression of the wines as each yeast has its own metabolism, regulating the production of aromas. Some yeast, such as **Excellence FTH**, are extremely thiol expressive as it has a strong activity of carbon-sulfide lyase which remove the cysteine portion of the odorless cysteinylated thiol precursors and so liberate the aromatic thiols. Others, such as **Excellence STR**, have lower thiol expression ability but higher fermentation ester production (Figure 2).

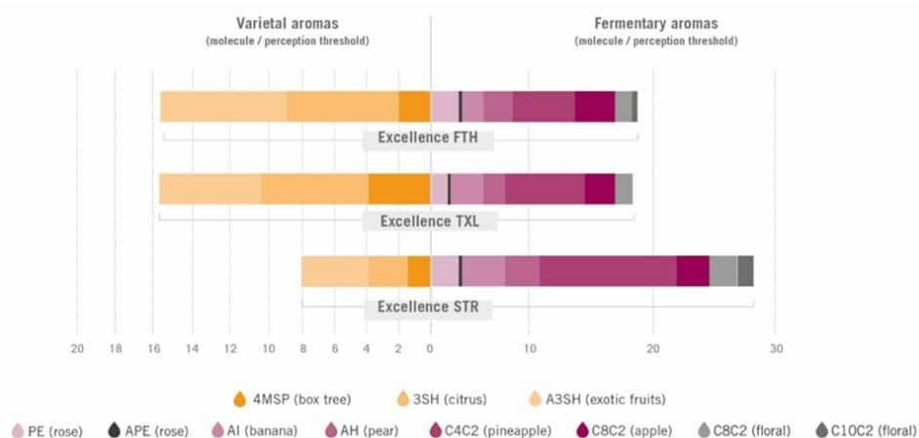


Figure 2: The relative varietal and fermentation ester aromas produced by Excellence FTH, Excellence TXL and Excellence STR yeasts

Varietal aromatic precursors can also be expressed during fermentation or during ageing, using specific enzymes such as **Oenozym Thiols** (Figure 3), pectinase with side activities, that express thiolic precursors and **Oenozym FW**, pectinase with β -glucosidase activity to express terpenes and nor-isoprenoids aromatic precursors.

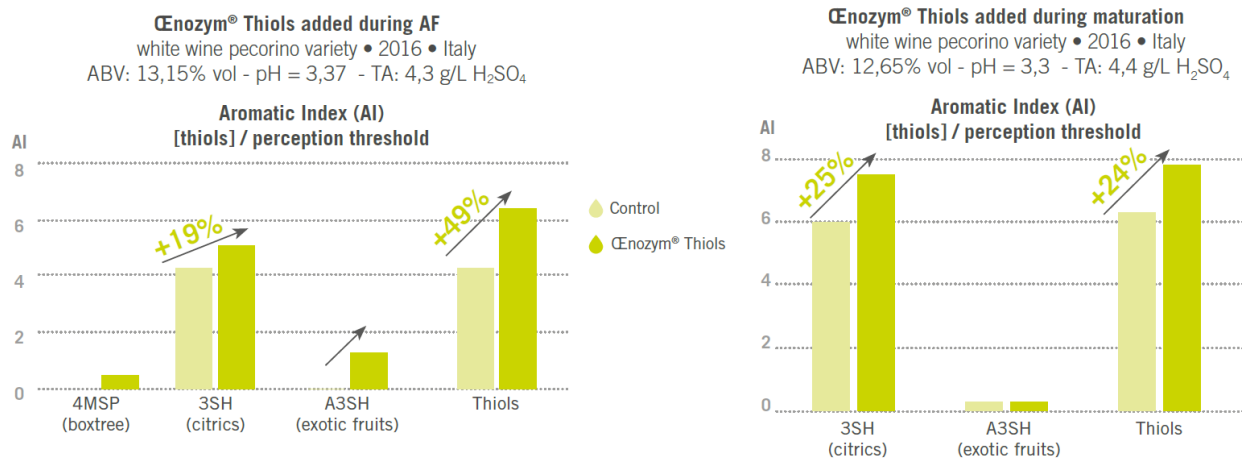


Figure 3: Oenozym Thiols used during fermentation or post fermentation releases thiolic precursors, thus increasing aromatic intensity, freshness, and complexity of the wines.

Yeast nutrition is essential and vital for the completion of the fermentation and has a great impact on the aromatic profile of the wines.

Yeast rehydration is one of the most important steps in a fermentation, and for that reason alone the use of a rehydration nutrient such as Lamothe-Abiet **OenoStim** is the simplest and most cost-effective step a winemaker can take to ensure a successful fermentation both in terms of quality and kinetic outcomes (Figure 4). **OenoStim** contains inactivated yeasts, which deliver vitamins, minerals, lipids, and sterols, all critical in their own way to yeast fermentation performance.

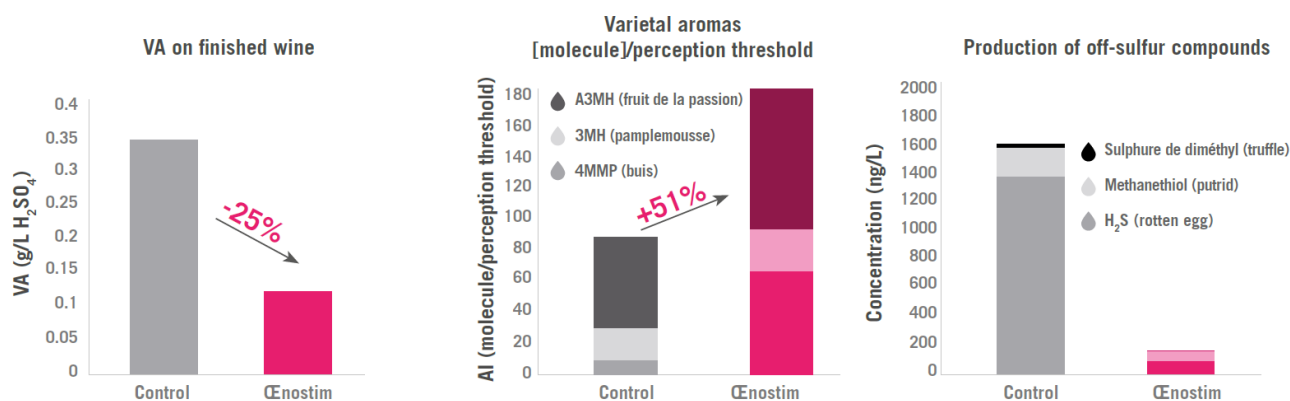


Figure 4: OenoStim used at rehydration stage improve yeast resistance to stress and its metabolism. Wines have lower VA, less 'reductive' off-aromas, and more varietal aromas

In recent years significant efforts have been made at developing nutrients that not only contribute to fermentation performance, but also increase the production of specific wine aromatic components.

- **OptiThiols** is a product from Lamothe-Abiet that strongly elevates thiol production and preservation (Figure 5). It is composed of specific inactivated yeasts with high concentrations of molecules that both increase thiol expression and protect them through increased wine anti-oxidant capacity, such as cysteine derivatives and glutathione. The effect of **OptiThiols** is duplex in nature, as it both increases thiol expression and lowers the production of undesirable sulfur compounds, such as methanethiol, ethanethiol, dimethyl sulfide and diethyl sulfide.
- In a similar manner in which a specific formulation of yeast nutrients can elevate thiol production, specific nutrients can elevate fermentation esters production. **OptiEsters**, composed of inactivated yeast rich in sterols and ergosterols, is specifically formulated to increase fermentation ester, ethyl esters and acetates production (Figure 6). Since fermentation esters are produced to greater or lesser extents by all yeast, the effect of increasing ester production is applicable to all yeasts. The application of **OptiEsters** at 30 g/hL, early in the fermentation, can yield up to a 200% increase in fermentation ester production, depending on the yeast used and varietal in question.

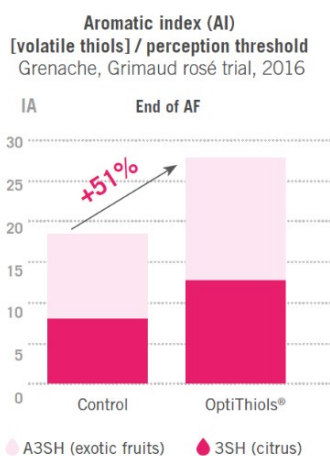


Figure 5: OptiThiols used prior to inoculation increase thiolic compounds production and protects wine aromas from oxidation.

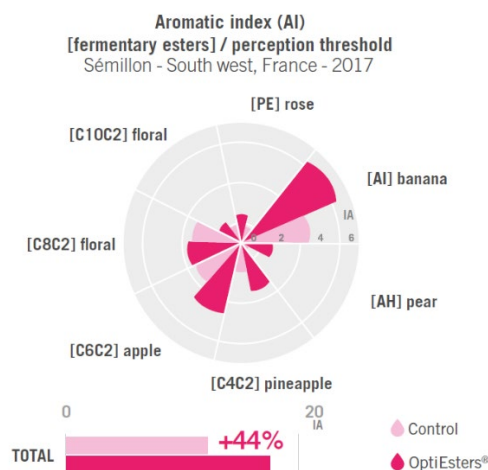


Figure 6: OptiEsters used early in fermentation increase the production of esters, ethyl esters and acetates esters, thus increasing aromatic intensity and complexity.

⇒ Preserve aromas from oxidation

During ageing, wine aromas are highly sensitive to oxidation, it is essential to protect and preserve them. Controlling dissolved oxygen, limiting headspace, reducing wine movement, using inert gas, together with a good management of anti-oxidant potential of the wine are crucial to preserve wine aromas and freshness. Lamothe-Abiet developed natural tools and successful strategies to scavenge oxygen radicals and stabilize redox potentials. **Tan&Sense Volume**, a pure untoasted oak tannins, used at every wine transfer to scavenge oxygen radicals and **Aroma Protect**, inactivated yeasts, naturally rich in glutathione to preserve wine freshness (Figure 7) by increasing wine's natural anti-oxidant capacity and lowering its redox potential.

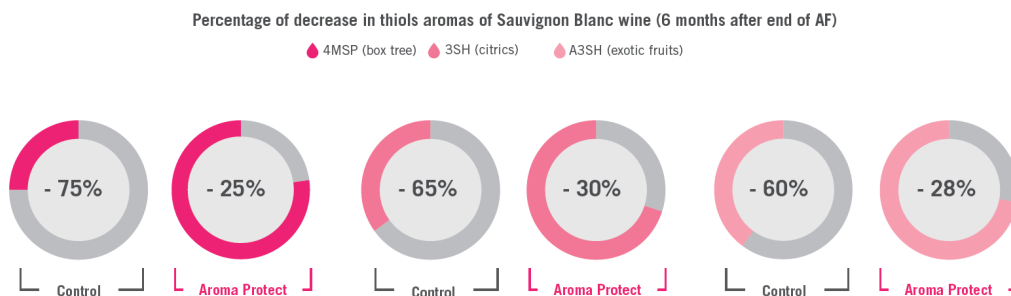


Figure 7: Aroma Protect enhances the anti-oxidant potential of wine, protects wine freshness and improves wine shelf-life