

Selected from nature

LALLEMAND

WINEMAKING UPDATE

Number 2 - 2011

LALVIN® uvaferm ENOFERM®

NEWS FLASH

❖ A new yeast has been selected from one of the great Italian *terroirs* – the D.O.C. Piave area in northeastern Italy. The **Lalvin RBS 133™** yeast was selected in partnership with the Università Degli Studi di Padova and the local Consorzio di Tutela. **Lalvin RBS 133™** yeast is particularly well suited for the fermentation of intense red wines, with high tannic structure, high acidity and deep colour, and destined for aging. It can also be used for “passito”-style wines and on structured rosés. **Lalvin RBS 133™** yeast is available under the **YSEO®** process.

❖ The second Lallemand ML School was held in Aurillac, France, June 22 and 23, 2011. Forty-five participants from seven countries, including South Africa, Italy, Germany, Portugal, Serbia, Macedonia and France, attended presentations by experts on malolactic fermentation. The aim of the ML School, part of the Lallemand Malolactic Fermentation Education program created in 2010 by the Oenology division of Lallemand, is to educate winemakers on controlled management of malolactic fermentation and to facilitate the sharing of information among viticulture professionals from different regions.

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WINEMAKING UPDATE

WINEMAKING UPDATE is published by Lallemand to inform oenologists and winemaking staff about the latest news and applications arising from research. To request previous issues, or to send your questions or comments, contact us at:

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www.lallemandwine.com

Specialty Inactivated Yeast Enriched in Glutathione

The utilization of specialty inactivated yeasts (SIY) in winemaking has gained popularity in recent years, and their uses are varied. For example, SIY can be used as protectors during yeast rehydration and as a nutrition tool during fermentation. As we understand more about the yeast cell constituents, the production process, the characterization of each yeast strain and their unique fractions, we can obtain very specialized inactivated yeasts to yield specific results under defined conditions. Such is the case for the inactivated yeasts that can trigger specific responses during fermentation due to their unique functionalities. This issue of *Winemaking Update* will focus on a new SIY designed for white and rosé wines.

1. A quick review: What are inactivated yeasts?

An inactivated yeast preparation is a dry product made from oenological yeast that has been treated to suppress its fermentation capacity. The inactivated yeast material is then processed using different techniques, such as enzymatic and/or physicochemical treatments, followed by purification steps. Derived from the whole yeast-cell biomass, all specialty inactivated yeasts (SIY) contain a high level of insoluble yeast cell walls and cell membranes as well as intracellular components. However, each SIY product is highly specialized and different in respect to its content of yeast hulls, soluble manoproteins and specific compounds, such as micronutrients, sterols and glutathione, etc.

2. The benefits of SIY

There are many uses for SIY. During rehydration, SIY are the core of the **NATSTEP®** rehydration aids which prepare active dry yeast for fermentation, especially in difficult winemaking conditions. During fermentation, SIY supply selected yeast and bacteria with specific nutrients as well. Other properties include their positive impact on the sensory properties of wines through the action of polysaccharides, and through the action of, for example, glutathione, which is found in some specific preparations.

3. Glutathione-enriched SIY

Glutathione (L-γ-glutamyl-L-cysteinyl-glycine, or GSH) is the most abundant non-proteic sulphur compound found in most living organisms.

This tripeptide has an extremely low redox potential, which gives it a buffer capacity in many cellular redox reactions. Glutathione is a powerful antioxidant compound that reacts with quinones to form stable and colourless compounds that limit browning in musts and wines. It will also help preserve the stability of thiol precursors due to the formation of quinone-glutathione complexes, called Grape Reaction Products (GRP). Glutathione is naturally found in must and is a natural component of yeasts. Because some wine yeasts are particularly efficient in synthesizing and accumulating this compound, we were able, under specific growth and process conditions, to

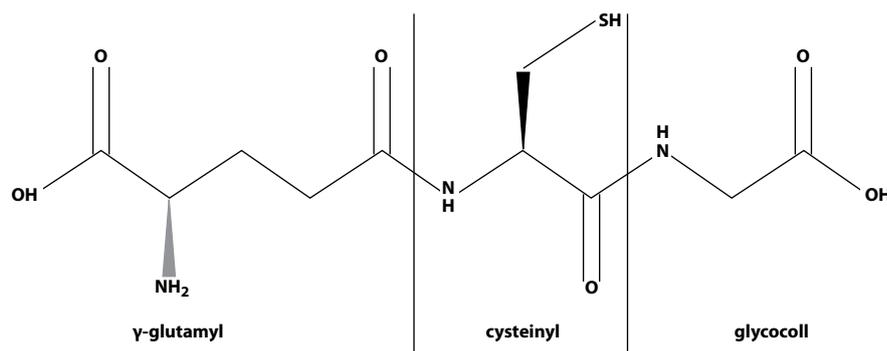


Figure 1. Glutathione molecule

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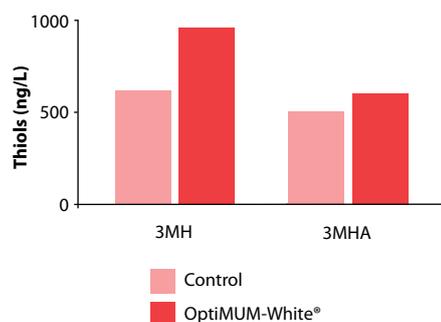


Figure 2. The levels of thiols in Sauvignon Blanc treated with OptiMUM-White®, one year after bottling.

naturally maximize this phenomenon. The production of enriched yeast is an innovation introduced by Lallemand in 2003 (Patent No.WO/2005/080543). Since then, our knowledge and experience have been enriched by several trials under different vintage conditions, which have led to the second generation of specialty inactivated yeasts to issue from a specific yeast. The innovative and precise production process that optimizes glutathione availability was developed in Lallemand's R&D laboratories. The result is OptiMUM-White® – a glutathione-rich inactive yeast with a more efficient action in wine.

4. Impact on aromas

As an SIY rich in glutathione, the most important impact of OptiMUM-White® is on aroma preservation. Many studies have shown that its impact on thiols and other volatile compounds is significant. For example, a 2008-2009 study carried out at the INRA Montpellier, in France, showed that glutathione-rich SIY (i.e., OptiMUM-White®) had a positive impact on varietal thiols in Sauvignon Blanc one year after bottling (figure 2).

The concentrations of 3-mercaptohexanol (3MH) and its acetate (3MHA) were significantly higher in the wines to which the specific glutathione-rich inactive yeast was added.

In another experiment carried out at the INRA on Grenache rosé (figure 3), different selected *Saccharomyces cerevisiae* strains were compared and combined (or not), with the early addition of OptiMUM-White®. On the one hand, a strain effect was observed, indeed, Yeast A showed better ability for thiol revelation than Yeast C.

On the other hand, with the yeast that has high nitrogen requirements to complete fermentation (Yeast B), the effect of the glutathione-rich SIY is not as interesting. Note

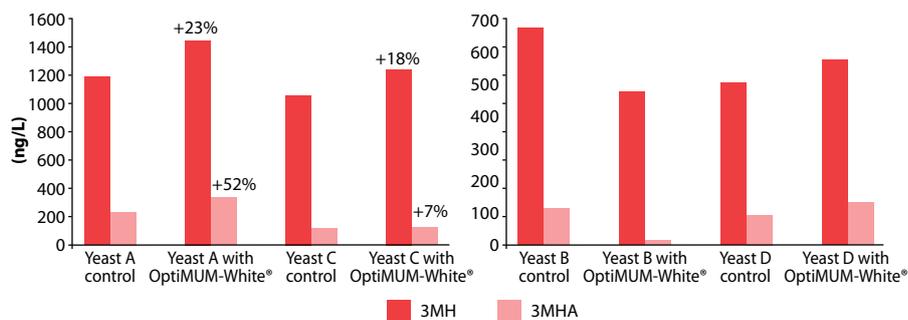


Figure 3. Level of thiols in Grenache wines with and without glutathione-enriched yeast

that in these must conditions, no nutrient addition was made to feed the yeast during alcoholic fermentation. It was thus hypothesized that the yeast could utilize the glutathione as a nitrogen source, thus rendering the effect of the glutathione-rich SIY less significant. This result is particularly important as it shows that proper fermentation management is still crucial, and the choice of yeast strain and its adapted nutrition are key for successful fermentation in order to maximize the impact of utilizing SIY.

Not only is there an impact on the stability of the volatile compounds, but on other aroma compounds, such as esters and terpenes, as well. In a trial carried out in Portugal on Roupeiro and Rabo de Ovelha varieties, comparing wines with and without OptiMUM-White®, and also with Opti-White® (the first generation of SIY enriched with glutathione), the variation in the concentration of thiols, esters and terpenes (figure 4) is higher in the wines where OptiMUM-White® was added, especially regarding the thiols, nerol, hexyl acetate, isoamyl acetate and ethyl hexanoate.

These results are reflected in the sensory analysis of the wine showing the superior impact of OptiMUM-White® (figure 5), especially on the positive aromas descriptors, for which the differences were significant.

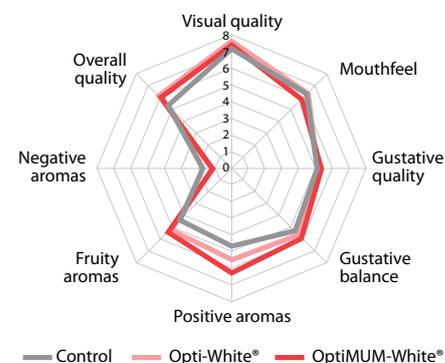


Figure 5. Average scores by a professional jury in France for wines resulting from a comparative trial carried out on Roupeiro and Rabo de Ovelha grapes (from Salmon et al. 2011, in press)

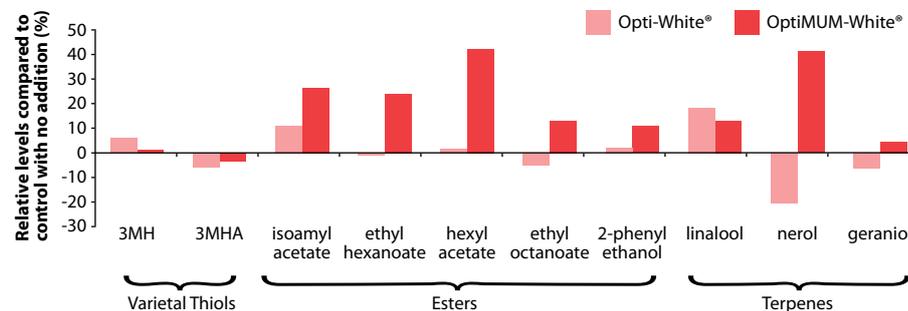


Figure 4. Variation in concentrations compared to control wine (%) with Roupeiro and Rabo de Ovelha wines (from Salmon et al. 2011, in press)

TO SUMMARIZE...

OptiMUM-White® is a new, specific inactivated yeast product rich in glutathione and polysaccharides for white and rosé winemaking. OptiMUM-White® benefits from a new, optimized and exclusive to Lallemand production process (Patent No. WO/2005/080543) that enhances glutathione availability. OptiMUM-White® has to be added at the earliest stage of alcoholic fermentation (after settling) in order to protect the must against oxidation and be the most efficient. This new biotechnological tool encourages and improves the intensity and longevity of aromas, particularly for thiols, esters and terpenes. OptiMUM-White® is OMRI®-approved for biological winemaking. The rate of addition is 30 g/hL. For more information, please contact your Lallemand representative.