



Editorial



Technical



Innovations



Summary



## Editorial

### Are consumers hooked on tradition?

When it comes to wine consumption, are people deeply attached to their traditional roots or open to new wines? An independent survey carried out by Survey Sampling International (SSI) in March 2016 proves that, for example, the French consumers, which have a strong tradition in wine and wine consumptions habits, are not afraid of new products.

Some 36% of French people ardently champion the nation's vineyards and support their economy by drinking first and foremost French wine. Nevertheless, 83% of French people have already sampled foreign wines, and 15-20% of them even enjoy these wines more than once a week. Curious about new vineyards and flavors, these consumers turn mainly to European wines (especially Italian and Spanish) before trying Californian and Chilean wines.

Have you heard of grapefruit rosé? Whether you're repelled or attracted by this concept, it has been a real success. Over half of people aged 18-25 drink this aromatized wine at least once a month. Wine-based cocktails – which are appreciated for their low alcohol content compared to those based on spirits – are also becoming more and more fashionable in bars and restaurants.

Increasingly, consumers also want transparency of information. When French people choose their wine, they look for clear, readable information on the label, including bottle traceability and a list of ingredients. They will also have asked their family and friends (58% of French people) or a wine professional (producer, wine merchant, sommelier, etc.) for advice beforehand. In addition, websites and blogs are very popular today, especially with the youngest consumers. People are aiming to improve their knowledge of wine and better understand its origins and how it is produced.

At Lallemand Oenology, disseminating this knowledge is equally as important. The Lallemand tour is an excellent example of this, and the concept has now been taken up in Spain and Portugal. Our Wine Expert and our Oenomag are opportunities to present Lallemand's innovative concepts and products. In this edition, learn about a new, patented yeast selection technique, and the first wine yeast selected within the *Saccharomyces cerevisiae* species for its natural ability to significantly acidify must during fermentation.





## Technical

## 1 Managing Acidity and Alcohol Levels



### A big challenge and a natural solution.

With global warming and changing climates, the reduced acidity and increased alcohol level of wine are of concerns for winemakers in their winemaking practices and processes. Figure 1 illustrates this trend over the past two decades, which affects most winegrowing regions.

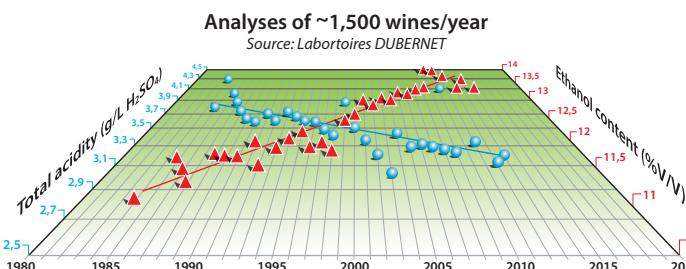


Figure 1. Changes in wine's ethanol content and acidity: a confirmed trend

Current methods can re-establish an acid balance that contributes to the harmony of flavors in the wine, as well as its longevity. Nevertheless, these methods use chemical such as tartaric acid, malic acid or lactic acid, or ion exchange systems. These practices are cumbersome and often expensive, and can be unsatisfactory. Total acidity can also decreases during alcoholic fermentation as yeast crystallizes tartaric acid, produces ethanol, and consumes malic acid.

### A Real Leap Forward for Wine Yeasts

The IONYS<sup>TM</sup> wine yeast is the result from a joint research project between Lallemand and the French National Institute for Agricultural Research (INRA) Montpellier. The aim of this collaboration was to select a wine yeast that is highly adapted to climate change, i.e. one that produces high levels of glycerol and consequently has a low conversion rate of sugar into alcohol. The strategy used – called ‘adaptive evolution’ – gradually adapt wine yeast to high osmotic pressure (figure 2).

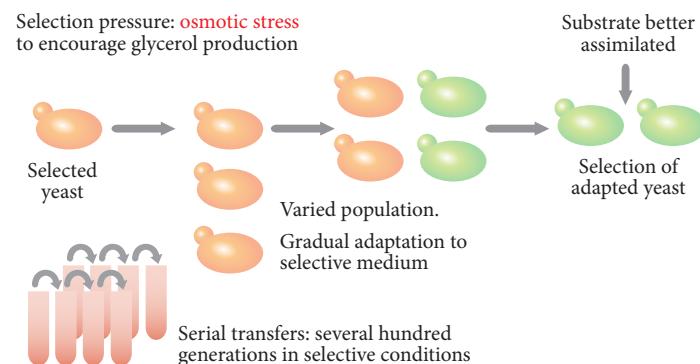


Figure 2. Alternative approach: directed evolution for glycerol overproduction

A patent has been registered for this innovative yeast selection method (N°WO2015/11411) and the IONYS<sup>TM</sup> has received innovation awards at Vinitech 2016 and Intervitis Interfructa 2016.

### Unique Metabolism

In reality, the specific metabolism of IONYS<sup>TM</sup> provides unique enological characteristics and properties, which are expressed during alcoholic fermentation:

- Overproduction of organic acids with its high acidifying power results in reduced pH and increase in total acidity up to + 1.4 g/L (figure 3);

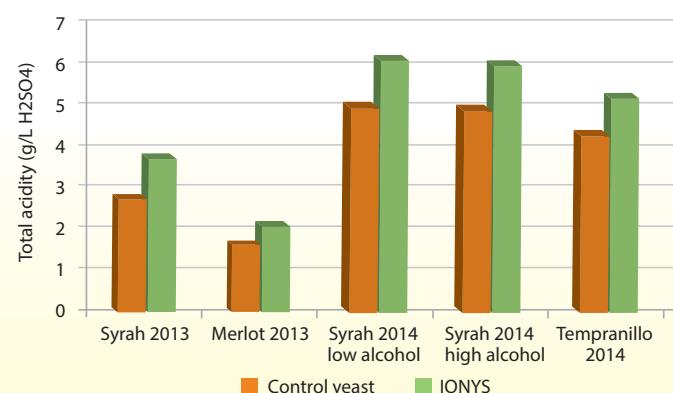


Figure 3. Acidifying effect of IONYS<sup>TM</sup>



## 2

## Managing Acidity and Alcohol Levels (cont'd)

- Overproduction of glycerol (up to +40%), from a lower conversion rate of sugar into alcohol (whereas most wine yeasts need to consume 16.8 g of sugar to produce 1% v/v of alcohol, IONYSWF™ needs 17.3 g), as shown in figure 4.

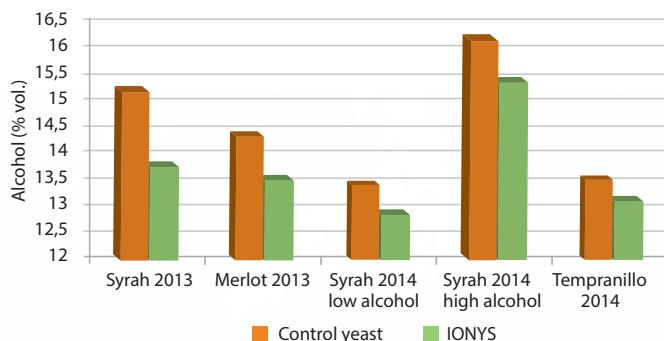
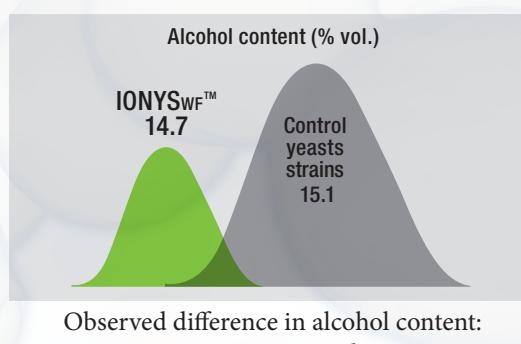
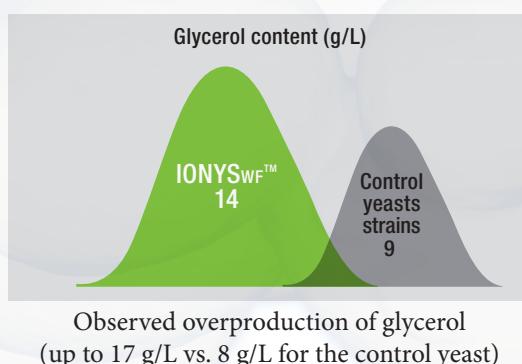
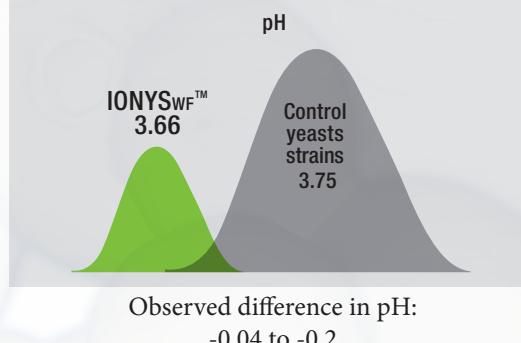
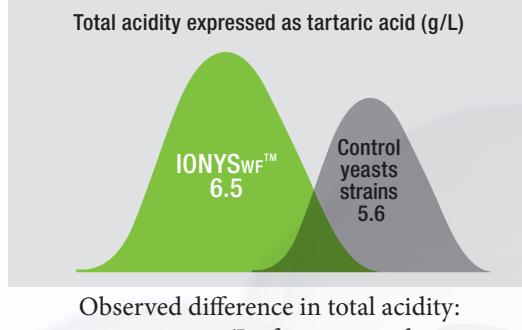


Figure 4. Reduction in alcohol content by IONYSWF™

- Very low volatile acid production

IONYS<sub>WF</sub>™ leads to more balanced, fresher wines by limiting acid additions (tartaric acid, malic acid, and citric acid). IONYSWF™ makes a positive contribution to the aromatic quality of the resulting wines.

IONYS<sub>WF</sub>™ is suitable for fermenting red wines from very ripe grapes. It is a natural solution to increase acidity and hence improve microbial stability during winemaking. As a result, the SO<sub>2</sub> doses required are better controlled and there is less risk of oxidation.



IONYS<sub>WF</sub>™ is the first wine yeast selected within the *Saccharomyces cerevisiae* species for its natural ability to significantly increase acidity during fermentation. Compared to other wine yeast, IONYSWF™ has a lower conversion rate of sugar into alcohol. Wines obtained from high-pH musts are more balanced and fresher.



## Innovations

1

### A Unique Yeast Selection Method for leads to Clean, Intense Aromas

Obtaining fresh, fruity wines without sensory faults is now a priority for many wine producers. Research carried out by the ICV Group, Lallemand, SupAgro, and the French National Institute for Agricultural Research (INRA) Montpellier has enabled the development of an innovative technique to select wine yeast producing very low levels of SO<sub>2</sub>, H<sub>2</sub>S, and acetaldehyde.

#### A New Patented Selection Technique

Wine yeasts are known to produce SO<sub>2</sub> and H<sub>2</sub>S. The molecular basis of these technological properties was hitherto little-known, ICV Group, Lallemand, SupAgro, and INRA Montpellier undertook a PhD research on the genetic basis of sulfur production by yeast to identify the molecular determinants involved in the yeast's SO<sub>2</sub> metabolism (Jessica Noble; PhD supervisor: Bruno Blondin; 2011).

The first part of this research identified the metabolic pathways and, above all, the genetic basis of yeast SO<sub>2</sub>, H<sub>2</sub>S, and acetaldehyde production. This method involved first crossing two wine yeasts with very contrasting enological characteristics: one producing low levels of SO<sub>2</sub> and the other with high SO<sub>2</sub> production. This first cross resulted in a population of 'daughter' yeast with very variable properties due to genetic mixing. Each yeast was then subjected to genotypic (genome mapping to identify the parental origin) and phenotypic (actual quantity of SO<sub>2</sub> produced) analysis. Reconciling this data identified two genome regions (called QTL – Quantitative Trait Loci) directly involved in SO<sub>2</sub>, H<sub>2</sub>S, and acetaldehyde production (figure 1). It has therefore been proved that these genome regions are involved in controlling the sulfate assimilation pathway.

The second stage involved naturally conferring these interesting characteristics identified (very low SO<sub>2</sub>, H<sub>2</sub>S and acetaldehyde production) into a target wine yeast, chosen for its fermentation capacity and enological interest. This target wine yeast was simply crossed once with the low SO<sub>2</sub>, H<sub>2</sub>S and acetaldehyde-producing yeast, and then several times with 'daughter' yeasts possessing interesting characteristics (backcrossing: figure 2). This gave a more precise cross (93.75 % of the target yeast's genome preserved).

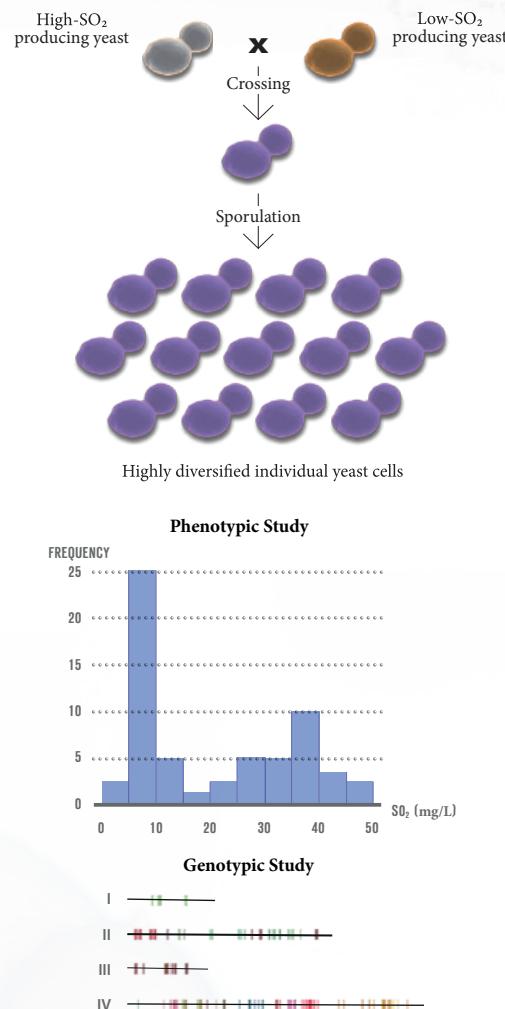


Figure 1. Simplified diagram of the method used to identify QTLs.

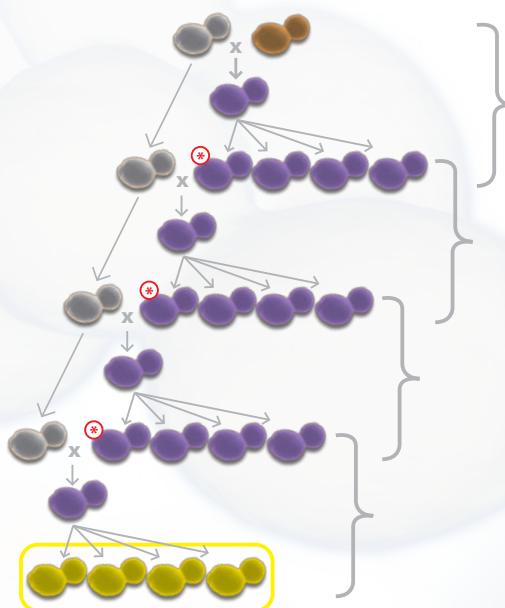


Figure 2. Obtaining the final yeast via backcrossing assisted by QTL markers.



## Innovations

### 2

## A Unique Yeast Selection Method for leads to Clean, Intense Aromas

### A New Generation Yeast

This approach has enabled the development of an innovative technique to select wine yeasts producing very low levels of SO<sub>2</sub>, H<sub>2</sub>S and acetaldehyde (patent pending PTC/IB220131050623). The first wine yeast from this process – LALVIN® ICV OKAY™, Lalvin Sensy™, Lalvin ICV Opale 2.0™.

Lalvin ICV Opale 2.0™ helps make premium white and rose wines with 'exotic' profiles, achieved by its production of complex, intense, fresh fruity aromas (citrus fruit, peach, exotic fruit, white flowers, litchi, blackcurrant, and strawberry) (Figure 3).

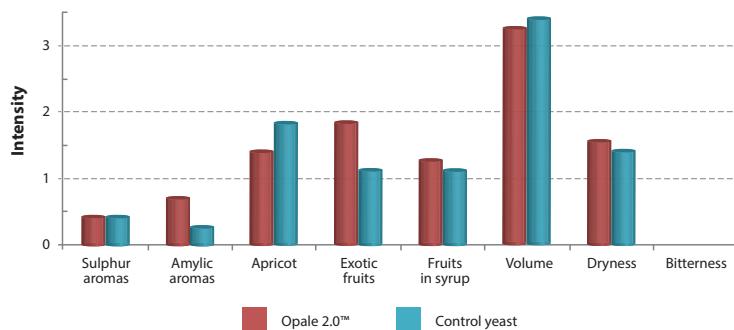


Figure 3. Sensory profile of Viognier (France) at 13.5% alcohol, at pH 3.5 (ICV France) with Lalvin ICV Opale 2.0™ versus a control yeast

Tests carried out with this yeast on white and rosé wines have demonstrated low SO<sub>2</sub> production (figure 4).

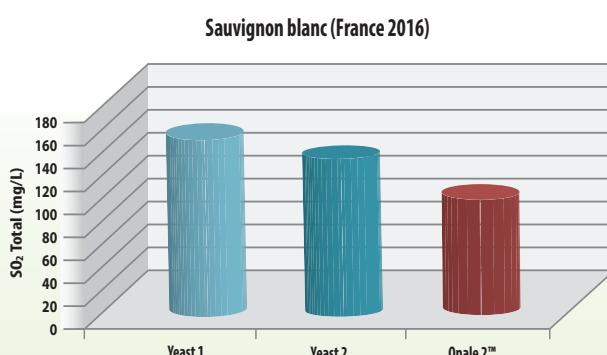


Figure 4. Total SO<sub>2</sub> production by Lalvin ICV Opale 2.0™ compared to a control yeasts.

The Lalvin Sensy™ also shows the remarkable ability to diminish the levels of sulphur compounds and sulphur-binding compounds such as acetaldehyde. In trials carried out during its selection, the SO<sub>2</sub> levels were reduced by half, whereas the acetaldehyde was also reduced almost by half. The resulting wines are cleaner and the aromas of the wines can be better expressed (figure 5A and 5B).

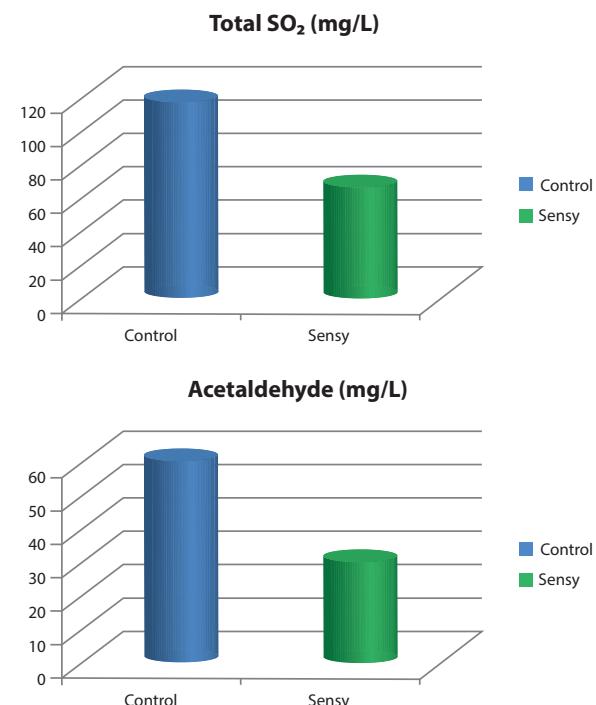


Figure 5 A and 5B. SO<sub>2</sub> and acetaldehyde levels in Macabeu (La Rioja, Spain) fermented with Lalvin Sensy™

The selection of these yeasts was largely made possible through a collaborative study between the ICV Group, Lallemand Oenology, SupAgro and INRA Montpellier. This study, using the QTL technique (Quantitative Trait Locus), was used during the thesis: Identification of the molecular basis of technological properties of wine yeast (Jessica Noble, Advisor: Bruno Blondin, 2011). This work resulted in a patent application filed by INRA and Montpellier SupAgro: « Method of control on the production of sulfites, hydrogen sulfur and acetaldehyde by yeast (Variants MET<sub>2</sub> / SKP<sub>2</sub>).» This approach has enabled the development of an innovative selection technique for yeast which produces low levels of SO<sub>2</sub>, H<sub>2</sub>S and acetaldehyde.



## Summary

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Did you know?



### Is wine a source of vitamins?

Initial experimental work carried out in Italy (Vitienologica e Agroalimentare, Fondazione E. Mach, San Michele all'Adige) could clarify this matter.

The aim of this research is to study the impact of a *Saccharomyces cerevisiae* yeast strain on the water-soluble vitamin content of white wines. Although *Saccharomyces cerevisiae* does not have high synthetic capacity, it can nevertheless be exploited within a context of greater consumer attention to wine health and safety.



The OIV's latest world forecasts:  
globally, despite a slight decline  
in vineyards (although Chinese vineyards  
are increasing), wine production and  
the world wine trade have grown by 2%.  
Worldwide wine consumption has been  
stable since 2008.

### The Lallemand Tour is exported to Spain and Portugal: Enotour!

On 30 June 2016, Lallemand Oenology's Portugal-Spain team organized the Enotour 2016 conference in Logroño (La Rioja, Spain). This event drew more than 400 wine professionals from Spain, Portugal, and other countries.

The program gave participants a complete overview of Lallemand's new products, from vine to wine. The latest results of LalVigne® Mature – a natural tool to improve red wine's phenolic maturity – were discussed. Innovative tools such as IONYSwf™ and ML Prime™ were then presented, which provide winemakers with practical solutions supporting their malolactic and alcoholic fermentations.

The event was widely reported in the press, online, on the radio, and on TV.



Click here to watch the Enotour 2016 videos:

<https://youtu.be/Pg4kOGjfXyA>

<https://youtu.be/3b01QP-wmFM>

<https://youtu.be/HfjTxDWtQVk>