



# 2022 CATALOG



Dear winemakers,

LAFFORT® has always been driven by the taste for excellence. This is made possible through the precision and rigor of our Research & Development unit and our prestigious scientific partners. Inspired by nature, respectful of the unique nature of each terroir and the typical character of each grape variety, our innovations guarantee **precision enology**.

Progress has naturally focused on tools inspired by our vineyards, allowing **BIO**Protection, for example, to become more firmly rooted in modern winemaking practice.

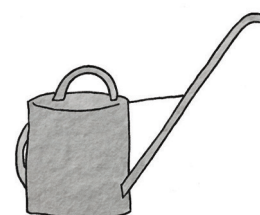
In this 2022 edition, you will discover the latest innovations that have expanded our ever-more comprehensive ranges, in particular a new strain of yeast intended for **BIO**Acidification: **ZYMAFLORE® OMEGA<sup>LT</sup>**.

Providing the answers to current issues using high-quality, preventive and natural solutions constitutes the essence of **LAFFORT®: enology by nature**.

In keeping with our motto, we are constantly committed to incorporating the wine sector's social, societal and environmental issues into the heart of our activities. As a result, implementing a Corporate Social Responsibility (CSR) approach was the natural choice for us. Today, we are extremely proud to announce that we have obtained CSR certification at Committed level (AFNOR ISO 26000). **LAFFORT®** is the first producer of enological products to obtain this certification! This achievement is far from being a culmination, however, but a simple step towards our goal of serving enology, which is our driving force.

We thank you for the trust you have placed in **LAFFORT®** and all its teams and employees and wish you all the best for this 2022 vintage.

Philippe GUILLOMET  
General Manager





ISO 26000



Confirmé ★ ★  
AFNOR CERTIFICATION

**LAFFORT®** certified as Committed  
to Corporate Social Responsibility  
according to standard ISO 26000

LAFFORT® had already paved the way in 1999, by being the first producer of enological products to be ISO 9001 certified for its quality management system. We are therefore proud today to be the first company in the sector to receive the Committed to CSR label (Confirmed level) according to the ISO 26000 standard.





## ZYMAFLORE® XarOm

*Saccharomyces cerevisiae* yeast selected for its ability to produce high-intensity fermentation and amyl aromas.

ZYMAFLORE® XarOm is recommended for the production of aromatic wines, to boost the potential of the grapes or serve as a base for blending. This strain has the genetic ability to preserve malic acid during the alcoholic fermentation. Its low production of volatile acidity and its POF(-) character allow for production of wines with a clean, precise and intense aromatic profile.



## ZYMAFLORE® OMEGA<sup>LT</sup>

Non-*Saccharomyces* yeast of the species *Lachancea thermotolerans* for the BIOAcidification of wines (red, white and rosé).

Selected for its high capacity to produce L-lactic acid from fermentable sugars, ZYMAFLORE® OMEGA<sup>LT</sup> brings freshness and restores balance to wines. Its unique metabolism leads to a decrease in the pH and increase in the total acidity of wines accompanied by a slight reduction in alcohol content. Enhances the perception of acidity by favoring fresher sensory profiles, while facilitating microbiological stabilization during aging. To be used in co-inoculation (simultaneous yeast additions) or in sequential inoculation with a *Saccharomyces cerevisiae* strain to complete the alcoholic fermentation.

## FUMARI<sup>Ctrl</sup>

Pure fumaric acid for controlling the growth and activity of the lactic acid bacteria responsible for malolactic fermentation in wine.

Use of FUMARI<sup>Ctrl</sup> on wine post-fermentation makes it possible to block the malolactic fermentation. It is also possible to stop an MLF in progress. The result of this practice is the preservation of malic acid as well as increased effectiveness of the SO<sub>2</sub>. Its ability to block MLF makes it an interesting ally in winemaking processes without added sulfites when MLF is not desired.

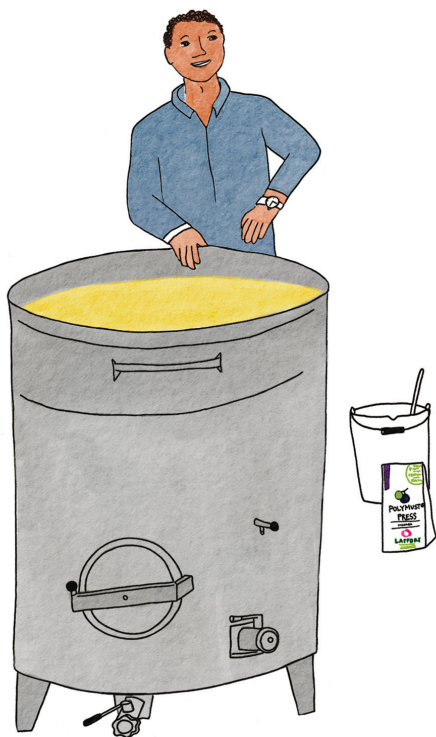


## MannOsweet®

100% natural preparation of pure mannoproteins and vegetal polysaccharides specifically selected for colloid stabilization of wines and to add finesse. Suitable for organic winemaking.

Thanks to a specific purification process, the mannoproteins extracted from yeast cell walls retain their stabilization properties. The association with vegetal polysaccharides improves their effectiveness, and helps preserve the sensory balance of the wine.





4	YEAST	
	BIOProtection	4
	Focus // ZYMAFLORE® EGIDE <sup>TDMP</sup> BIOProtection of equipment	5
	Focus // BIOProtection	6
	Non <i>Saccharomyces</i> Applications	8
	Focus // BIOAcidification	9
	ZYMAFLORE®	10
	ACTIFLORE®	18
21	NUTRIENTS	
	Yeast performance optimization	22
	Focus // Yeast nutrition	24
27	YEAST PRODUCTS	
	FRESHAROM®	27
	OENOLEES®	27
	POWERLEES® ROUGE	28
29	BACTERIA	
	LACTOENOS® range	30
	Focus // Bacterial nutrition	32
35	ENZYMES	
	Pressing and skin contact for white and rosé wines	37
	Aromatic extraction	38
	White and rosé wine clarification	39
	Red wine extraction	40
	Red wines clarification	41
	Specific applications	42
	Focus // Flotation	43
	Focus // Utility of red extraction enzymes	44
46	FINING	
	Vegetable protein	46
	POLYMUST® range	49
	Juice fining	50
51	TANNINS	
	Winemaking tannins	52
	Focus // TANIN VR SUPRA® - TANIN VR COLOR®	54
56	SPECIFIC TREATMENTS	

# BIOPROTECTION

## non-*Saccharomyces* yeasts



### ZYMAFLORE® KHIO<sup>MP</sup>

Non-*Saccharomyces* yeast of the species *Metschnikowia pulcherrima* for BIOProtection of white and rosé musts and grapes under low-temperature conditions during long pre-fermentation phases.

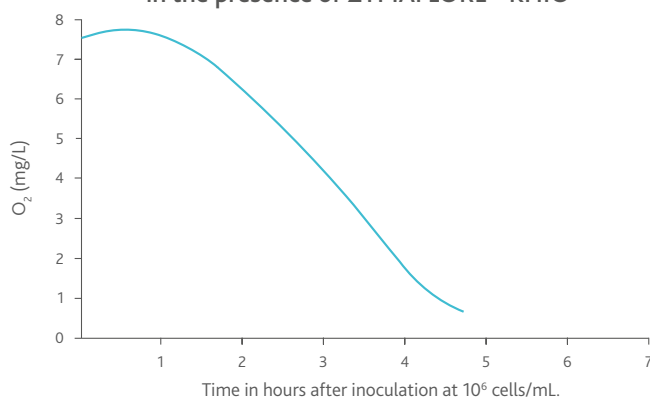
- Colonization of the medium and maintenance of the population at very low temperature (0°C / 32°F).
- Protection of the must against oxidation due to its strong capacity to consume dissolved oxygen.
- Limits the predominance of potentially undesirable indigenous microorganisms.
- Limits the growth of indigenous flora to avoid the onset of alcoholic fermentation.
- Good compatibility with the strain of *Saccharomyces cerevisiae* selected for the AF.

Dosage: 2 - 5 g/hL (20 - 50 ppm) of ZYMAFLORE® KHIO<sup>MP</sup> directly on grapes or must (healthy harvest); rehydrated or not. Then inoculate with *Saccharomyces cerevisiae* at 20 g/hL (200 ppm) for the alcoholic fermentation.



500 g

Change in dissolved oxygen in a must  
in the presence of ZYMAFLORE® KHIO<sup>MP</sup>



### DID YOU KNOW ?

In Greek mythology, Chione or Khione was a goddess, daughter of Boreas (god of the north wind) and Orithyia (an Athenian princess). She is associated with winter, making her the goddess of cold, snow and ice.

ZYMAFLORE® KHIO<sup>MP</sup> helps to protect against oxidation by quickly consuming all the dissolved oxygen in the must.

MORE BIOPROTECT project, 2021 - Windholtz, S., Masneuf-Pomarède, I., Nioi, C.



### ZYMAFLORE® ÉGIDE<sup>TDMP</sup>

A formulation of two strains (*Torulaspora delbrueckii* and *Metschnikowia pulcherrima*) in harvest BIOProtection, grapes and musts, as an SO<sub>2</sub> reduction strategy.

- Colonization of the medium without any detected fermentation activity (no assimilation of sugars or nitrogen, no difference in turbidity levels at the end of the settling process).
- Restriction of the growth of indigenous flora.
- Establishment of the *Saccharomyces cerevisiae* strain selected for the alcoholic fermentation is facilitated.
- BIOProtection of the medium in a wide variety of situations.

Dosage: 2 - 5 g/hL (20 - 50 ppm) of ZYMAFLORE® ÉGIDE<sup>TDMP</sup> directly, rehydrated or non-rehydrated, on grapes or must ; rehydrated or not. Then inoculate with *Saccharomyces cerevisiae* at 20 g/hL (200 ppm) for the alcoholic fermentation.

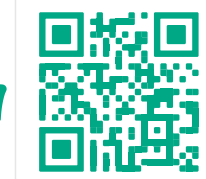
500 g



See Focus P. 5 for the application of ZYMAFLORE® ÉGIDE<sup>TDMP</sup> to equipment.



## ZYMAFLORE® ÉGIDE<sup>TDMP</sup> BIOPROTECTION OF EQUIPMENT



SCAN ME

### WHY BIOPROTECTION OF EQUIPMENT?

- To limit the predominance of undesirable microorganisms on the surface of equipment in contact with grapes.
- To avoid (microbiological) spoilage linked to the contamination of grapes.

ZYMAFLORE® ÉGIDE<sup>TDMP</sup> is a formulation based on two strains of the species *T. delbrueckii* and *M. pulcherrima* suitable for many enological BIOProtection applications.

### BIOPROTECTION OF WHAT TYPE OF EQUIPMENT?

- Machine Harvesters.
- Must and Juice Tankers.
- Picking Bins.
- Harvesting Lugs.
- Grape receival equipment.

#### PREPARATION OF THE ZYMAFLORE® ÉGIDE<sup>TDMP</sup> SPRAY SOLUTION:

Step 1



Add a measured volume of water to the sprayer  
5 - 10 L food-grade sprayer. Nozzles for wide spraying without filter.

Step 2



Weigh ZYMAFLORE® ÉGIDE<sup>TDMP</sup>.

Step 3



Add ZYMAFLORE® ÉGIDE<sup>TDMP</sup> to the sprayer.

Step 4



Mix the contents of the sprayer.

#### CONCENTRATION OF ZYMAFLORE® ÉGIDE<sup>TDMP</sup> IN THE SPRAYER: 50 g/L

Equivalent ZYMAFLORE® ÉGIDE<sup>TDMP</sup> on the grape: 5 g/100 kg.

Spray on all parts in contact with the grapes.

#### Spray volume and time:

- Grape trailer: 1 - 1.5 L of solution - 3 min.
- Harvesting machine: 2 - 3 L of solution - 4 to 5 min.

ZYMAFLORE® ÉGIDE<sup>TDMP</sup> solution can be stored for 5 - 6 hours at 25°C (77°F).

### SPRAYING ZYMAFLORE® ÉGIDE<sup>TDMP</sup> ON EQUIPMENT: IMPACT ON THE GRAPES.

Microbiological analysis of grapes in the cellar, with and without prior application of ZYMAFLORE® ÉGIDE<sup>TDMP</sup> (BIOProtection agent) on the harvesting machine and grape trailer, shows the following results.

#### Count of grape microflora on "total yeast" culture medium:



Without BIOProtection: significant presence of molds and potentially undesirable microorganisms on grapes at the end of the day of picking.



BIOProtection with ZYMAFLORE® ÉGIDE<sup>TDMP</sup>: exclusive and progressive colonization of the grapes by ZYMAFLORE® ÉGIDE<sup>TDMP</sup> during the day of picking and absence of molds.

A\*q-PCR MPTD analysis reveals population levels of ZYMAFLORE® ÉGIDE<sup>TDMP</sup> of  $9.6 \times 10^6$  cells/mL, confirming its significant presence for optimum bioprotection of the grapes.

\*q-PCR MPTD: specific for the two species *M. pulcherrima* and *T. delbrueckii*.

#### ZYMAFLORE® ÉGIDE<sup>TDMP</sup> ON EQUIPMENT ALLOWS:

- Colonization of equipment and grapes throughout the day.
- BIOProtection through limiting the growth of microorganisms and molds potentially detrimental to the final quality of the wine.

## FOCUS

# BIOPROTECTION

## BIOPROTECTION, HOW AND WHY?

- **BIOProtection** consists in the addition of a living organism to occupy the ecological niche and thus limit the predominance of potentially undesirable indigenous microorganisms.
- In practical winemaking terms, it means applying selected microorganisms to the grapes or must to limit the occurrence of changes harmful to wine quality.

### PREREQUISITES

- Microorganisms selected from the grape and/or must microflora, to guarantee their enological origin.
- Microorganisms with low fermentation activity at the inoculated dose and able to colonize the medium.
- Selection of high-quality strains from among recognized species.

## TWO BIOPROTECTION SOLUTIONS FROM LAFFORT®

Characteristics of the two **BIOProtection** solutions from LAFFORT®:

ZYMAFLORE® ÉGIDE <sup>TDMP</sup>	ZYMAFLORE® KHIO <sup>MP</sup>
Mixture of 2 strains of the species <i>Torulaspora delbrueckii</i> and <i>Metschnikowia pulcherrima</i>	Specific strain of the species <i>Metschnikowia pulcherrima</i>
Ability to become established under diverse conditions (musts and grapes).	Suitable for pre-fermentation phases at low temperature (resistance to cold).
Application to harvesting equipment.	High capacity to consume dissolved oxygen in musts.
Low fermentation activity.	Very low fermentation activity.
Robustness to non-rehydration.	Robustness to non-rehydration.



## IMPACTS OF SO<sub>2</sub> REDUCTION ON THE MICROBIAL POPULATION

When SO<sub>2</sub> is reduced, the microbiological pressure on the must is increased. Indigenous populations are larger than after conventional sulfite addition. Depending on the enological context, the effect can be variable, as shown below.

The reduction in the dose of SO<sub>2</sub> changes the microbial balance in the musts.

	SO <sub>2</sub> -	SO <sub>2</sub> +
<i>Saccharomyces cerevisiae</i>	↘	↗
<i>Starmerella bacillaris</i>	→	→
<i>Hanseniaspora uvarum</i>	↗	↘
<i>Torulaspora delbrueckii</i>	↘	↗

PREFERMENT project - Albertin et al., 2014.

Not all yeast species present react in the same way to variations in SO<sub>2</sub> levels. An undesirable species, *Hanseniaspora uvarum* (VA production), seems particularly favored when SO<sub>2</sub> doses are low or if no sulfites are added.

At low or zero SO<sub>2</sub>, the microbiological pressure leads to undesirable effects that can be avoided through **BIOProtection**.

In the case of grapes without sulfite only, the microbiological pressure of the must is such that it limits establishment of the inoculated *S. cerevisiae* yeast. Consequently, the concentration of undesirable compounds (ethyl acetate and VA) and compounds that bind with SO<sub>2</sub> is greater than in grapes without sulfite but with bioprotection.

		No sulfite	No sulfite + ZYMAFLORE® ÉGIDE <sup>TDMP</sup>
Analysis during AF	Establishment of the <i>S. cerevisiae</i> strain	Negative	Positive
	TL35 (mg/L)	74	61
Analysis at end of AF	Ethyl acetate (mg/L)	86	61
	VA (g/L)	0.27	0.16

Impact of using ZYMAFLORE® ÉGIDE<sup>TDMP</sup> (5 g/hL / 50 ppm) during fermentation with no sulfite added. Musts inoculated with a *S. cerevisiae* strain at 20 g/hL (200 ppm) after a 48 h pre-fermentation period at 12°C (53°F).



## BIOPROTECTION & OXYGEN CONSUMPTION

### ZYMAFLORE® KHIO<sup>MP</sup>

The LAFFORT® solution for the BIOProtection of grapes and musts at low temperatures.

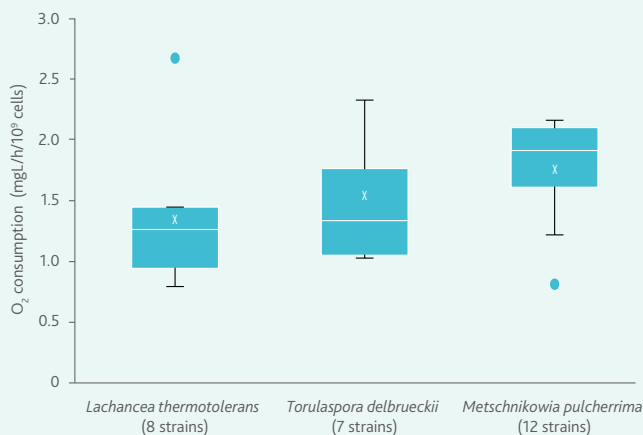
Selected strain of the species *Metschnikowia pulcherrima* with a high capacity to consume dissolved oxygen in musts while limiting the development of potentially undesirable indigenous flora.

Suitable for particularly long pre-fermentation phases at low temperature:

- On white and rosé musts (stabilisation).
- On grapes when filling the tank, for cold soaking before fermentation.

The concentration of dissolved oxygen in musts varies according to temperature. It is more soluble at low temperature. Applied early, ZYMAFLORE® KHIO<sup>MP</sup> thus ensures adequate antioxidant activity due to its ability to become established at low temperature.

Strains of the species *Metschnikowia pulcherrima* consume more dissolved oxygen than other non-Saccharomyces yeast strains.



Oxygen consumption of several non-Saccharomyces yeast species.  
MORE BIOPROTECT project, 2021 - Windholtz, S.,  
Masneuf-Pomarède, I., Nioi, C.

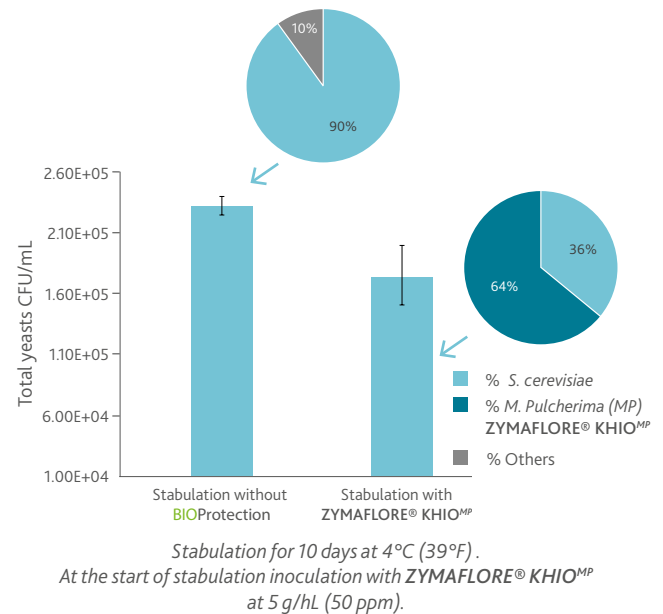
## BIOPROTECTION & CONTROL OF THE MICROBIAL POPULATION

During long pre-fermentation phases, the presence of nutrient-rich solids can encourage the growth of indigenous microflora.

The latter can lead to spontaneous alcoholic fermentation, making must clarification more difficult and impacting the final quality of the wine. This makes it more difficult to establish a selected *S. cerevisiae* yeast for a quality alcoholic fermentation.

ZYMAFLORE® KHIO<sup>MP</sup> allows to limit the development of indigenous microflora.

Distribution of the different yeast populations in the must at the end of stabilisation (counting on specific medium).



Control tank: more than 90% of the microflora present at the end of stabilisation are indigenous *S. cerevisiae* yeasts.

With inoculation: significant colonization of ZYMAFLORE® KHIO<sup>MP</sup>, limiting the development of indigenous *S. cerevisiae* yeasts (only 36% of total yeasts). BIOProtection limits the risk of fermentation starting spontaneously during stabilisation.

# NON SACCHAROMYCES APPLICATIONS

Yeast excellence

## AROMATIC COMPLEXITY



### ZYMAFLORE® ALPHA<sup>TDN.SACCH</sup>

500 g

Non-*Saccharomyces* yeast (*Torulaspora delbrueckii*) for a complex aromatic profile and increased mouthfeel. All grape varieties.

- POF(-) character [no formation of vinyl phenols]: fine and clean profile.
- Increases **aromatic complexity** of both varietal and fermentation aromas.
- Increases **mouthfeel volume** through high polysaccharides production.
- Low volatile acidity production in high sugar and *Botrytis* infected musts.
- Control of indigenous populations as part of a strategy to reduce SO<sub>2</sub> additions.
- Inoculate with a strain of *Saccharomyces cerevisiae* of your choice 24 to 72 hours after the addition of ZYMAFLORE® ALPHA<sup>TDN.SACCH</sup> to secure the completion of the alcoholic fermentation and to benefit from the sensory impact of ZYMAFLORE® ALPHA<sup>TDN.SACCH</sup>.

Dosage: 30 g/hL (300 ppm) for dry wines; 40 g/hL (400 ppm) for desert wines.

## BIOACIDIFICATION

### NEW IN 2022



### ZYMAFLORE® OMEGA<sup>LT</sup>

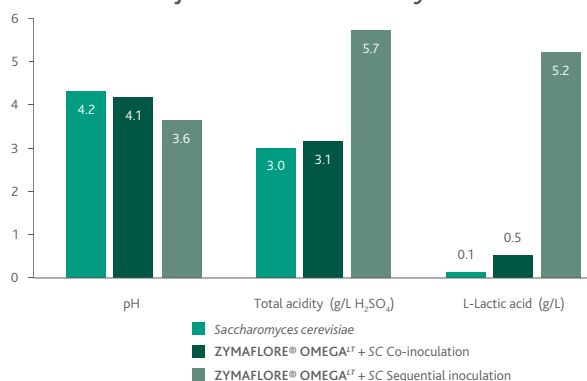
500 g

Non-*Saccharomyces* yeast of the species *Lachancea thermotolerans* for the BIOAcidification of wines (red, white and rosé). Allows adjustment of the acid balance and favors a fresh sensory profile.

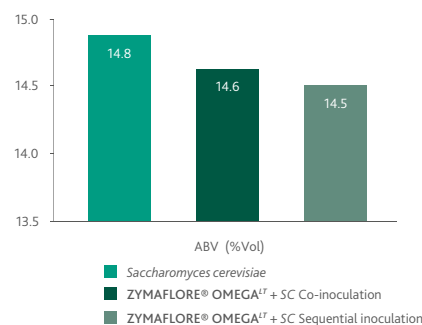
- Selected for its **strong ability to produce L-lactic acid** from fermentable sugars.
- **Decrease in the pH** and increase in the total acidity of wines accompanied by a slight reduction in alcohol content.
- Recommended for healthy and lightly sulfited harvests (less than 4 g/hL (40 ppm)).
- Best used in co-inoculation (simultaneous yeast additions) with *Saccharomyces cerevisiae*.
- Sequential inoculation with *Saccharomyces cerevisiae* favors the expression of ZYMAFLORE® OMEGA<sup>LT</sup> and may produce significant quantities of lactic acid.

Dosage: 20 - 40 g/hL (200 - 400 ppm).

#### Adjustment of the acidity



#### Adjustment of the alcohol level



Adjustment of acidity and alcohol level in wines resulting from co-inoculation (simultaneous yeast additions) or sequential inoculation with ZYMAFLORE® OMEGA<sup>LT</sup> and a strain of *Saccharomyces cerevisiae*. Conditions: Viognier, Australia, 2019; AF temperature 18 °C (64°F), pH 3.9 (Hranilovic et al. 2022).

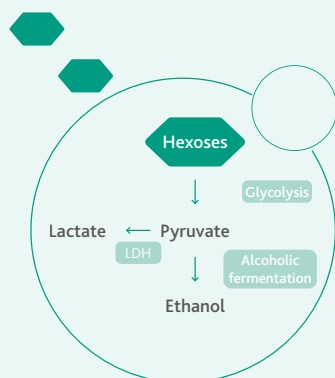


# BIOACIDIFICATION

## BIOACIDIFICATION BY *LACHANCEA THERMOTOLERANS*

*Lachancea thermotolerans* is a yeast that forms part of the indigenous flora of grapes. It can transform part of the fermentable sugars (glucose + fructose) into L-lactic acid rather than ethanol during the alcoholic fermentation (Figure 1).

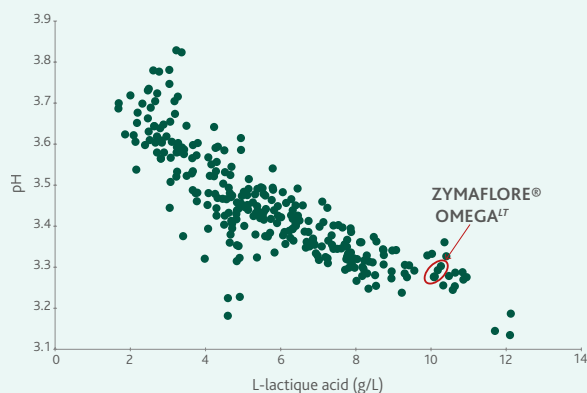
### Mechanisms for BIOAcidification by *Lachancea thermotolerans*



Production of L-lactic acid by *Lachancea thermotolerans* through the enzymatic activity of lactate dehydrogenase (LDH; Hranilovic et al., 2018).

This capacity for BIOAcidification varies from one strain of *Lachancea thermotolerans* to another. Some strains produce very little L-lactic acid, while other strains produce high levels.

Effects of different *Lachancea thermotolerans* strains on wine pH



Production of L-lactic acid by 94 strains of *Lachancea thermotolerans* (in triplicate) and their effects on wine pH (Chardonnay ~240 g/L sugar; initial pH 3.6; must without added sulfite; Hranilovic et al., 2018).

## LAFFORT® SOLUTION



### ZYMAFLORE® OMEGA<sup>LT</sup>

The LAFFORT® Solution to promote freshness and restore the balance of wines.



Selected from more than 100 strains of *Lachancea thermotolerans* for its high capacity to produce L-lactic acid, ZYMAFLORE® OMEGA<sup>LT</sup> brings freshness and restores balance to wines.

The level of BIOAcidification provided by ZYMAFLORE® OMEGA<sup>LT</sup> can be adapted to the technical goal and the fermentation conditions, in particular according to the temperature of AF and the timing of inoculation with *Saccharomyces cerevisiae*.

Its metabolic activity is greater at high temperature (>20°C/68°F) and in the absence of *Saccharomyces cerevisiae* (sequential inoculation).

Refer to the product data sheet for the different application methods.

## ANALYTICAL & SENSORY IMPACTS

- Enhanced perception of acidity in wines from warm climates/ vintages by favoring fresher sensory profiles.
- Decrease in pH and increase in total acidity of the wine, accompanied by a slight decrease in alcohol.
- Allows the production of more acidic batches as part of a blending strategy.
- Color stabilization and increased aging capacity.
- Alternative to traditional acidification by adding organic acids.

## BIOACIDIFICATION & SO<sub>2</sub> REDUCTION

- Microbiological stabilization is facilitated during aging due to the drop in pH increasing the proportion of active SO<sub>2</sub>.
- BIOControl of lactic acid bacteria. Inhibition of MLF in the case of high production of L-lactic acid (greater than 3 - 4 g/L).

# ZYMAFLORE®

## Yeast excellence

	Grape variety	Yeast	Alcohol Resistance* (%v/v)	Nitrogen Requirements	Optimal Fermentation Temperature	Fermentation Kinetics	Sensory Impact
RED WINE	Merlot, Cabernet Sauvignon, Cabernet Franc, Pinot Noir...	F15	16%	Medium	20 - 32°C 68 - 90°F	Rapid	Fruit Volume
	Grenache, Carignan, Sangiovese, Mourvedre, Syrah, Merlot...	F83	16.5%	Medium	20 - 30°C 68 - 86°F	Regular	Fruit Volume
	Cabernet, Merlot, Malbec, Tempranillo...	FX10	16%	Low	20 - 35°C 68 - 95°F	Regular	Neutral Volume
	Pinot Noir, Merlot, Gamay...	RB2	15%	Low	20 - 32°C 68 - 90°F	Regular	Varietal
	Aromatic wines, 'Beaujolais' style...	RB4	15%	Low	20 - 30°C 68 - 86°F	Rapid	Fruity Primeur
	Zinfandel, Petite Sirah, Grenache, Syrah...	RX60	16.5%	High	20 - 30°C 68 - 86°F	Regular	Varietal
	Pinot Noir, Syrah, Cabernet (terroir highlight)	XPURE	16%	Medium	15 - 30°C 59 - 86°F	Regular	Fruit Volume
WHITE & ROSÉ WINE	Aromatic intensity all grape varieties	XAROM	15	High	14 - 24°C 57 - 75°F	Regular	Esters - Amyl Intensity
	Pinot Gris, Riesling, Pinot Blanc, Chardonnay	XORIGIN	15.5%	Low	14 - 22°C 57 - 72°F	Rapid	Volume Fruity Varietal
	Chardonnay	CX9	16%	Low	14 - 22°C 57 - 72°F	Regular	Varietal Volume
	Rose, Viognier, Pinot Gris, Sauvignon Blanc...	DELTA	14.5%	High	14 - 22°C 57 - 72°F	Regular	Varietal
	Secondary fermentation (sparkling wines)	SPARK	17%	Low	10 - 32°C 50 - 90°F	Rapid	Neutral
	Sweet wines	ST	15%	High	14 - 20°C 57 - 68°F	Regular	Varietal
	Chardonnay, Semillon, Riesling, Gewurztraminer, Chenin Blanc, Muscat...	VL1	14.5%	High	16 - 20°C 61 - 68°F	Regular	Varietal
	Chardonnay, Viognier, Roussanne	VL2	15.5%	Medium	14 - 20°C 57 - 68°F	Regular	Varietal Volume
	Sauvignon Blanc, Vermentino, Gewurztraminer, Semillon...	VL3	14.5%	High	15 - 21°C 59 - 70°F	Regular	Varietal Volume
	Sauvignon Blanc, Albarino, Rose, Riesling...	X5	16%	High	13 - 20°C 55 - 68°F	Rapid	Varietal Esters
	Chardonnay, Viognier, Chenin Blanc, Pinot Gris, Rose...	X16	16.5%	Medium	12 - 18°C 54 - 64°F	Rapid	Esters
ORGANIC	All grapes	011 BIO	16%	Low	14 - 26°C 57 - 79°F	Rapid	Neutral

\* Yeast alcohol tolerance depends on nutrition, temperature, etc. It is recommended to use **SUPERSTART® ROUGE** (for red wines) or **SUPERSTART® BLANC** (for white and rosé wines) and a higher yeast dose rate for wines with high alcohol potential.

# ZYMAFLORE® - ALL TYPES OF WINES

## Yeast excellence

NEW IN 2022



### ZYMAFLORE® XarOm

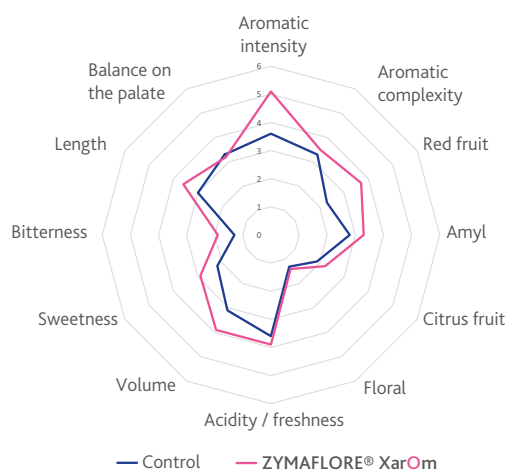
500 g

Yeast allowing intense production of fermentation aromas, amyl aromas (yellow fruit, strawberry, pineapple, etc.).

- Ability to produce wines with very great aromatic intensity.
- Suitable for fermentation of neutral grape varieties or as part of a blending strategy.
- Genetic ability to preserve malic acid during AF.
- POF(-) character [no formation of vinyl phenols]: **fine and clean aromatic profile.**
- Very low production of volatile acidity.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

#### Sensory profile



*Wine vinified with ZYMAFLORE® XarOm presents a more intense sensory profile. Tasting results by a panel of trained tasters. (Rosé - Languedoc-Roussillon, 2021)*



## CERTIFIED ORGANIC YEAST



### ZYMAFLORE® 011 BIO

500 g

Organic certified yeast according to European organic production regulations (EU) 848/2018 and compliant with U.S. National Organic Program (NOP) for organic production.

This *Saccharomyces cerevisiae* strain has been selected for its remarkable fermentation capabilities, its high alcohol tolerance, its respect for varietal typicity, and its low production of medium-chain fatty acid compounds inhibiting lactic acid bacteria.

Its alcohol tolerance makes ZYMAFLORE® 011 BIO well adapted to restarting stuck fermentations or inoculation in case of sluggish spontaneous fermentations to ensure a healthy completion of fermentation.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

30 - 50 g/hL (300 - 500 ppm) in case of stuck fermentation.



# RED WINES

Yeast excellence



## ZYMAFLORE® XPURE

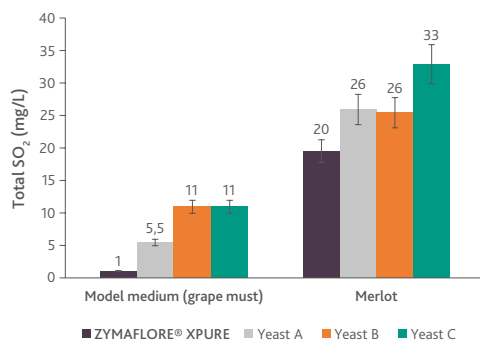
Yeast for varietal red wines. Enhances aromatic purity.



500 g  
10 kg

- Suitable for fermentation with reduced doses of sulfites for a low total  $\text{SO}_2$ .
- Low production of volatile acidity.
- ZYMAFLORE® XPURE is suited to the production of red wines for full expression of the **aromatic finesse** and potential of the grapes.
- Reduces the perception of vegetal characters.
- Promotes the expression of **dark fruit** and **aromatic freshness**.
- Allows the production of wines with **great suppleness** in the mouth and **sweetness** on the palate.
- Excellent fermentation ability.

Dosage: 15 - 30 g/hL (150 - 300 ppm).



### Total $\text{SO}_2$ – end of alcoholic fermentation

*Trial on must: Merlot, ABV: 15% vol., total  $\text{SO}_2$ : 40 mg/L (40 ppm).*

*Trial in model medium: synthetic must, ABV: 13% vol., total  $\text{SO}_2$ : 20 mg/L (20 ppm).*

ZYMAFLORE® XPURE allows for lower concentrations of total  $\text{SO}_2$  at the end of the alcoholic fermentation.



## ZYMAFLORE® FX10

Yeast for wines showing structured and silky tannins. Cabernet, Merlot, Malbec, Tempranillo...



500 g  
10 kg

- Fructophilic character.
- Improved cell viability at high fermentation temperatures.
- Preserves **varietal specificity and terroir** (very low production of fermentation aromas).
- Good for aging on lees (liberation of Hsp12 protein gives perception of **sweetness**).
- High polysaccharide release (contributes to **softening tannins**).
- Helps to mask the perception of green characters.

Dosage: 15 - 30 g/hL (150 - 300 ppm).



## ZYMAFLORE® RX60

Yeast for fruity, spicy red wines. Zinfandel, Petite Sirah, Syrah, Grenache.



500 g  
10 kg

- Very high aroma production (fresh currant and berry aromas).
- Low production of  $\text{H}_2\text{S}$ .
- LACTOENOS® 450 PREAC recommended in early co-inoculation to preserve aromatic freshness.

Dosage: 15 - 30 g/hL (150 - 300 ppm).



Consider **SUPERSTART® ROUGE** to optimize yeast viability in juice and must with high sugar concentration.  
See P. 22

# RED WINES

Yeast excellence



## ZYMAFLORE® F15

Yeast for rounded, full bodied wines. Merlot, Cabernet Sauvignon, Pinot Noir...

- Isolated from one of the best terroirs in Bordeaux.
- Broad aromatic spectrum.
- **Fermentation security**, high compatibility with bacteria strains.
- Produces wines suitable for extended aging.

Dosage: 15 - 30 g/hL (150 - 300 ppm).

500 g  
10 kg



## ZYMAFLORE® RB2

Yeast for fruity and elegant red wines. Pinot Noir, Nebbiolo, Merlot...

- Strain isolated from a premium estate in Burgundy.
- Low color **matter adsorbtion**.
- Good aptitude for expressing **typical aromas** like cherry/kirsch.

Dosage: 15 - 30 g/hL (150 - 300 ppm).

500 g



## ZYMAFLORE® F83

Yeast for supple, fruity and floral red wines. Grenache, Nebbiolo, Sangiovese, Tempranillo, Syrah...

- Strain isolated in Tuscany from Sangiovese.
- High production of **red fruit** aromas.
- Respects the typicity of mediterranean grape varieties.

Dosage: 15 - 30 g/hL (150 - 300 ppm).

500 g



## ZYMAFLORE® RB4

Yeast for aromatic and early-to-release style wines.

- Strain selected in Beaujolais.
- Important production of fermentation aromas such as **red fruits**.
- Ideal strain for rapid initiation of MLF.
- Aromatic and fruity wines, **long finish**.

Dosage: 15 - 30 g/hL (150 - 300 ppm).

500 g



### THINK NOBILE®!

Supplementing the natural supply of ellagic tannins and polysaccharides, adding **NOBILE® FRESH GRANULAR 24M** (untoasted oak) during alcoholic fermentation can prepare your wine for aging while raising its aromatic potential and fruit expression.

Dosage: 2 to 4 g/L.

See P. 79

# WHITE & ROSÉ WINES

Yeast excellence



## ZYMAFLORE® X5

Yeast for aromatic white wines with excellent thiol expression. Sauvignon Blanc, Albarino, Rosé, Riesling...

- Strong expression of **volatile thiols** (boxwood, tropical fruits) and production of **fermentation aromas**.
- **Fresh and complex** wines.

Dosage: 20 - 30 g/hL (200 - 300 ppm).



500 g  
10 kg

### SELECTING YOUR YEAST STRAIN FOR HIGH-THIOL WINE VARIETIES

	ZYMAFLORE® DELTA	ZYMAFLORE® X5	ZYMAFLORE® VL3
Varietal expression	..... (3SH)	.....	....
Production of fermentation esters	-	...	-
Aromatic intensity	....	.....	...
Volume and sweetness on the palate	....	...	.....
Fermentative capability	...	.....	....
Optimal conditions	150 - 250 NTU 18 - 20°C (64 - 68°F)	80 - 150 NTU 16 - 20°C (60 - 68°F)	100 - 150 NTU 18 - 20°C (64 - 68°F)



To increase the thiol concentration in your wines, think about **LAFAZYM THIOLS<sup>®</sup>**. See our focus on aromas P. 38.



## ZYMAFLORE® DELTA

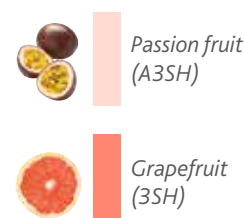
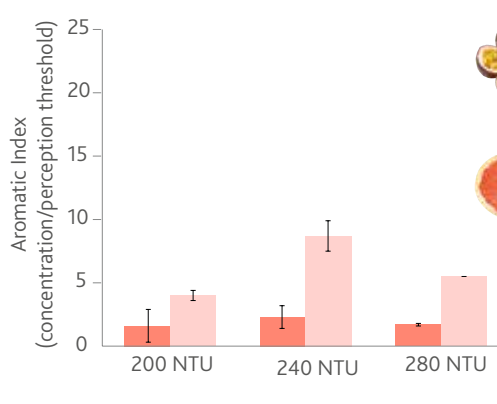
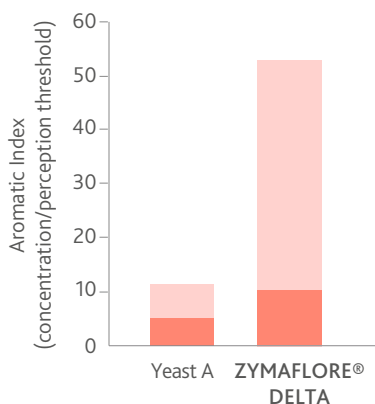
Yeast for aromatic white and rosé wines. Rosé, Viognier, Pinot Gris, Sauvignon Blanc...

- **Complex and elegant** wines, clean aromatic profile.
- High expression of **citrus** notes, especially **grapefruit**.
- Optimal conditions for fermentation: 150 - 250 NTU turbidity.
- Very low formation of negative sulfur-containing compounds even at high turbidities.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

500 g

### Aromatic index of volatile thiols



Sauvignon Blanc, Bordeaux. Fermentation temperature 16 - 22°C (61 - 72°F). Check on yeast establishment: positive.

Analyses carried out at the end of alcoholic fermentation.



# WHITE & ROSÉ WINES

Yeast excellence



## ZYMAFLORE® XORIGIN

Production of well-balanced fine white wines, respecting the typical character of grape varieties and terroirs.

- Revelation of the aromatic potential of the grape variety: fine and elegant aromas of white- and yellow-fleshed fruit, delicate flowers.
- **Adds mouthfeel.**
- Suitable for fermentation with reduced doses of sulfites for a low total SO<sub>2</sub>.
- Low production of volatile acidity.
- Very good fermentation capacities.
- POF(-) character [no formation of vinyl phenols]: **fine and clean aromatic profile.**

Dosage: 20 - 30 g/hL (200 - 300 ppm).



500 g



## ZYMAFLORE® CX9

Yeast resulting from selection from a great Burgundy vineyard and breeding technology specifically selected for Chardonnay.

- Develops notes of **lemon, fresh hazelnut, almond and toast.**
- Contributes to the balance between **smoothness, tautness and mouthfeel.**
- Very good fermentation ability.
- POF(-) character (no vinyl phenol formation), generating a delicate and **clean wine profile.**
- Particularly suited to Chardonnay fermentation.

Dosage: 20 - 30 g/hL (200 - 300 ppm).



**TYPICAL  
#CHARDONNAY**

Consider the combined  
use of ZYMAFLORE® CX9  
and NOBILE®  
STAVE 18-DIVINE.

500 g  
10 kg



## ZYMAFLORE® X16

Yeast for modern and aromatic style white and rosé wines. Chardonnay, Viognier, Chenin Blanc, Pinot Gris, Rosé...

- Very strong fermenter.
- High **aromatic production** (peach, white flowers, stone fruits).
- POF(-) character (no vinyl phenol formation), generating a delicate and **clean wine profile.**
- Low production of H<sub>2</sub>S.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

500 g  
10 kg

### SELECTING YOUR YEAST STRAIN FOR CHARDONNAY WINES

	ZYMAFLORE® CX9	ZYMAFLORE® VL1	ZYMAFLORE® VL2	ZYMAFLORE® X16
Varietal expression	..... (Lemon, hazelnut, almond and toasted bread)	.... (minerality, exotic fruits)	...	.
Production of fermentation esters	-	-	..(•)	.....
Aromatic intensity	....	...	....	.....
Volume on the palate	....	.....	...	-
Fermentative capability	....	...	...	.....

# WHITE & ROSÉ WINES

Yeast excellence



## ZYMAFLORE® VL1

Yeast for elegant and refined white wines. Sémillon, Chardonnay, Riesling, Gewürztraminer, Chenin Blanc, Muscat...

- POF(-) character (no vinyl phenol formation), generating a **delicate and clean wine profile**.
- High  $\beta$ -glucosidase enzymatic activity.
- Expression of floral **terpene varietal aromas**.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

500 g  
10 kg



## ZYMAFLORE® VL2

Yeast for delicate and clean barrel fermented wines. Chardonnay, Viognier, Roussane...

- POF(-) character (no vinyl phenol formation), generating a **delicate and clean wine profile**.
- High polysaccharides production.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

500 g  
10 kg



## ZYMAFLORE® VL3

Yeast for wines of elegance and finesse with high expression of volatile thiols. Sauvignon Blanc, Vermentino, Gewürztraminer & Pinot Gris.

- Isolated from one of the best Sauvignon Blanc vineyards in Bordeaux.
- Good aptitude for expressing the **varietal aromas** such as volatile thiols from the odorless precursors in the must.
- **Volume** and **roundness** in the mouth.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

500 g  
10 kg



## ZYMAFLORE® ST

Yeast for sweet wines from Botrytized grapes. Late Harvest, Semillon, Riesling...

- Strain selected in Sauternes.
- Sensitive to  $\text{SO}_2$  for arresting fermentation easily and **low production** of  $\text{SO}_2$  binding compounds.
- Resistance to high sugar concentration.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

500 g



### THINK NOBILE®!

Supplementing the natural supply of ellagic tannins and polysaccharides, adding **NOBILE® FRESH GRANULAR 24M** (untoasted oak) during alcoholic fermentation can prepare your wine for aging while raising its aromatic potential and fruit expression.

Dosage: 0.5 - 2 g/L.

See P. 79

# SPARKLING WINES

Yeast excellence



## ZYMAFLORE® SPARK

Secondary fermentation and tough conditions.

- Still wine fermentation and secondary fermentation of sparkling wines.
- Resistant to difficult fermentation conditions (potential alcohol, turbidity, temperature).
- Tolerates high SO<sub>2</sub> and alcohol levels.

Dosage: 20 - 30 g/hL (200 - 300 ppm).



500 g

*Tested and validated by the laboratory for microbiological technique at the Comité Interprofessionnel du Vin de Champagne (CIVC).*



For the complete range of products for sparkling wines and LAFFORT® recommendations.

See P. 89



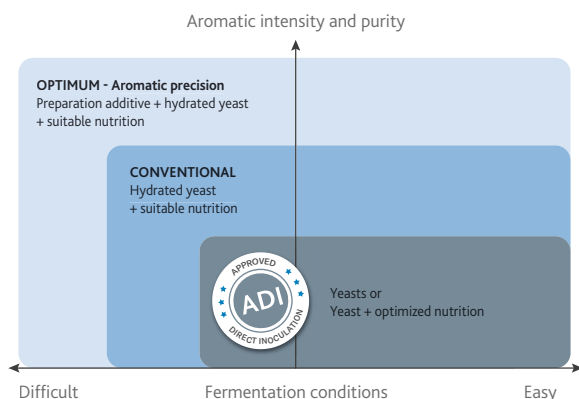
## ADI - YEASTS APPROVED FOR DIRECT INOCULATION



In 2022, LAFFORT® is offering a selection of strains for direct inoculation.

Several years of qualification, based on discriminating criteria such as cell viability after inoculation or the resumption of cell activity, have made it possible to approve strains from our collection for easier application while preserving their intrinsic characteristics.

ZYMAFLORE® ÉGIDE<sup>TMP</sup>, ZYMAFLORE® KHIO<sup>MP</sup>, ZYMAFLORE® RX60, ZYMAFLORE® X5, ACTIFLORE® BO213, ACTIFLORE® F33 and ACTIFLORE® D.ONE are now offered for inoculation without rehydration.



The ADI concept forms part of the overall and controlled management of the alcoholic fermentation, to preserve wine quality whatever the fermentation conditions.

Extreme fermentation conditions (temperature, high fermentable sugar, strong pressure from indigenous microflora) or the quest for intense and precise aromatic profiles must be taken into account when choosing the most appropriate inoculation strategy. A controlled fermentation is a guarantee of good winemaking practice for the production of quality wines.

**Find out more:** Discover our **YEAST REHYDRATION** video on our website, in the **LAFFORT & YOU** section.






# ACTIFLORE®

Natural performance

Inoculation with a selected yeast strain is part of the control of the alcoholic fermentation. Leaving the alcoholic fermentation to wild yeasts means taking a risk with both the **fermentation** (stuck ferment, increased VA, increased formation of SO<sub>2</sub>-binding compounds...) and with the **aromas** (many potential off-flavors).

While the choice of yeast strain is essential, its establishment in the medium, its protection and its nutrition, to guarantee a smooth alcoholic fermentation up to completion, are also important. **Following the yeast addition procedure** is essential, to avoid population loss and to ensure it is properly established. ACTIFLORE® yeasts are **technical tools** for ensuring complete fermentation, without sensory fault, even under difficult conditions.

	YEAST	ALCOHOL RESISTANCE (% VOL)	NITROGEN REQUIREMENTS	OPTIMAL FERMENTATION TEMPERATURE	FERMENTATION KINETICS	AROMATIC IMPACT
	ACTIFLORE® BO213	18	Low	10 - 32°C (50 - 90°F)	Rapid	Neutral
	ACTIFLORE® F33	16	Low	13 - 30°C (55 - 86°F)	Regular	Fruity
	ACTIFLORE® RMS2	17	Low	10 - 30°C (50 - 86°F)	Rapid	Neutral
	ACTIFLORE® ROSÉ	15	Medium	13 - 18°C (55 - 64°F)	Regular	Esters
	ACTIFLORE® F5	15	Medium	13 - 25°C (55 - 77°F)	Regular	Neutral
	ACTIFLORE® CEREVISIAE	13.5	Low	20 - 30°C (68 - 86°F)	Rapid	Fruity
	ACTIFLORE® D.ONE	16	Low	12 - 32°C (54 - 90°F)	Regular	Neutral

\* Yeast alcohol tolerance depends on nutrition, temperature, etc. It is recommended to use **SUPERSTART®** and a higher yeast dose rate for wines with high alcohol potential.

## ACTIFLORE® ROSÉ

500 g

Spicy and fruity notes.

- Excellent strain for the production of fruit-driven rosé wines, especially when they are made from grapes of low aromatic potential.
- POF(-) character (no vinyl phenol formation), resulting in a **fine and clean aromatic profile**.
- Strong implantation ability and fermentation rates.
- Produces high levels of **fermentation aromas**.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

**Find out more:** Discover our **FERMENTATION RESTART PROTOCOL** on our website, in the **LAFFORT & YOU** section.

# ACTIFLORE®

## Natural performance



### ACTIFLORE® BO213

Fermentation restart and clean aromatic profile.

- Very strong ability to restart sluggish or stuck fermentations.
- Excellent fermentation capacity.
- Ferments at low temperatures (10 - 12°C / 50 - 54°F).
- Tolerates extremely high alcohol (18 % vol.) levels.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

30 - 50 g/hL (300 - 500 ppm) for stuck fermentations. [Restarting stuck fermentations - See P. 96.](#)

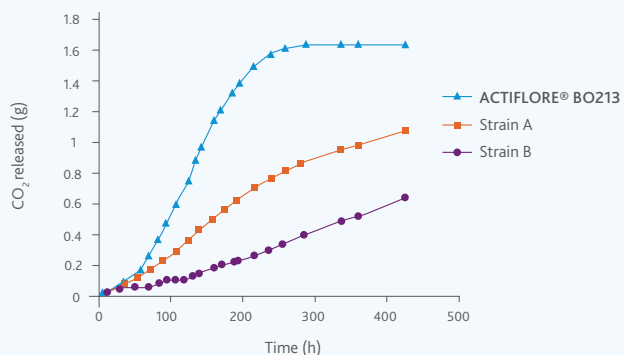
500 g  
10 kg



### FRUCTOPHILIC CHARACTER

*S. cerevisiae* metabolizes glucose more easily than fructose, which results in higher fructose concentrations in wines at the end of fermentation. In addition, the accumulation of ethanol increases fermentation difficulties for the yeast at the end of AF.

Synthetic medium representative  
of a wine with stuck fermentation



*ACTIFLORE® BO213* has two copies of a particular genetic form of the *HXT3* gene (Guillaume et al., 2007). This gene codes for a protein responsible for sugar transport, allowing *ACTIFLORE® BO213* to assimilate fructose better than most other winemaking strains. Composition of the medium: 16 g/L fructose, no glucose and 13.5% vol. ethanol.



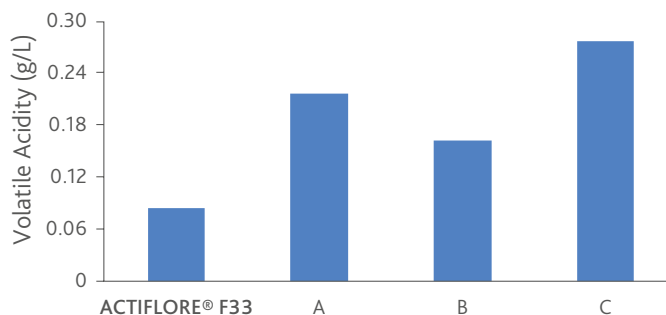
### ACTIFLORE® F33

Low VA, high polysaccharide release, fermentation security.

- Perfectly suited to the production of elegant red wines.
- Superior **balance & softness** due to high polysaccharide release.
- Excellent fermentation characteristics & kinetics over a wide temperature range.
- Very good alcohol tolerance and low nitrogen demand.
- **Very low VA production.**

Dosage: 15 - 30 g/hL (150 - 300 ppm).

500 g  
10 kg



### Volatile acidity at the end of AF

Comparison of VA production by 4 different strains of yeasts, at end of alcoholic fermentation (13.5% vol, pH: 3.6). Cabernet Sauvignon.

# ACTIFLORE®

Natural performance

## ACTIFLORE® F5

500 g

Yeast for base wines intended for distillation.

- Yeast selected for its ability to easily establish itself in the medium.
- Excellent fermentation capacities, short lag phase.
- Low production of SO<sub>2</sub>.
- Low production of higher alcohols, ethanal, ethyl acetate.

Dosage: 20 - 30 g/hL (200 - 300 ppm).

## ACTIFLORE® CEREVISIAE

500 g

Starter yeast.

- Selected for a rapid start to fermentation.
- Does not modify the varietal character of wines.

Dosage: 15 - 30 g/hL (150 - 300 ppm).

## ACTIFLORE® RMS2

500 g

Difficult conditions, low production of reduction compounds.

- Yeast selected for its superb white wine fermentation capabilities.
- Adapted to **extreme white winemaking conditions** (high volume, low turbidity, low temperature, anaerobic conditions).
- Very low production of H<sub>2</sub>S.
- Also recommended for secondary fermentation of sparkling wines.

Dosage: 20 - 30 g/hL (200 - 300 ppm).



## ACTIFLORE® D.ONE

10 kg

Yeast-based preparation associated with an activator for direct inoculation without rehydration.

All types of wine.

- Easy to use in the winery; direct inoculation.
- Very robust *Saccharomyces cerevisiae* yeast with an activation supplement based on yeast derivatives, specific for effective direct inoculation.
- Neutral strain (respects the typical character of grape varieties).

Dosage: 30 - 40 g/hL (300 - 400 ppm) (depending on the potential alcohol) ; 50 g/hL (500 ppm) in case of late inoculation.



# NUTRIENTS

## The best for your yeasts

A stressful fermentation results in aroma defects and production of factors inhibiting bacteria. Yeast must have complete nutrition for a stress-free fermentation. Grape nutrition and nutrient additions need to be balanced in both growth and survival factors for the yeast to ensure a clean and strong fermentation finish.

ENOLOGICAL CONCERN	YEAST METABOLISM FACTOR	RECOMMENDATION
<b>Regular fermentation</b> Avoid rapid fermentation or heat spikes.	Nutritional balance between mineral and organic nitrogen.	Partially or completely correct with organic nitrogen (not only with ammonium salts). Make two additions during the first third of fermentation.
<b>Healthy fermentation completion.</b>	Yeast viability and vitality. Cell membrane resistant to acid and alcohol stresses.	Use yeast rehydration products during the rehydration phase to add sterols and long-chain fatty acids to strengthen the cell membrane.
<b>Clean aromatic profile</b> Low H <sub>2</sub> S and sulfur compound production, low VA, low masking of aromas.	Stress minimization and good cell membrane permeability.	Rehydrate the yeast with specific rehydration nutrients. Add nutrients before midfermentation. Incorporate pantothenic acid (vitamin B5) from yeast nutrients to regulate and minimize H <sub>2</sub> S production.
<b>Aromatic optimization</b> Expression of varietal aromas and/or production of fermentation aromas.	Cell membrane permeability. Vitamins, minerals and precursors of fermentation esters (amino acids).	Use yeast rehydration nutrients to add sterols during rehydration for good fluidity and membrane transport. Nutrition quality and quantity to be determined in relation to desired aromatic profile.

For optimal nutrition and protection of yeast, LAFFORT® highly recommends rehydration with SUPERSTART®. Then add NUTRISTART® ORG, NUTRISTART® AROM or NUTRISTART® as required.

### ASSIMILABLE NITROGEN CONTRIBUTION BY NUTRIENT

PRODUCT	EQUIVALENCE	BALANCE AND COMPOSITION			
	YAN CONTRIBUTION FROM 10 g/hL (100 ppm)	ORGANIC AVAILABLE NITROGEN	MINERAL AVAILABLE NITROGEN	VITAMINS AND MINERALS	NUTRITIONAL BALANCE
NUTRISTART® ORG	10 mg/L (10 ppm)	• • • •		• • • •	• • •
NUTRISTART® AROM	14 mg/L (14 ppm)	• • •	•	• • •	• • • •
NUTRISTART®	15 mg/L (15 ppm)	•	• • •	• •	• •
THIAZOTE® PH	21 mg/L (21 ppm)		• • • •	• •	•

# YEAST PERFORMANCE OPTIMIZATION

The best for your yeasts

## SUPERSTART® RANGE

SUPERSTART® products are for use at the active dry yeast rehydration step. SUPERSTART® use ensures optimal aromatic performance and a healthy and complete fermentation. Patent FR 2736651. These products:

1 kg  
5 kg

- Provide the essential building blocks for yeast membranes (mainly long chain fatty acids and ergosterols).
- Guarantee fluidity of the membrane, its alcohol tolerance, and the correct conformation of transporters for better assimilation of sugars and nutrients (amino acids, etc.).
- Significantly **reduce production** of VA and H<sub>2</sub>S.
- Promote onset of MLF (the yeast will produce fewer compounds inhibiting malolactic bacteria due to a less stressful primary fermentation).
- In nitrogen deficient juice and must, an additional supply of ammonium salts or organic nitrogen (**NUTRISTART® AROM** or **NUTRISTART®**) remains essential.
- To be used most particularly in the cases of high potential alcohol, low turbidity white juice, low fermentation temperature or yeast restart cultures.
- To be added into yeast rehydration water.

Dosage: 20 - 30 g/hL (200 - 300 ppm) (increase the dosage for potentially high alcohol juice and must).

## SUPERSTART® Rouge

Due to its high ergosterol content, SUPERSTART® ROUGE improves yeast cell longevity under stressful conditions and increases yeast tolerance to high temperatures and alcohol.

## SUPERSTART® Blanc

Due to its specific formulation, particularly rich in certain vitamins and mineral salts, SUPERSTART® BLANC optimizes the production and aromatic revelation by yeasts guaranteeing stronger fermentation completion.

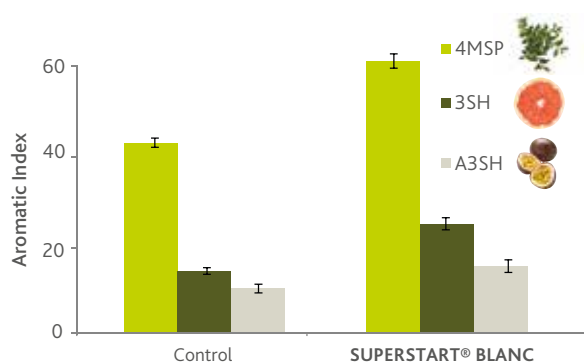
Ergosterol content



Comparison of ergosterol\* contents (%) in different equivalent application products, standardized against the product with the highest concentration (100%), in this case, **SUPERSTART® ROUGE**.

\*This sterol gives yeast a higher resistance to ethanol.

Aromatic optimization



Sauvignon Blanc. ABV 12.5% vol. **ZYMAFLORE® X5**.

By improving the general assimilation of must compounds, **SUPERSTART® BLANC** optimizes the yeast metabolism to give more aromatic wines.



Use **SUPERSTART® SPARK** for secondary fermentation and starters for stuck fermentation.  
See P. 91, 92 & 96.

# YEAST NUTRITION

The best for your yeasts



## NUTRISTART® AROM

Complete nutrient (inactivated yeast, yeast cell fragments rich in glutathione and diammonium phosphate) enhancing the aromatic complexity of wines.

- **Balanced nitrogen sources** (organic and mineral) highlighting wine sensory complexity.
- Glutathione-rich formula useful during fermentation of white and rosé wines to preserve the aromatic potential of wines.
- 10 g/hL (100 ppm) of **NUTRISTART® AROM** brings the equivalent of 14 mg/L (14 ppm) of assimilable nitrogen.

Dosage: 20 - 60 g/hL (200 - 600 ppm) depending on nitrogen deficiency levels.



1 kg  
5 kg

## NUTRISTART® ORG

100% organic nutrient from inactivated yeast (yeast autolysates), rich in amino acids, vitamins (thiamine, niacin, pantothenic acid, folic acid...), minerals and micro-nutrients (magnesium, manganese, zinc, iron...) favoring cell multiplication.

- Ensures regular and complete alcoholic fermentation in the case of slight to moderate nutritional deficiencies.
- Results in more aromatic wines and limits the formation of undesirable compounds (compounds that combine with  $\text{SO}_2$ ,  $\text{H}_2\text{S}$ , etc.).
- In the case of large nitrogen deficiencies and/or high potential alcohol, use **NUTRISTART® ORG** with a supplementary nitrogen source to guarantee improved nutritional balance in the yeast.
- 10 g/hL (100 ppm) of **NUTRISTART® ORG** brings the equivalent of 10 mg/L (10 ppm) of assimilable nitrogen.

Dosage: 30 - 60 g/hL (300 - 600 ppm) according to the necessary nitrogen addition.



1 kg  
5 kg

## NUTRISTART®

All-round yeast activator combining growth and survival factors and promoting yeast multiplication (inactivated yeasts, yeast autolysates, diammonium phosphate, thiamine).

- To be used in the case of nutrient deficiency in the must.
- 10 g/hL (100 ppm) provides about 15 mg/L (15 ppm) assimilable nitrogen.

Dosage: 20 - 60 g/hL (200 - 600 ppm) depending on nitrogen requirement.



1 kg  
5 kg  
20 kg

**Yeast nutrition:  
nitrogen adjustment using the  
LAFFORT® Online Calculator.**

Calculate organic and/or inorganic  
nitrogen additions using our simple  
online nutrient calculator.

**Find out more:** See our **Decision Making Tool for YEAST NUTRITION** on our website,  
in the **LAFFORT & YOU** section.

# YEAST NITROGEN NUTRITION

## THE DEMAND FOR YEAST NITROGEN

The nitrogen sources that can be used by *Saccharomyces cerevisiae* are ammonium ( $\text{NH}_4^+$ ) and amino acids (organic nitrogen). They both represent assimilable nitrogen and are present in must at varying concentrations, sometimes not in sufficient quantities to meet the requirements of the yeast.

The three following factors must be taken into consideration:

- **Below 150 mg N/L, must is deficient.** It is therefore important to supplement it with nitrogen elements.
- **Yeast nitrogen requirements depend on sugar concentration.** The higher this concentration, the greater the amount of yeast biomass needed to successfully achieve a thorough breakdown of the sugars during alcoholic fermentation. Although, the yeast biomass must not be too excessive to avoid an induced nitrogen deficiency.
- **The nitrogen initially present in must is rapidly assimilated** during the first third of the alcoholic fermentation, at the point when the biomass is at its highest density. Consequently, irrespective of the initial nitrogen content, its addition at one-third alcoholic fermentation allows preservation of the biomass formed, which is dependent on the yeast strain and proportional to the initial nitrogen concentration.

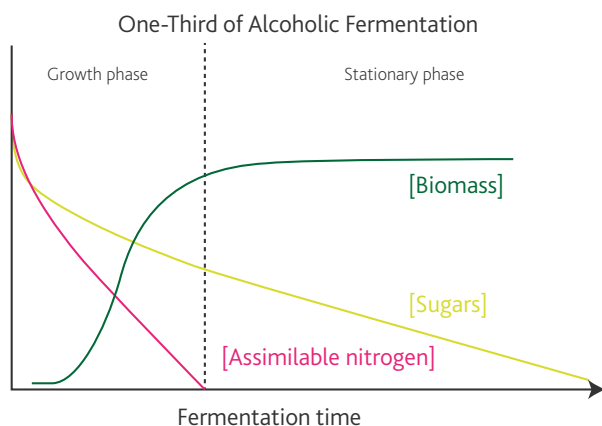
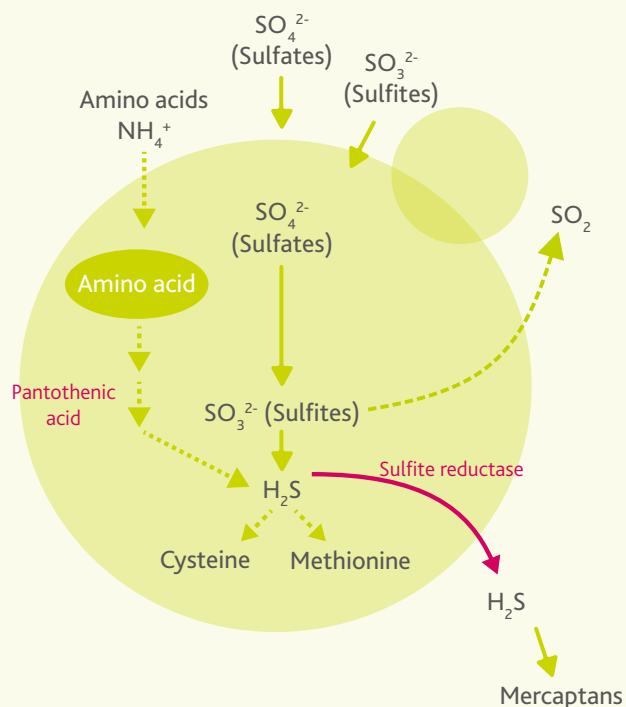


Figure 1: Assimilation of nitrogen and production of biomass during alcoholic fermentation.

### DID YOU KNOW ?

The key enzyme in the production of  $\text{H}_2\text{S}$  is sulfite reductase. When the  $\text{H}_2\text{S}$  and amino acids pathways meet the sulfur amino acids (cysteine and methionine) are produced. Where there is an imbalance between these two pathways and a nitrogen deficiency, the precursors of these sulfur amino acids are limiting, leading to an accumulation of  $\text{H}_2\text{S}$ .





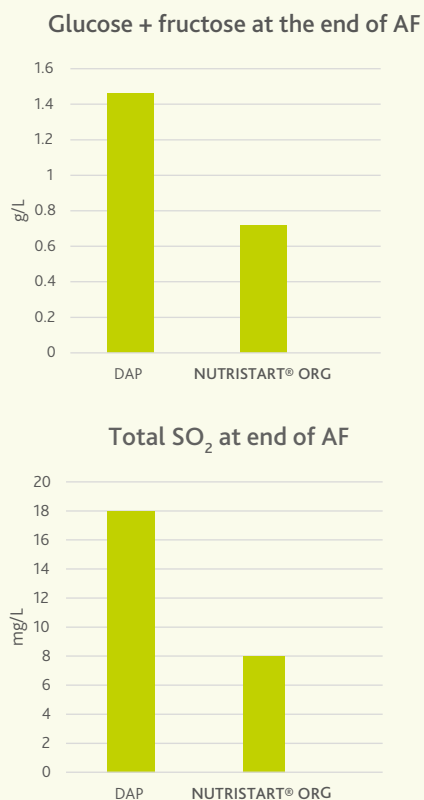
## WHY ORGANIC NUTRITION ?

Organic nitrogen is supplied by adding yeast derivatives (usually autolyzed yeast). In addition to amino acids, these yeast derivatives include lipids, vitamins and minerals which also contribute to the efficient performance of the yeast.

Yeast has the ability to simultaneously assimilate organic nitrogen and mineral nitrogen from the beginning of the alcoholic fermentation.

Organic nitrogen must be present in order to:

- Limit the production of  $\text{SO}_2$  and sulfur compounds ( $\text{H}_2\text{S}$  and mercaptans).
- Produce healthy, but not excessive, biomass.
- Limit the risk of stuck or sluggish fermentation.



**Figure 2:** Concentrations of glucose + fructose and total  $\text{SO}_2$  at the end of alcoholic fermentation. Must derived from Sauvignon Blanc (13.9% ABV, initial Nass: 125 mg N/L). At the one-third point of alcoholic fermentation, 35 mg N/L were added with DAP or NUTRISTART® ORG, deliberately making yeast conditions difficult.

## SENSORY EFFECTS OF ORGANIC NUTRITION

Numerous experiments show that improved outcomes of alcoholic fermentation can be achieved with the use of organic nitrogen ([figure 2](#)). Even in the case of wines considered dry (glucose + fructose < 2 g/L), small amounts of fermentable sugars can be used by degrading microorganisms and can have an adverse effect on the quality of the wines.

Besides its effects on fermentation kinetics, the addition of organic nitrogen can increase the fruitiness of wines and limit the aromatic mask linked to the production of sulfur compounds during the alcoholic fermentation. Except for the source of the nitrogen added, a comparison of wines produced under the same conditions reveals significant preferences for wines derived from musts supplemented with NUTRISTART® ORG ([table 1](#)).

The wines are considered fruitier, fresher, less vegetal and subject to less reduction than those supplemented with mineral nitrogen alone.

MINERAL / ORGANIC COMPARISON	
Number of tasters	20
Number of correctly detected differences	13
Results	99% significant difference
Preference	Organic: 13/13

**Table 1:** Triangular tasting tests (ISO 4120-2004) of red wines. Comparison of two vinified Merlot wines with 65 mg N/L nitrogen added in the form of THIAZOTE® or NUTRISTART® ORG.

# YEAST NUTRITION

The best for your yeasts

## YEAST NUTRITION - SPECIALIZED PRODUCTS

	PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
NUTRITION	THIAZOTE® PH	Alcoholic fermentation activator (diammonium phosphate and thiamine). 10 g/hL (100 ppm) of THIAZOTE® PH provides 21 mg/L (21 ppm) assimilable nitrogen.	To be determined according to fermentation conditions (Initial YAN, potential alcohol...).	1 kg 5 kg
DETOXIFICATION	BI-ACTIV®	A formulation of survival factors, yeast cell walls, inactivated yeast, and inert supporting elements. <b>To be used when fermentation slows down or becomes stuck.</b> Does not contain DAP.	30 - 60 g/hL (300 - 600 ppm).	1 kg
	OENOCCELL®	Highly purified yeast cell walls. <b>Stimulate and activate alcoholic fermentation.</b>	20 - 40 g/hL (200 - 400 ppm), depending on the type of treatment.	1 kg
SUPPORT	TURBICEL®	Cellulose powder <b>for over-clarified juice.</b> 10 g/hL (100 ppm) increases the juice/must turbidity by 20 NTU.	20 - 50 g/hL (200 - 500 ppm), depending on the turbidity correction to be made.	5 kg

# YEAST PRODUCTS

Innovations born from nature

## AROMATIC PRESERVATION



### FRESHAROM®

Specific preparation of inactivated yeasts with strong reducing power.

- Rich in reducing metabolites, **FRESHAROM®** has a much greater anti-oxidant potential than SO<sub>2</sub> or ascorbic acid.
- Promotes the assimilation of glutathione precursors (cysteine, N-acetylcysteine...) by the yeast during AF and thus increases the synthesis of this tripeptide.
- Effectively protects the aromatic potential of the wine and significantly delays the appearance of oxidized notes/ for more aromatic wines with better aging potential.
- Inhibits wine browning mechanisms.

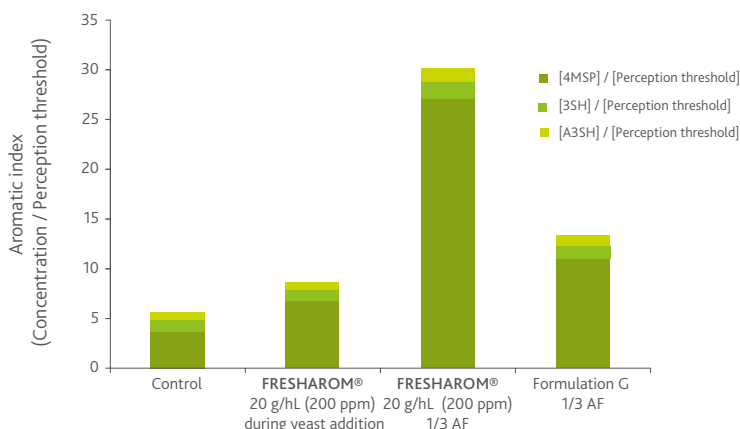
Dosage: 20 - 30 g/hL (200 - 300 ppm).

Incorporate to the tank during the first 1/3 of alcoholic fermentation.



1 kg  
5 kg

### Preservation and aromatic revelation with FRESHAROM®



*Comparison of the concentration of aromatic molecules at the end of alcoholic fermentation.*

*The addition of **FRESHAROM®** promotes a higher concentration of volatile thiols and their preservation. The time of addition is important. To be programmed during a nutritional addition or aeration, a third of the way through alcoholic fermentation.*

*Study on Sauvignon Blanc must inoculated with **ZYMAFLORE® X5**.*

## AGING ON LEES



**OENOLEES®** is an enological product derived from natural constituents found in wine and obtained using innovative and patented production processes. It is paving the way for a new type of enology: more natural, more specific while enhancing and preserving the integrity of wine.

### OENOLEES®

Specific preparation based on yeast cell walls and inactivated yeasts with a high sapid peptide content (Patent EP 1850682).

**OENOLEES®**, the result of **LAFFORT®**'s research on the properties of yeast lees and their importance in wine, contributes towards improving the sensory quality in wine by:

- **Reducing aggressive sensations:** the cellular envelopes have a refining action that promotes elimination of certain polyphenols responsible for bitterness and astringency.
- **Increasing sweet sensations:** **OENOLEES®** has a high content of a specific peptide fraction that is released naturally by yeasts during autolysis and has an excessively low perception threshold (only 16 mg/L (16 ppm) compared to 3 g/L (3000 ppm) for sucrose).

Dosage: 20 - 40 g/hL (200 - 400 ppm).



1 kg  
5 kg

# YEAST PRODUCTS

Innovations born from nature

## SHORTER WINE AGING



### POWERLEES® *Rouge*

Formula based on inactivated yeast and  $\beta$ -glucanase, for fining during fermentation.

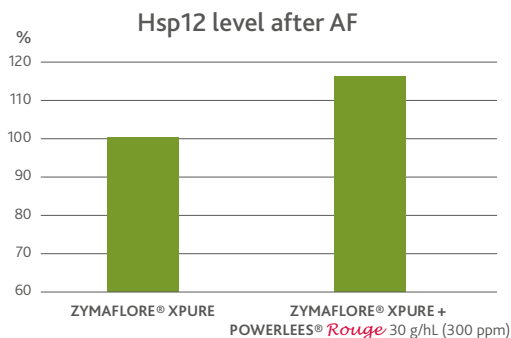
Developed by LAFFORT®, POWERLEES® *Rouge* carries inherent cell components that **soften the wine** from the beginning of the alcoholic fermentation.

- The enzyme action accelerates the sensory fining.
- Extraction of components with high sensory potential (sapid peptides from Hsp12 protein):  $\beta$ -glucanase helps the fast extraction of peptides present at the cell walls of the inactivated yeast and from yeast autolysis fragments.
- Contributes to wine stabilization through fining and the diffusion of mannoprotein fragments from yeast.
- Allows the winemaker to rebuild lees in wines racked after fermentation.
- Specialty adapted to quick-to-market wines.

Dosage: 15 - 40 g/hL (150 - 400 ppm).

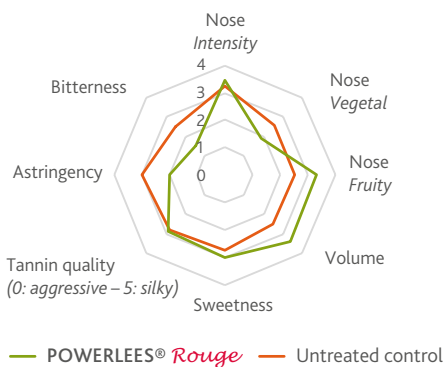


1 kg



*POWERLEES® Rouge* allows, from the end of AF, efficient liberation of larger fractions Hsp12 sapid peptides. Fermentation under synthetic media at 25°C (77°F). Inoculation with ZYMAFLORE® XPURE at 20 g/hL (200 ppm). Hsp12 measurement via HPLC, C18. Addition of *POWERLEES® Rouge* at start of AF.

### Tasting profile after treatment with POWERLEES® *Rouge*



*Tasting profile of wines treated with POWERLEES® Rouge*  
Averages of 8 trials on red wines, treatment in AF or on finished wine.

*POWERLEES® Rouge* (20 - 30 g/hL / 200 - 300 ppm) allows for a reduction in the perception of bitter and astringent notes. The aromatic intensity of the wines is not changed but the treated wines are perceived as more fruity and less vegetal. The perception of mouthfeel is clearly improved.



# BACTERIA

## Controlling the malolactic fermentation

### WHAT ARE THE DIFFERENT TECHNIQUES OF BACTERIA ADDITION?

Fermentation management typically involves the addition of yeasts, then the addition of bacteria for malolactic fermentation (MLF) following the completion of alcoholic fermentation (AF). More and more winemakers are choosing yeast/bacteria co-inoculation, where bacteria are added before the primary fermentation is complete.

There are different techniques.

- **Early co-inoculation:** bacteria are added 24 hours after the beginning of AF. The main goal is to optimize the bacterial acclimatization and survival (close to 100% after inoculation) and to save time.
- **Late co-inoculation:** bacteria can also be added to the wine towards the end of AF, at about 3° Brix. The main goal of this technique is to prevent microbial alteration: selected bacteria will take over after yeast, and colonize the ecosystem avoiding spoilage micro-organism growth (*Brettanomyces* yeasts, biogenic amine-producing bacteria...).

These two co-inoculation techniques are also **economically significant**: the **total energy costs are greatly reduced**, since bacteria are added to a warm wine and MLF is faster. In addition, both techniques facilitate quick completion of the MLF, allowing the wine to be stabilized as soon as possible.

### WHAT ARE THE KEY POINTS AND HOW TO PERFORM A CO-INOCULATION?

SO<sub>2</sub> management on the grapes, pH, yeast strain and nutrition, maceration and fermentation temperature, bacteria strain and inoculation are extremely important factors.

In case of co-inoculation, LAFFORT® recommends the **LACTOENOS® B7 DIRECT**, **SB3 DIRECT** or **450 PREAC®** bacteria, depending on your wine conditions. Ask your LAFFORT® representative for the specific co-inoculation protocol.

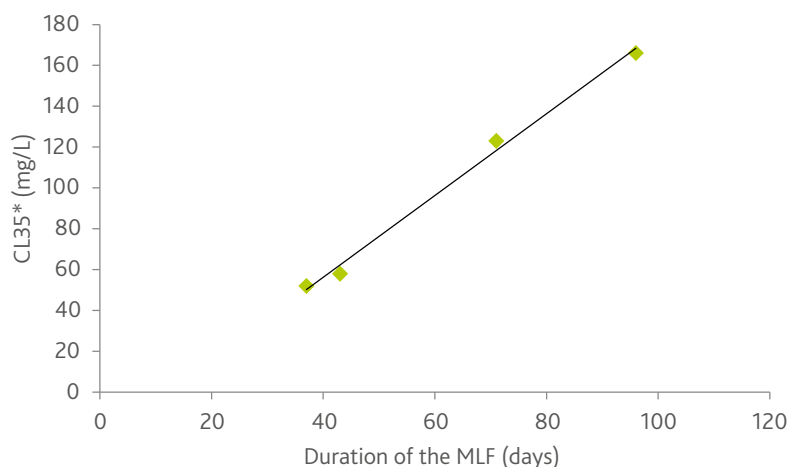


*After completion of the alcoholic fermentation, malolactic fermentation is an excellent tool to limit the production of compounds that combine with SO<sub>2</sub> in the wine.*

The bacteria are able to decompose compounds formed during the alcoholic fermentation that combine with SO<sub>2</sub>. Thus, if started as soon as the AF is complete and carried out quickly, MLF provides a reduction in the wine's SO<sub>2</sub> combination rate, which is directly proportional to the length of the MLF (see figure opposite).

\* CL35: dose of total SO<sub>2</sub> required to obtain 35 mg/L free SO<sub>2</sub>. The higher the value, the higher the content of SO<sub>2</sub>-binding components in the wine.

SO<sub>2</sub>-Binding rate and MLF duration



Source: Coulon J. & al, RDO No. 151, April 2014, p.44 - 46. Sulfite management  
How to maximize the impact of SO<sub>2</sub> while controlling its intake.

# LACTOENOS® RANGE

## Options for MLF Management

### CHOOSING THE RIGHT TYPE OF INOCULATION

INOCULATION TYPE	STAGE	RECOMMENDED LACTOENOS® PREPARATION	OBJECTIVES
Early Co-inoculation*	24 to 48 hours after the start of alcoholic fermentation.	450 PREAC B7 DIRECT B3 DIRECT	Save time and prevent degradation. Optimize management of the fermentation processes. Reduce the production of diacetyl. Aromatic freshness.
Late Co-inoculation	At 3° Brix.	450 PREAC SB3 DIRECT B7 DIRECT	Precise control of the ecosystem. Safeguarding a conventional fermentation sequence (AF followed by MLF). Aromatic freshness.
Sequential Inoculation	At dryness and post pressing.	B7 DIRECT SB3 DIRECT 450 PREAC	Red wine MLF post pressing. MLF in barrel. Thermo-fermentation. Reduce the potential of SO <sub>2</sub> to combine with wine compounds.
Curative Inoculation	To restart a stuck MLF.	B7 DIRECT 450 PREAC	Restarting stuck MLF. Spring MLF.
Preparation of a starter	Must or wine	B16 STANDARD	Sparkling base wine / low pH.

\* During the first few days of AF, must pH drops by up to 0.2 units. This parameter is to be taken into account when selecting the strain.  
Do not hesitate to contact your LAFFORT® representative to check on the inoculation time and quantity to incorporate.

### STRAIN SPECIFICATIONS

PREPARATION	ALCOHOL	pH	SO <sub>2</sub> TOTAL	TEMPERATURE
LACTOENOS® B7 DIRECT	≤ 16% vol.	≥ 3.2	≤ 60 mg/L (60 ppm)	≥ 16°C (61°F)
LACTOENOS® SB3 DIRECT	≤ 15% vol.	≥ 3.3	≤ 40 mg/L (40 ppm)	≥ 18°C (64°F)
LACTOENOS® 450 PREAC	≤ 17% vol.	≥ 3.3	≤ 60 mg/L (60 ppm)	≥ 16°C (61°F)
LACTOENOS® B16 STANDARD	≤ 14% vol.	≥ 2.9	≤ 60 mg/L (60 ppm)	≥ 16°C (61°F)

In the event of difficult or sluggish alcoholic fermentation, it is recommended to carry out a prior treatment with yeast hulls (OENOCCELL®) to reduce the fatty acid load and encourage the MLF.

# LACTOENOS® RANGE

## Options for MLF Management

BACTERIA



### LACTOENOS® B7 DIRECT

Direct inoculation bacteria.

- A strain that performs reliably in wide-ranging conditions of pH, alcohol, SO<sub>2</sub>, temperature and tannic structure, in red, white and rosé wines.
- The direct process allows inoculation of LACTOENOS® B7 DIRECT directly into the wine.
- With well-managed MLF the fruitiness of the wine can be retained (low VA, no biogenic amines) and the combination rate in the wine (ethanal and other molecules combining SO<sub>2</sub>) can be minimized, to achieve an increase in active SO<sub>2</sub>.
- LACTOENOS® B7 DIRECT is particularly suitable for co-inoculation on must with a pH of > 3.4 (during the first few days of AF, the pH can drop by up to 0.20 units).

Dosage: refer to the packaging.



2.5 hL  
25 hL  
250 hL



### LACTOENOS® SB3 DIRECT

Direct inoculation bacteria.

- The direct process allows inoculation of LACTOENOS® SB3 DIRECT directly into wines.
- In association with good fermentation management and correct yeast nutrition, LACTOENOS® SB3 DIRECT can be inoculated at the start of alcoholic fermentation (early co-inoculation) and ensures rapid MLF immediately afterwards.

Dosage: refer to the packaging.



25 hL  
250 hL

### LACTOENOS® 450 PREAC

A pre-acclimatized bacteria distinguished by its high malolactic activity.

- Strong implantation capacity in wines at any stage of its inoculation in wine or must (pH, fatty acids...).
- Especially selected for its resistance to **high alcohol** (up to 17% vol).
- An exclusive production process, developed by LAFFORT®, that ensures a higher bacterial survival rate and a shortened lag phase. ENERGIZER® starter supplied with the bacterium.

Dosage: refer to packaging.



50 hL  
250 hL

### LACTOENOS® B16 STANDARD

Bacteria to be reactivated in the form of a starter.

- Strain selected on a low-pH base wine, particularly suitable for the production of sparkling wines and wines at low pH.
- The adaptation is made by *pied de cuve* (multiple step protocol, 3 to 5 days duration, please refer to package label or product data sheet). The activator is supplied with the bacterium.

Dosage: refer to packaging.



50 hL  
250 hL



In instances where the wine displays limiting characteristics (low pH, high level of clarification, high TA or SO<sub>2</sub> levels, nutritional deficiencies, problematic AF...), the addition of an MLF nutrient is essential for the activation and progress of MLF.

MALOBOOST®, nutrient specific for bacteria.

See P. 33

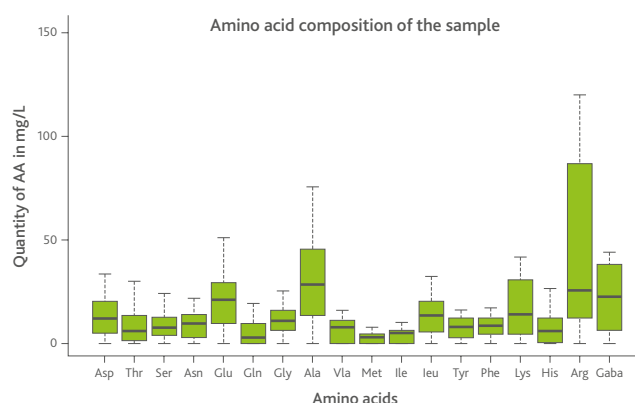
# LACTIC ACID BACTERIA NUTRITION

Bacteria have specific nutritional needs that cannot be compared to those of *Saccharomyces cerevisiae* yeasts, which essentially require mineral and organic nitrogen in its free form.

## NUTRITIONAL NEEDS OF *OENOCOCCUS OENI*

Unlike *Saccharomyces cerevisiae*, *Oenococcus oeni* is not able to use the nitrogen contained in the  $\text{NH}_4^+$  ion (known as "mineral nitrogen"). They can however use other sources of nitrogen such as amino acids. The nature and number of these essential amino acids vary according to the strain, but there is agreement that some are indispensable to ensure growth of *Oenococcus oeni* (e.g. arginine, cysteine, glutamic acid, isoleucine, methionine, tryptophan...).

Research has also shown that only a minimal concentration of amino acids is required: as low as 2 mg/L (2 ppm) is sufficient for each amino acid under laboratory conditions. A review carried out on many wines prior to MLF enabled us to demonstrate that available concentrations of amino acids routinely are found at levels above 2 mg/L (2 ppm).



Amino acid content of wines at the end of alcoholic fermentation (data taken from the bibliography and assays on wines at the end of AF, 144 wines were examined in total - Maisonnave, personal communication).



## AMINO ACIDS ARE NOT THE ONLY REQUIRED NUTRIENT...

Free amino acids are not the only source of nitrogen that *Oenococcus oeni* can use, and the species seems to favor more complex sources, which it can use thanks to proteolytic enzyme activities. Studies have highlighted the positive impact of the presence of small peptides (0.5 - 10 kDa) in the medium for the growth of *Oenococcus oeni*. These peptides are found in certain yeast derivatives which can then serve as a source of bacterial nutrition.

	GROWTH / MLF ACTIVITY	PERCENTAGE OF FREE AMINO ACIDS IN THE TOTAL ORGANIC NITROGEN
Derivative A	+	71%
Derivative B	++	65%

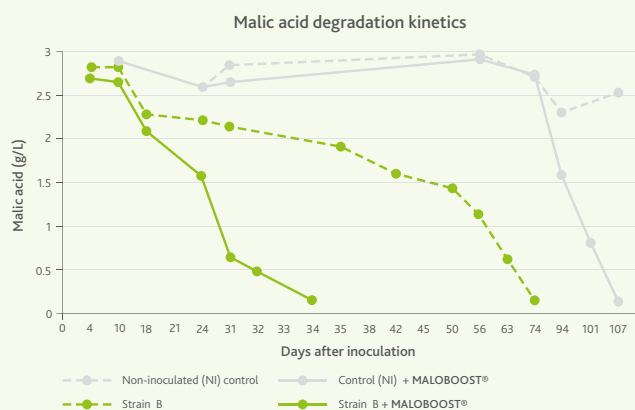
	PERCENTAGE OF PEPTIDES IN THE TOTAL ORGANIC NITROGEN		
	< 0.5 kDa	< 0.5 - 10 kDa	> 10 kDa
Derivative A	24%	< 10%	< 5%
Derivative B	< 5%	35%	< 5%

Link between the capacity for growth of a model *Oenococcus oeni* strain and the peptide content of the yeast derivative used in the culture medium (after Remize et al., 2005).

With a comparable free amino acid content, the growth of *Oenococcus oeni* is favored in the medium enriched with yeast derivative B, containing the highest percentage of medium-sized peptides (between 0.5 and 10 kDa).



Work carried out by LAFFORT® and by teams of independent researchers enabled us to rely on robust data in order to select specific yeast derivatives for the formulation of MALOBOOST®.

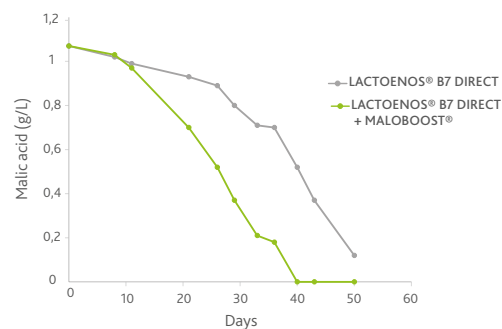


Study of a Cabernet Sauvignon wine reluctant to go through MLF (ABV: 14.04% vol.; pH: 3.62; L-malic acid: 3.34 g/L). Comparison of MLF carried out with and without inoculation with selected lactic acid bacteria at 1 g/hL (10 ppm).

Addition of MALOBOOST® (30 g/hL / 300ppm) 24 hours before adding bacteria for the inoculated wine and at the same time for the non-inoculated wine. Temperature of the trial: 18°C (64°F).

MALOBOOST® significantly improves the MLF kinetics in wine inoculated with MLB, and allows the initiation and completion of MLF in wine uninoculated with MLB.

## MLF: utility of MALOBOOST® in difficult conditions

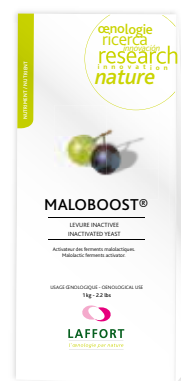


During inoculation with bacteria, the addition of a nutrient such as MALOBOOST® allows for full completion of the MLF in a shorter time

Chemical analysis of the wine at the end of AF

Merlot: 14.6% vol. ABV | pH 3.43 | L-malic acid 1.07 g/L | MLF temperature: 20°C (68°F). Population of indigenous lactic acid bacteria detected by Epifluorescence: 10<sup>5</sup> cell/mL.

MALOBOOST® dose: 30 g/hL (300 ppm)



## MALOBOOST®

Nutrient adapted to the specific nutritional needs of lactic acid bacteria (*Oenococcus oeni*). Promotes a rapid start to the malolactic fermentation and optimal kinetics.

Facilitating all MLFs, MALOBOOST® is used to:

- Start and complete MLF more quickly.
- Help to restart stuck or sluggish MLFs.
- Encourage MLF under difficult conditions (Low temperature and pH, high alcohol).

Dosage: 20 - 40 g/hL (200 - 400 ppm).



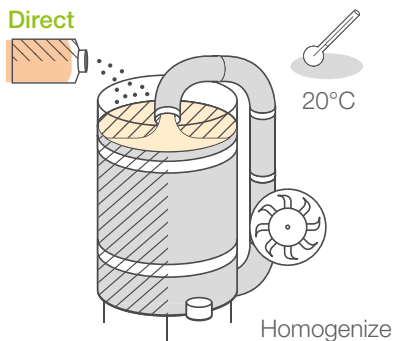
# LACTOENOS® RANGE

## Options for MLF Management

LACTOENOS® DIRECT

### DIRECT INOCULATION

Direct



- Early co-inoculation  
24 - 48 h after start of AF.  
(16 - 30°C / 60 - 86°F)
- Late co-inoculation  
3 Brix (< 26°C / < 78°F).
- Sequential inoculation  
After AF, at drain & press  
(20 - 22°C / 68 - 71°F).
- Curative inoculation  
(20 - 22°C / 68 - 71°F).

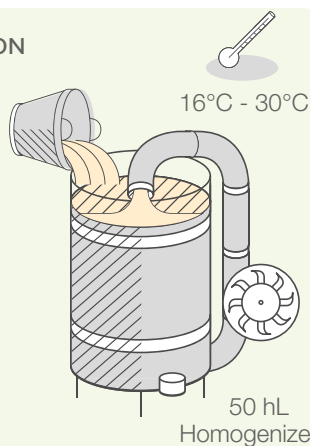
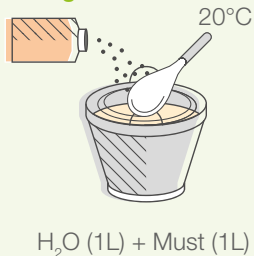
LACTOENOS® PREAC

### INOCULATION WITH ACCLIMATIZATION

#### EARLY CO-INOCULATION

Preparation step

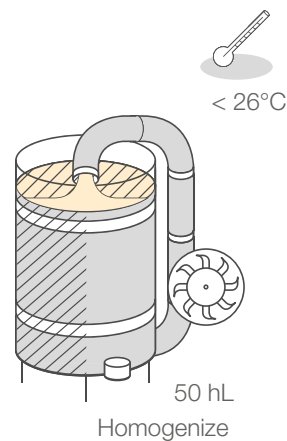
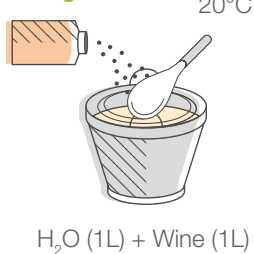
PreAc +  
Energizer



#### LATE CO-INOCULATION or SEQUENTIAL INOCULATION

Acclimatizing phase

PreAc +  
Energizer



**Find out more:** Discover our **MALOLACTIC FERMENTATION RESTART PROTOCOL** on our website, in the **LAFFORT & YOU** section.

# ENZYMES

## Natural accelerators

### USE OF ENZYMES IN ENOLOGY

Although enzymes are naturally occurring in grape berries and wine microorganisms, they are found in varying concentrations.

- Their addition during fermentation promotes clarification and the extraction of skin compounds of interest and optimizes pressing.
- Mastery of the use of enzymes allows for a reduction in the use of other inputs.

### ENZYMOLOGY AND BIOCHEMISTRY: BEHIND THE SCENES OF ENZYME FORMULATION.

Enzymes are highly-specific complex catalytic proteins. In the wine industry, the most common principal activities are the pectinases (polygalacturonase [PG], pectin methyl esterase [PME], pectin lyase [PL], arabinanase, rhamnogalacturonase and galactanase). In addition, there are some glucanases and glycosidases complemented with many naturally occurring side activities such as hemicellulases, cellulases, and proteases.

### IMPORTANCE OF THE SECONDARY ACTIVITIES OF ENZYME PREPARATIONS

Each enzyme preparation is a unique cocktail of activities that depend on the strain of fungus, such as *Aspergillus niger*, *Aspergillus aculeatus*, and *Trichoderma harzianum*. Each of them produces specific enzymes to grow and to best adapt to its own environment. The diversity of natural environments leads to varied enzyme spectra for each strain. Significant expertise is required for the selection of strains as well as their industrial and secure production.

### WHY DIFFERENT FORMS?

☼ **Microgranulate** offers easy room temperature storage and best stability. Their activity remains stable and are at no risk of microbial contamination even after opening.

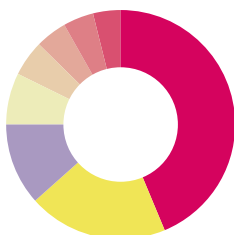
💧 **Liquid** enzymes are the most convenient to handle and dose but require cold storage. These enzymes require dilution for even distribution into grape must and wines. They should be stored in a cool place they have a shorter shelf life as their micro biological stability is harder to guarantee.

**P** *Purified enzymes are identified by this logo in our catalog.*

#### EXAMPLE OF TWO DIFFERENT ENZYMATIC SPECTRA FOR THE SAME STRAIN OF *ASPERGILLUS ACULEATUS*:

distribution of activities from a quantitative and qualitative point of view.

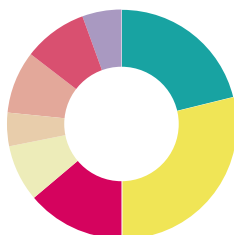
Strain n° 1 - *Aspergillus aculeatus*



Top 8 activities > 75 %  
Rest of activities < 25 %

■ Cellobiohydrolase (cellulase)  
■  $\beta$ -mannosidase ( $\beta$  D Mannanase)  
■ Pectin Methyl-esterase (PME)  
■ Endo- $\beta$ -1,4-glucanase (Cel)  
■ Pectin lyase (PL)

Strain n° 2 - *Aspergillus aculeatus*



Top 8 activities > 70 %  
Rest of activities < 30 %

■ Rhamnogalacturonase (Rgases)  
■ Endo- $\beta$ -1,4-Mannanase  
■ Endo-polygalacturonase (Endo-PG)  
■ Exo-polygalacturonase (Exo-PG)

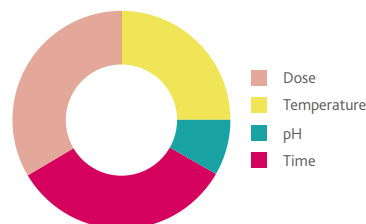
*Each enzyme preparation is selected for its robustness, its performance but also for its very specific technical applications.*

#### MANAGEMENT OF ENZYME ACTIVITY FOR OPTIMAL PERFORMANCE:

The four criteria – dose, must or wine temperature, pH, and time – have a major impact on enzyme performance and they are interrelated. Each parameter can be modified according to the application and the winemaker's technical constraints.

The choice of enzyme preparation and dose is made based on:

- **The technical objective:** clarification, extraction, pressing, filtration...
- **The matrix:** must, grapes, wine, color, grape variety.
- **The time of action possible:** related to the winery's procedures.



# ENZYMES

## Natural accelerators

Process

	<div>LAFASE® HE GRAND CRU</div> <div>LAFASE® FRUIT</div> <div>LAFAZYM® CL</div> <div>LAFAZYM® PRESS</div> <div>LAFAZYM® EXTRACT</div> <div>EXTRALYSE®</div> <div>LAFAZYM® AROM</div> <div>LAFAZYM® THIOLS<sup>[+]</sup></div> <div>LAFASE® BOOST</div> <div>LAFAZYM® 600 XL<sup>CE</sup></div> <div>LAFASE® XL PRESS</div> <div>LAFASE® XL CLARIFICATION</div> <div>LAFASE® XL EXTRACTION ROUGE</div> <div>LAFASE® XL FLOT</div>												
Form	⚙	⚙	⚙	⚙	⚙	⚙	⚙	⚙	⚙	⚙	⚙	⚙	⚙
CE - Purified preparation	✓	✓	✓	✓	✓	✓	*	**	**	✓	✓	**	**
Pre-fermentation maceration	●	●			●						●		●
Conventional red wine maceration	●	●			●								●
Pressing				●							●		
Enhances the thiols revelation in wines***								●					
Clarification of white and rosé musts			●					●	●		●		
Clarification at low temperature (≤ 5°C)			●					●	●	●			
Flotation			●					●	●	●	●	●	●
Clarification of red grape musts treated by thermo-vinification									●		●		
Clarification of wines (free-run and/or press)			●		●			●	●	●	●		
Lees aging					●								
Filtration and/or botrytized harvests					●								
Aroma release						●							

✓ = Purified in order to optimize the required actions.

\* *Cinnamoyl esterase* (CE) is inhibited by 3% ethanol; purified preparations are not necessary during use of these enzymes.

\*\* Enzymes produced by means of technology maintain unwanted activity at non-significant levels.

\*\*\* Acts in synergy with specialty yeast with thiol production abilities (ZYMAFLORE® X5, DELTA, VL3...).

### Legend

⚙ Microgranulate

● Liquid

● Red

● White

● Rosé



# PRESSING AND SKIN CONTACT FOR WHITE AND ROSÉ WINES

Natural accelerators

ENZYMES

## USING ENZYME PREPARATIONS ON GRAPES:

- Optimize press cycles: filling the press (facilitate juice draining). Improve yields by facilitating juice extraction at lower pressure and limiting mechanical action. Reduce the length and number of press cycles.
- Improve the clarification and filterability of press juice.

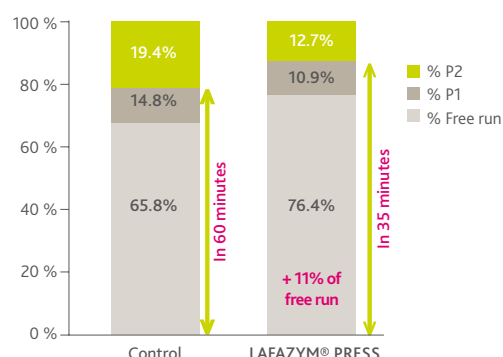
### LAFAZYM® PRESS

Pulp extraction   
Secondary activities 

Specific to pressing white harvests and red grapes for the production of rosé and sparkling wine, to optimize volumes of quality juice.

- Purified microgranulated preparation of pectolytic enzymes rich in secondary activities.
- Purified from CE; low PME in order to preserve aromatic finesse.
- Improves free run juice and first pressing yields (white and rosé).

Dosage: 20 - 50 g/ton.



The use of LAFAZYM® PRESS, compared to a control shows not only a significant process time saving, an increase in quality free run juice, and decrease in lower quality press juice yield.

  
  
100 g  
500 g

### LAFASE® XL PRESS

Pulp extraction   
Secondary activities 

Designed for pressing red and white grapes to optimize quality juice volumes in white and rosé wines production.

- Purified liquid preparation of pectolytic enzymes with secondary activities.
- Increases high-quality juice yields.
- Protects musts from oxidation.

Dosage: 10 - 40 mL/ton.

  
  
1 L  
10 L

## SPECIFIC OBJECTIVE: PRE-FERMENTATION SKIN CONTACT

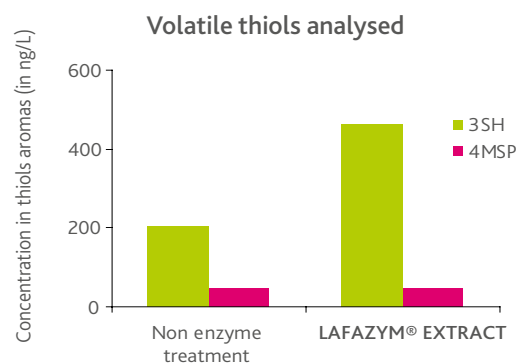
### LAFAZYM® EXTRACT

Pulp extraction   
Secondary activities 

Designed for pre-ferment skin contact at low temperatures.

- Microgranulated preparation of pectolytic enzymes with secondary activities.
- Helps reduce maceration duration.
- Allows for varietal aroma and precursor extraction, increases the aromatic potentials of must.
- Purified from CE to help preserve aromatic finesse of wines.
- Improves drain or free run juices yields and clarification.

Dosage: 20 - 30 g/ton.



3SH: 3-sulfanyhexanol (grapefruit and passion fruit).  
4MSP: 4-methyl-4-sulfanylpentan-2-one (boxwood and broom).

  
  
250 g

# AROMATIC EXTRACTION

## Natural accelerators

### LAFAZYM® THIOLS<sup>[+]</sup>

Specific for bringing out aromas in grape varieties with volatile thiol characters.

- Micro-granulated preparation of pectolytic enzymes with secondary activities.
- Acts in synergy with yeasts to bring out volatile thiols.
- Can be used on juice and added up to the first third of the alcoholic fermentation, to increase the aromatic potential of wines.

Dose: 3 - 6 g/hL (30 - 60 ppm).

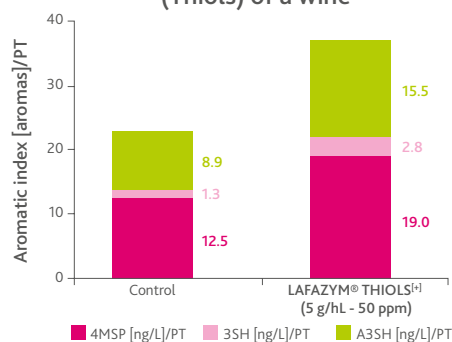
### LAFAZYM® AROM

Specific to aromatic wines made from grape varieties with terpene precursors.

- Micro-granulated preparation of pectolytic and  $\beta$ -glucosidase enzymes.
- Increases the aromatic intensity of wines made from grape varieties with glycosylated terpene and norisoprenoid precursors.

Dose: 2 - 4 g/hL (20 - 40 ppm).

### Increase in the aromatic potential (Thiols) of a wine



Experimental cellar trial - Sauvignon Blanc  
4MSP: Boxwood - 3SH: Grapefruit - A3SH: Passion fruit - PT: perception threshold

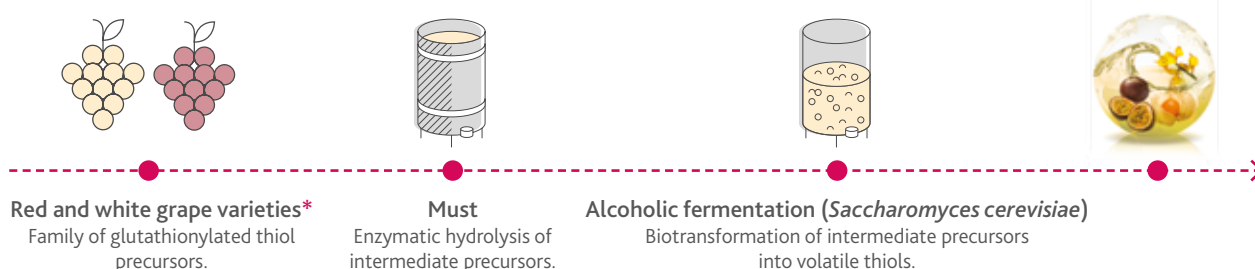


250 g



100 g

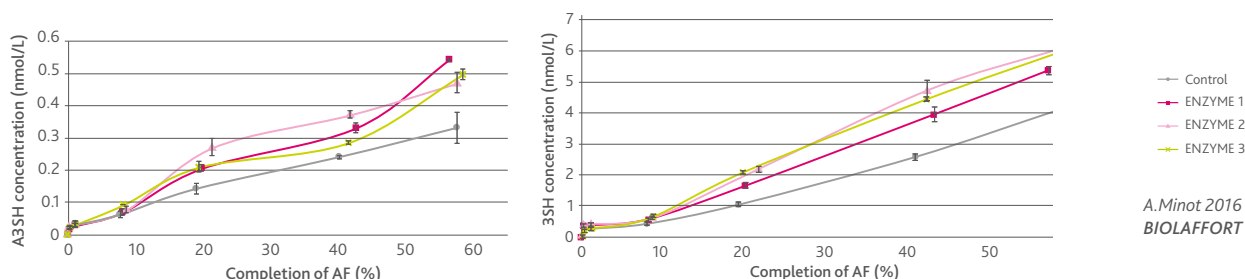
### MECHANISMS FOR BIOTRANSFORMATION OF THIOL PRECURSORS BY YEAST



\* Present in many red and white grape varieties: Sauvignon Blanc, Colombard, Petit Manseng, Sémillon, Muscadet, Pinot Gris, Pinot Blanc, Melon Bourgogne, Macabeo, Syrah, Malbec, Pinot Noir, Grenache, Gewürztraminer, Cabernet Sauvignon, Chardonnay, Negrette, Verdejo, Merlot (red & rosé), Chenin and Muscat.

Tominaga & al., 2000; Murat & al., 2001; Blanchard & al., 2004; Sarrazin & al., 2007.

### INCREASING THE BIOTRANSFORMATION OF VOLATILE THIOLS (3SH AND A3SH) THROUGH THE ADDITION OF ENZYME PREPARATIONS



Enzyme preparations at 5 g/hL (50 ppm) compared with a control with no enzyme addition - A3SH: Passion fruit - 3SH: Grapefruit

A. Minot 2016  
BIOLAFFORT

### HOW TO OPTIMIZE THE BIOTRANSFORMATION OF THIOLS DURING ALCOHOLIC FERMENTATION?

- By using a yeast with the ability to release and convert volatile thiols: ZYMAFLORE® X5, DELTA and VL3.
- By adding an enzyme preparation capable of promoting release of thiols by the yeast LAFAZYM® THIOLS<sup>[+]</sup>.

# WHITE & ROSÉ WINE CLARIFICATION

## Natural accelerators

### USING ENZYMES TO CLARIFY JUICE AND MUST:

Qualitative and quantitative optimization of clarification:

- Rapid depectinization for optimized flocculation and clarification.
- Improve compaction of solids and facilitate degradation of the pectin chain.
- Increase the proportion of clear juice: contribute to the aromatic finesse of the wine.

### LAFAZYM® CL

Lees compaction	●●●●●
Depectinization	●●●●●
Secondary activities	●●●●●

Designed for juice clarification maximizing grape potential with respect for terroir of juice for the production of superior white wines.

- Microgranulated preparation of pectolytic enzymes rich in secondary activities.
- Improves lees settling and compaction.
- Increases the volume of clear juice.
- Purified from CE to help preserve aromatic finesse of wines.

Must dosage: 0.5 - 2 g/hL (5 - 20 ppm).



100 g  
500 g

### LAFASE® XL CLARIFICATION

Lees compaction	●●●●○
Depectinization	●●●●○
Secondary activities	●●●●○

Designed for enhanced clarification of grape must and wines.

- Liquid pectolytic enzymes with secondary activities.
- Well adapted for fast depectinization prior to flotation.
- Allows the clarification of must from heat treatment or flash detente.
- Perfectly suited to static and dynamic clarification.

Dosage: 1 - 3 mL/hL.



1 L  
10 L

### SPECIFIC OBJECTIVE: EXTREME CONDITIONS

### LAFAZYM® 600 XL<sup>ICE</sup>

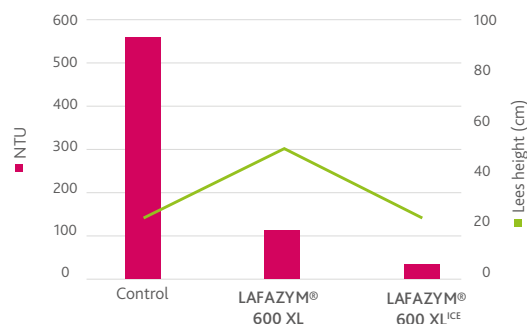
Lees compaction	●●●●●
Depectinization	●●●●●
Secondary activities	●●●●●

Specific to the rapid and effective clarification of musts over a wide range of pH (2.9 - 4.0) and temperature for the production of high-quality wines.

- Micro-granulated preparation of pectolytic enzymes with secondary activities.
- Allows rapid depectinization even at low temperature (effective from 5°C / 41°F).
- Reduces settling time and improves compaction of solids.

Dosage: 0.5 - 2 mL/hL.

### Lees height and turbidity after static settling



Comparative trial with the formulation of LAFAZYM® 600 XL<sup>ICE</sup>.  
In static settling, improvement of lees compaction and juice clarification after one night at 5°C (41°F) (trial in 250 mL Imhof cones).



250 mL  
10 L

# RED WINE EXTRACTION

## Natural accelerators

### USING ENZYME PREPARATIONS IN RED FERMENTATION:

- Improve yield of free-run wine through an increase in pulp and skin extraction of compounds of interest.
- Promote depectinization of wines at the end of alcoholic fermentation, optimize clarification of wines to facilitate their preparation for bottling.

### LAFASE® HE GRAND CRU

Cell compound extraction



Secondary activities

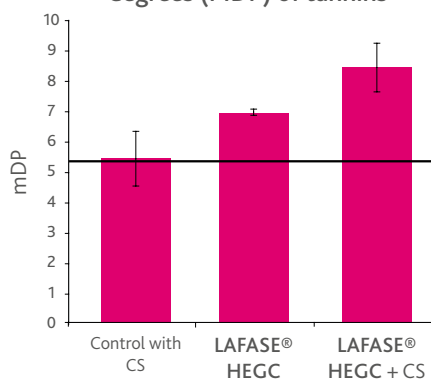


Designed for traditional macerations. Produces structured wines rich in color and elegant tannins.

- Microgranulated preparation of pectolytic enzymes with secondary activities.
- Purified from CE to help preserve aromatic finesse of wines.
- **Increases the storage potential of wines** by promoting the extraction of stable phenolic compounds and polysaccharides.
- Increases the sensation of sweetness and decreases the astringency in wines by the targeted extraction of smaller size polysaccharides (rhamnogalacturonase II) and less larger size polysaccharides (polysaccharides rich in arabinose and galactose.).

Dosage: 30 - 50 g/ton.

Comparison of mean polymerization degrees (MDP) of tannins



Enzyme: **LAFASE® HE GRAND CRU** with and without Cold Soaking (CS). Cabernet Sauvignon.



100 g  
500 g  
5 kg



### LAFASE® FRUIT

Cell compound extraction



Secondary activities



Designed for short macerations with or without pre-fermentation cold soaking.

- Microgranulated preparation of pectolytic enzymes rich in secondary activities.
- Optimizes the **fruit potential of wines** by promoting gentle extraction of phenolic compounds and aromas from the grape skin while minimizing the need for physical extraction.

Dosage: 30 - 50 g/ton.



250 g

### LAFASE® XL EXTRACTION ROUGE

Cell compound extraction



Secondary activities



Designed for maceration of red and white grapes to optimize quality juice volumes.

- Liquid pectolytic enzymes with secondary activities.
- Increases free run juice or wine yields.
- Improves grape skin compound release.
- Limits the need for physical extraction by pumping.

Dosage: 20 - 40 mL/ton.



1 L  
10 L



# RED WINE CLARIFICATION

Natural accelerators

ENZYMES

## LAFAZYM® CL

Microgranulated formulation of pectolytic enzymes rich in secondary activity for clarification, reduction in lees volume and better compaction.

- Improves filterability and facilitates the preparation of wines for bottling.
- Optimizes fining doses.

Dosage: 2 - 4 g/hL (20 - 40 ppm).



100 g  
500 g

## LAFASE® XL CLARIFICATION

Liquid formulation of pectolytic enzymes for must clarification.

Dosage: 1 - 5 mL/hL.



1 L  
10 L

**SPECIFIC OBJECTIVES: OPTIMIZATION OF MICROBIOLOGICAL STABILIZATION AND FILTERABILITY OF WINES**

## EXTRALYSE®

Enhances clarification and filtration of wines.

- Micro-granulated preparation of pectolytic enzymes with secondary activities.
- Accelerates all biological mechanisms linked to aging on lees and especially yeast autolysis.
- Improves clarification and filterability, particularly in wines from *botrytis*-affected grapes.
- Promotes the hydrolysis of long chains of colloids, which cause filter clogging.

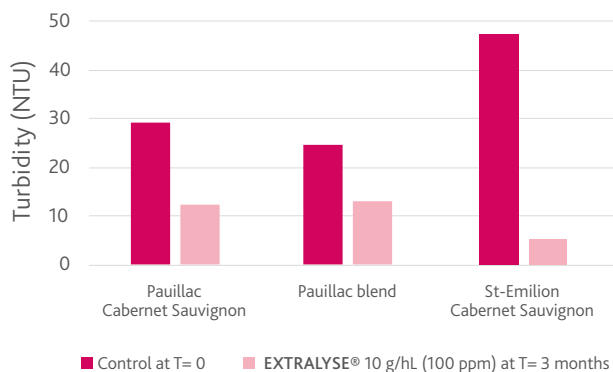
Dose depending on the application and the type of wine 5 - 10 g/hL (50 - 100 ppm).



250 g

### Improvement of clarification

Turbidity values after treatment with EXTRALYSE® at 10 g/hL.



## TREATMENT OF RED PRESS WINES

Red press wines contain very high level of solids, and contain many macromolecules that hinder clarification before blending and bottling. These large molecules, mainly polysaccharides, originate from grapes (homogalacturonans, rhamnogalacturonans RGI and RGII, PRAGS...), fermentation yeasts or contaminating fungi such as *Botrytis cinerea* (mannoproteins and glucan).

It is recommended to add the enzymes as early as possible, as soon as the wine comes off the press, for more effective treatment. Enzymatic preparations allow efficient clarification and facilitate filtration of press wines. The benefits of a well conducted enzyme addition are proven both from a technical stand point (lower filter clogging index, optimum sedimentation, reduced turbidity and more compact lees), as well as from a quality stand point (reduced oxidation, increased aroma protection) or even an economic stand point (labor and time management...).

**CONSIDER THE USE OF POLYMUST® PRESS IN COMBINATION WITH EXTRALYSE® FOR REFINING PRESS WINES. SEE P. 49**

# SPECIFIC APPLICATIONS

## Natural accelerators

### PROCESS

#### FLOTATION

##### LAFASE® XL FLOT

Lees compaction	●●●●○
Depectinization	●●●●●
Secondary activities	●●●●○

Specific for the rapid depectinization of flotation musts.

- Liquid preparation of pectolytic enzymes with secondary activities.
- Low cinnamoyl esterase activity to preserve juice quality.
- Rapid flocculation for optimised clarification.

Dosage: 1 - 4 mL/hL.



**FLOTATION**  
use in association  
with VEGEFLOT®.  
See P. 43



10 L

#### WINE FILTRATION

##### EXTRALYSE®

Specific for aging on lees and post-fermentation clarification steps.

- Microgranulated preparation of pectolytic enzymes rich in  $\beta$ -(1-3 ; 1-6) glucanase.
- Improves wines filterability and clarification especially in the case of wines affected by *Botrytis cinerea*.

Dosage: 6 - 10 g/hL (60 - 100 ppm).



250 g

#### DIFFICULT CLARIFICATION

##### LAFASE® BOOST

Designed to complement usual pectinases in essential side activities to unlock or accelerate depectinization.

- Liquid preparation of pectolytic enzymes rich in essential side activities.
- Acts in synergy with usual clarification pectinases to allow timely and complete depectinization.
- Allows to decrease the time necessary to obtain a negative pectin test and fit into winery time constraints.

Dosage: 1 - 1.5 mL/hL (in addition to the manufacturer recommended dose of usual pectinase).



250 mL

## FLOTATION

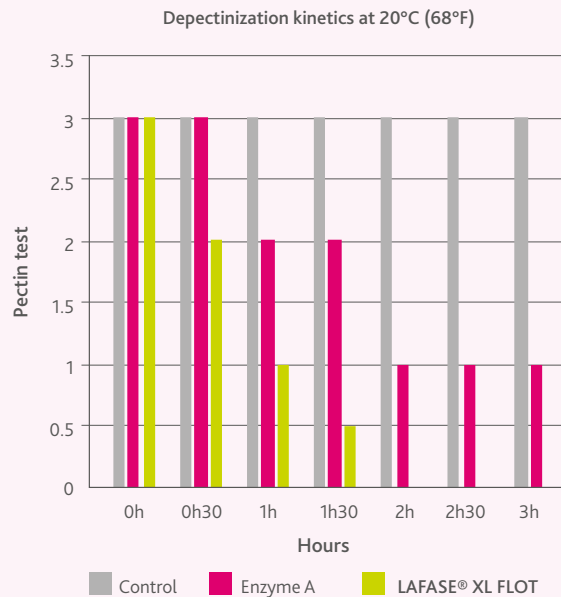


### TIME OPTIMIZATION

#### LAFASE® XL FLOT

Robust, effective and fast formulation for depectinization of juices before flotation.

Monitoring the depectinization of a Chardonnay juice (Australia) with high turbidity (> 1,000 NTU).



**LAFASE® XL FLOT** completes the depectinization in less than 2 hours.



- Liquid enzyme for very rapid depectinization compatible with flotation.
- Low cinnamoyl esterase activity to preserve juice quality.
- Dose: 1 - 4 mL/hL.

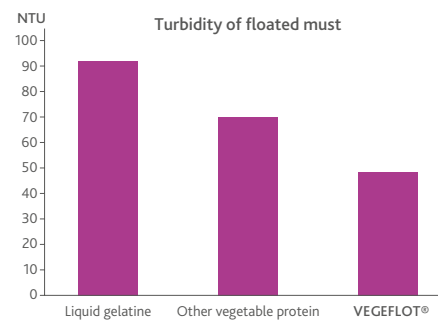
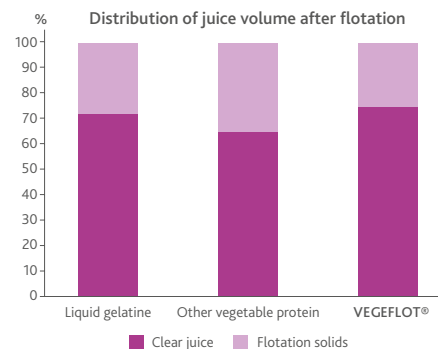
See also page 42.

### FLOCCULATION OPTIMIZATION

#### VEGEFLOT®

Improvement of flocculation and action on phenolic compounds.

Better juice yield and high clarification power in the liquid phase.



Flotation of an Airén must - Pressure: 5 bar.  
Finning agent doses: 15 g/hL (150 ppm) - Time: 150 min.



- Non-allergenic vegetable formulation.
- Rapid flocculation.
- Broad spectrum of action on phenolic compounds.
- Dose: 10 - 20 g/hL (100 - 200 ppm).

See also page 48.

# RED EXTRACTION ENZYMES

## THE COMPLEXITY OF PECTIN STRUCTURE AS A FUNCTION OF THE LOCATION OF THE GRAPE BERRY CELLS.

### PULP CELLS

Pectin structure: mainly composed of galacturonic acid, with little branching. This constitutes the **main, linear chain of the pectin**.

Technical objectives of the enzyme:

- Optimization of pulp extraction while pressing.
- Optimized depectinization and clarification of juices.

For this application, a suitable enzymatic formulation must mainly be **composed of pectinases (PL, PG and PME\*)**.

### PULP - SKIN CELLS

Pectin structure made up of linear parts (main chain) and branched portions (secondary chains).

Technical objectives of the enzyme:

- Extraction of compounds of interest.
- Increase in juice extraction yield.
- Depectinization and clarification of juices and wines.

For this application, the enzyme formulation must combine the main activities (PL, PG and PME) **and secondary activities** that promote the degradation of the branched portions and give the pectinases access to the main chain.

### SKIN CELLS

Pectin structure made up of linear parts (main chain) and many branched and complex portions (secondary chains).

Technical objectives of the enzyme:

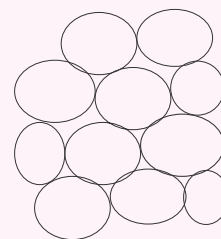
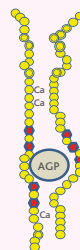
- Extraction of compounds responsible for improved mouthfeel or softening tannins, e.g. Rhamnogalacturonan II.
- Increase in juice extraction yield.
- Depectinization and clarification of wines.

For this application, the enzyme formulation must combine the main activities (PL, PG and PME) **and specific secondary activities such as Rhamnogalacturonase II** for the extraction of **positive compounds of interest**.

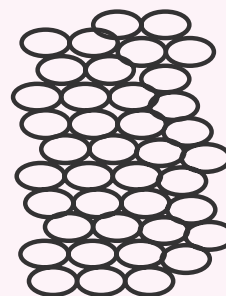
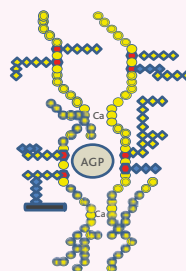


Research programme (2013-2016) - BIOLAFFORT® in collaboration with John P. Moore's team (University of Stellenbosch).

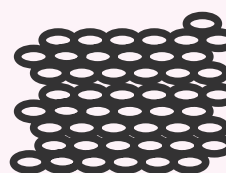
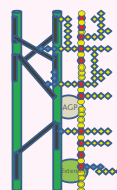
SCHEMATIC DIAGRAMS INSPIRED BY "HYPOTHETICAL MODEL OF THE GRAPE WALL", YU GAO, 2016.



PULP



PULP - SKIN



SKIN

Schematic representation of grape berry cells.

\* PL: Pectine Lyase / PG: Polygalacturonase / PME: Pectine Methyl Esterase.

## OBJECTIVES OF THIS RESEARCH PROGRAMME:

- To study the impact of enzymes during the maceration of red grapes.
- To understand the extraction mechanisms of cellular compounds under winemaking conditions for the differentiation of LAFFORT® maceration enzymes.

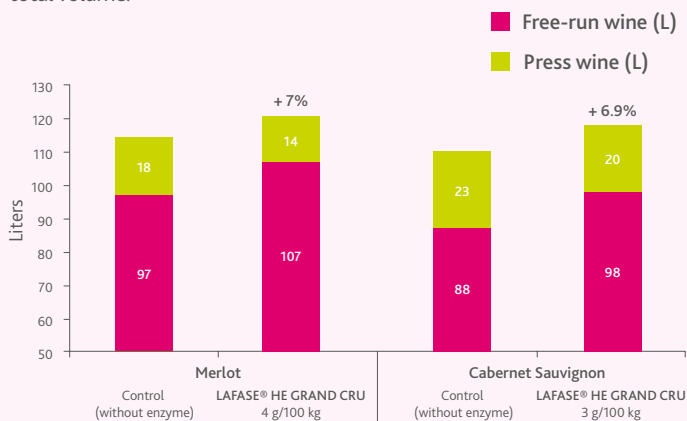
For more details, see our article "Structure de la paroi cellulaire du raisin rouge" RDO no. 172 - July 2019.

## IMPACT OF RED EXTRACTION ENZYMES ON FINISHED WINES

Actions common to all LAFFORT® red extraction enzymes.

### → QUANTITATIVE OPTIMIZATION:

Increasing the overall yield, especially free-run wine in relation to the total volume.



### Wine volumes when pressing: free-run and press wine

Pilot-scale study carried out at the LAFFORT® experimental cellar.

This tasting was carried out by 19 trained tasters on a Merlot wine after malolactic fermentation. The wine-making conditions were identical. Enzyme doses of 3.5 g/100 kg of grapes. - \*Statistically significant.

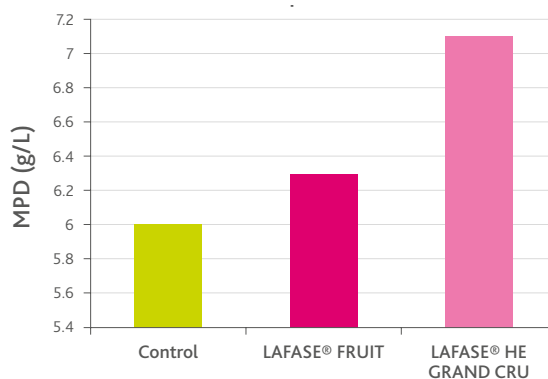
### → QUALITATIVE OPTIMIZATION:

Improving the release of compounds of interest and facilitating clarification steps for the preparation of wines for bottling.

- Promoting the release of phenolic compounds such as anthocyanins and tannins.
- Improving color stability by extracting phenolic compounds that are more stable over time.
- Contributing to the sensory quality of wines: extraction of Rhamnogalacturonan II and similar compounds which combine with tannins, leading to a reduction in astringency (Vidal 2004).
- Respecting the fruit profiles of wines through selective extraction by specific secondary enzymatic activities.
- Depectinization of wines: facilitating the filtration and clarification of wines for bottling.

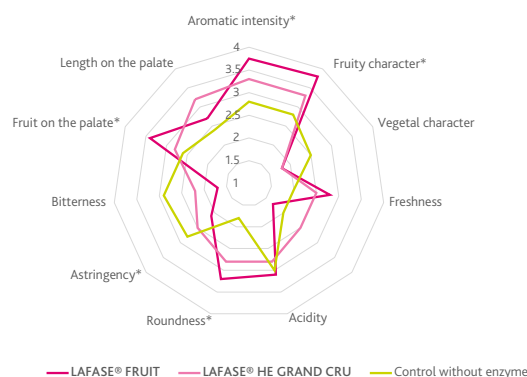
This study here under illustrates the capacity of LAFASE® FRUIT and LAFASE® HE GRAND CRU to extract cellular compounds of interest by the selectivity of their enzymatic spectrum of action.

### Average degrees of polymerization - Merlot



Study carried out at the LAFFORT® experimental cellar (2 hL tank, enzyme doses of 3.5 g/100 kg of grapes). MPD is a marker for the extraction of skin tannins. A higher value corresponds to more supple tannins.

### Descriptive sensory analysis - Merlot





# VEGETABLE PROTEIN

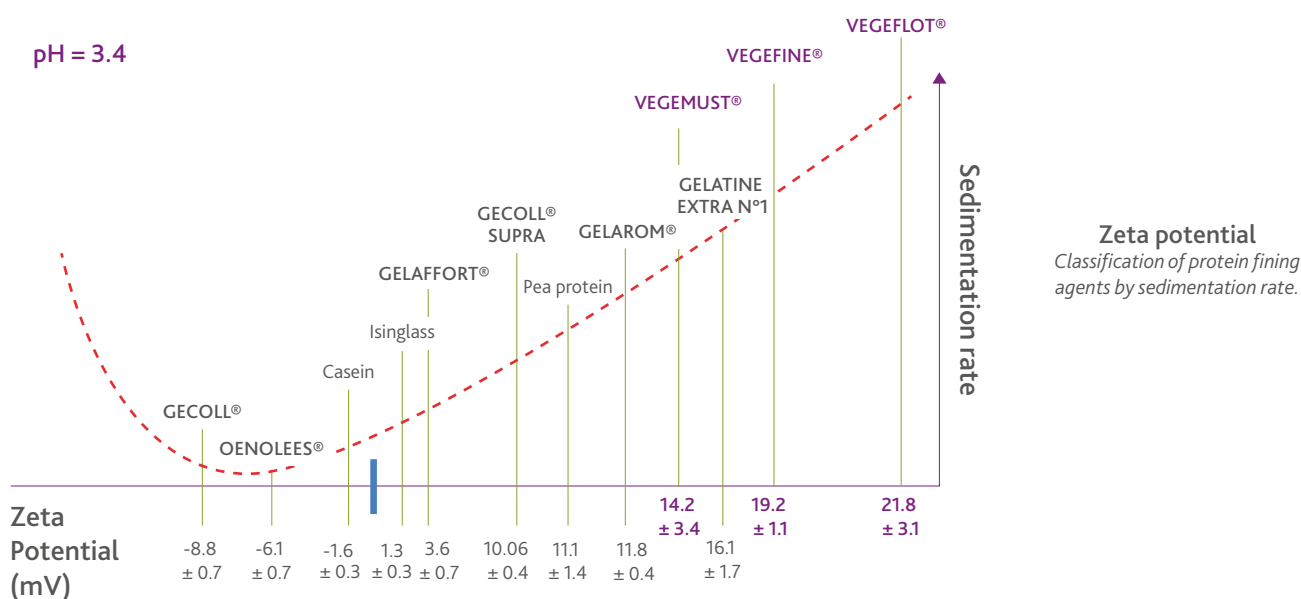
## Potato Protein Isolate & Pea

### FINING AND ZETA POTENTIAL

The addition of a protein fining agent to must or wine causes flocculation. The formation of flocs, and their sedimentation over time, leads to clarification.

Flocculation results from the interaction of the fining agent proteins with polyphenols in musts and wines. Polyphenols group together under hydrophobic forces and are made unstable through attractive interactions with proteins. The flocs thus formed tend to grow, group together and precipitate. Their precipitation leads to the sedimentation of suspended particles and clarification of the wine. Not all plant proteins have the same ability to develop these interactions.

The Zêta potential is a measure of this capacity for attractive interactions. The speed of clarification depends on its value and the size of the particles (Iturmendi et al., 2012). For faster clarification the zeta potential values should be high (positive and negative).



#### ZETA POTENTIAL OF PROTEIN FINING AGENTS AS A FUNCTION OF PH.

Typically, most proteins lose some of their effectiveness at higher pH.

		ZETA POTENTIAL (MV)	
		pH 3.4	pH 3.8
Animal origin	Food-grade gelatines of animal origin	-8 to 16	-8 to 10
	Egg albumin	15	11
	Isinglass	1.3	2.8
	Casein	0.5	≈0
Vegetable origin	Pea protein	11	-3
	VEGEFINE®	19.2	11.47
	VEGEMUST®	14.2	9.5
	VEGEFLOT®	21.8	11.2



Thanks to their potato protein isolate fractions, VEGEFINE®, VEGEMUST® and VEGEFLOT® retain strong activity over a broad spectrum of pH.

# VEGETABLE PROTEIN

## Juice Fining



FINING

### VEGEFINE®

Vegetable protein (potato protein isolate), for the clarification of musts and wines.

- Non-animal, non-GMO protein.
- Strongly reactive with phenolic compounds.
- Low quantity of lees after sedimentation.
- No risk of over-fining.
- Preservation of aromas.

Dosage:

\*Fining free-run white and rosé juices for preventive and curative treatment of oxidation: 5 - 30 g/hL (50 - 300 ppm).

\*Fining press juices (low pressure) to eliminate oxidized phenolic compounds: 10 - 50 g/hL (100 - 500 ppm).



### VEGEMUST®

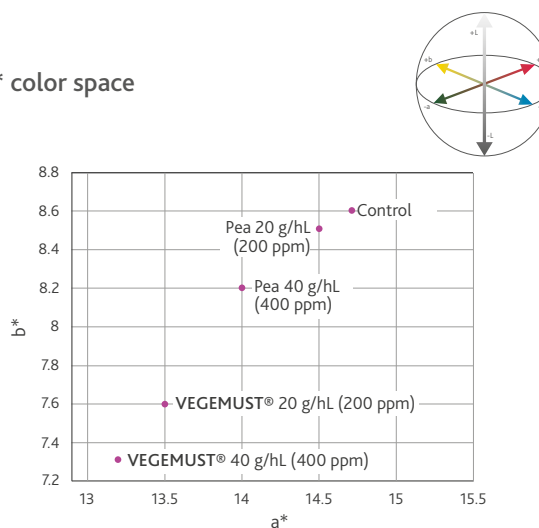
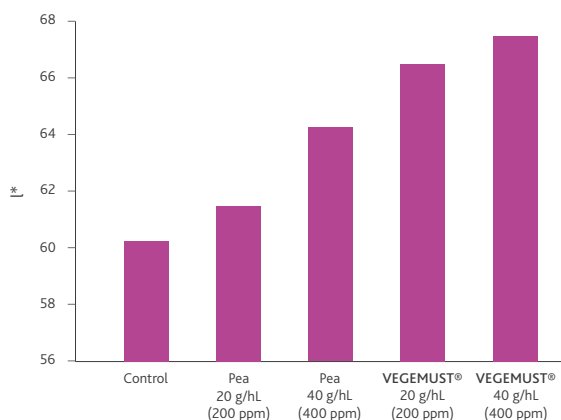
Specific combination of vegetable proteins (potato protein isolate & pea) with a high flocculation capacity, suitable for static cold settling and fining in fermentation.

- High zeta potential, synergistic effect of the proteins.
- High sedimentation rate.
- The presence of potato protein isolate helps to reduce the risks of wine oxidation at an early stage.
- Better juice yield (low percentage of solids).
- Flocculation capacity retained, even at high pH.
- Non-animal, non-GMO protein.
- No risk of over-fining.

Dosage: White and rosé musts: 10 - 40 g/hL (100 - 400 ppm).



CIELAB - The L\*a\*b\* color space



Addition of fining products a third of the way through fermentation, Grenache rosé, 2020  
Greater effectiveness of VEGEMUST® compared with a pea protein, for the decrease in color and the increase in clarity.

CIELAB color space: color space used to characterise the colors of musts and wines.  
For fining white or rosé musts and wines, the aim is to  $\nearrow$  L\* (increased clarity) and  $\searrow$  a\* and b\* (decrease in red and orange colors).



# VEGETABLE PROTEIN

## Juice fining

### VEGEFLOT®

Combination of vegetable proteins (potato protein isolate & pea) with high flocculation capacity, suitable for flotation. Optimized balance between plant protein sources.

- Rapid flotation, highest zeta potential.
- The presence of potato protein isolate contributes to the early reduction of oxidation risks.
- Stable flotation foams.
- Better juice yield (low percentage of lees).
- Flocculation capacity retained, even at high pH.
- Non-allergenic, non-animal, non-GMO protein.
- No risk of over-fining.

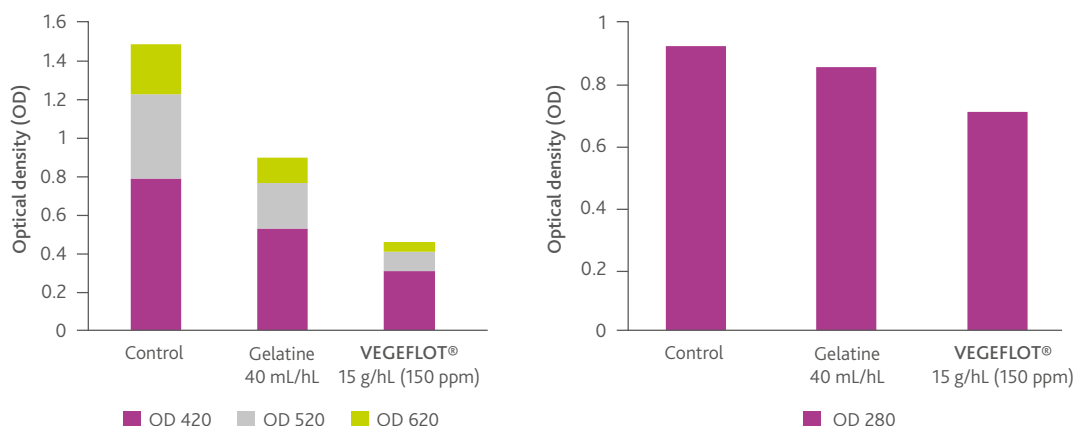
Dosage: Flotation: 10 - 20 g/hL (100 - 200 ppm) - White and rosé musts: 10 - 40 g/hL (100 - 400 ppm).

Use in association with **LAFASE® XL FLOT** - See **FOCUS FLOTATION P. 43**.



1 kg

Flotation of a Pinot Gris must, South Africa, 2020



*VEGEFLOT® more effective than a gelatine for reduction of color and total polyphenols.*

**Find out more:** watch our **FLOTATION** video on our website, in the **LAFFORT & YOU** section.

# POLYMUST® RANGE

## Juice Fining



FINING



### POLYMUST® ROSÉ

Association of PVPP with vegetable protein (potato protein isolate) for the fining of white and rosé musts and wines.

- Elimination of phenolic acids.
- Stabilization of the color of rosé musts and wines in fermentation.

Dosage: 30 - 80 g/hL (300 - 800 ppm).



### POLYMUST® BLANC

Association of vegetable protein (pea) with PVPP for the preventive treatment of oxidation in white and rosé musts.

- Prevention of oxidation.
- Elimination of oxidizable phenolic compounds liable to trap aromas and distort the color.
- Compatible with flotation and for treatment of wines.

Dosage: 30 - 80 g/hL (300 - 800 ppm).



### POLYMUST® PRESS

Association of PVPP, calcium bentonite and vegetable protein (potato protein isolate) for the preventive fining of press wines and the reduction of oxidized character.

- Preventive treatment of oxidation in white and rosé juices: elimination of oxidizable and oxidized phenolic compounds, preservation of glutathione content and limitation of browning and pinkening phenomena.
- Refining red press wines: clarification, stabilization of the coloring matter, reduction of astringency and green and metallic notes, microbiological stabilization.
- Color correction and sensory refinement of white and rosé wines.

Dosage: 15 - 50 g/hL (150 - 500 ppm) on red press wine - 40 - 100 g/hL (400 - 1000 ppm) on white and rosé press wines.



### POLYMUST® NATURE

Combination of vegetable protein (pea), sodium bentonite and calcium bentonite for fining musts.

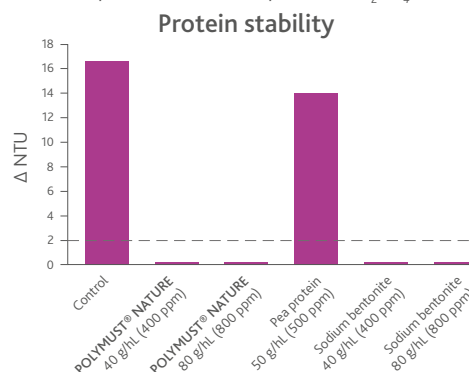
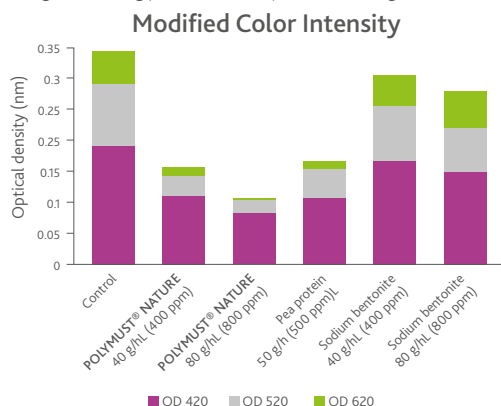
- Remarkable clarification effect.
- Preventive and curative treatment of polyphenol oxidation in white and rosé wines.
- Contributes to protein stabilization as from the fermentation phase.

Dosage: 20 - 100 g/hL (200 - 1000 ppm) white and rosé musts.



\*on demand

Fining trial during fermentation of a 2019 Sauvignon Blanc must. ABV 12% vol., pH: 3.57, TA: 3.86 expressed as  $H_2SO_4$ .



A delta NTU < 2 represents acquired protein stability according to the heat test method (reference test).

POLYMUST® NATURE provides a strong reduction in the MCI thanks to its strong reactivity with phenolic compounds. The presence of bentonite in the formulation promotes early protein stabilization as from the alcoholic fermentation.

# JUICE FINING

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
CASEI PLUS	Potassium caseinate. Treatment of <b>oxidation phenomena and maderization</b> in juice (white and rosé).	5 - 20 g/hL (50 - 200 ppm) for clarification. 20 - 60 g/hL (200 - 600 ppm) for maderization treatment and color correction.	1 kg 5 kg
POLYLACT®	Combination of PVPP and casein. <b>Preventing and treating oxidation in juice</b> (white and rosé).	Preventative treatment: 20 - 40 g/hL (200 - 400 ppm). Curative treatment: 40 - 100 g/hL (400 - 1000 ppm).	1 kg 10 kg
MICROCOL® ALPHA	<b>High quality natural sodium microgranular bentonite</b> with a high adsorption capacity. Protein stabilization in juice over a large range of pH.	10 - 80 g/hL (100 - 800 ppm).	1 kg 5 kg 25 kg
GECOLL® SUPRA	<b>Liquid gelatine</b> produced from a selection of exceptionally pure raw materials, exclusively of porcine origin. Juice clarification.	40 - 100 mL/hL.	1.05 kg 5.25 kg 21 kg
VINICLAR® P	<b>Microgranulated preparation of PVPP.</b> Preventive and curative treatment of the oxidation of juice.	20 - 50 g/hL (200 - 500 ppm).	1 kg

**Find out more:** Discover our **MICROCOL® ALPHA** video on our website in the **LAFFORT & YOU** section.



# TANNINS

## The essential element

For over 20 years, LAFFORT® has been investing in research to:

- ✓ Identify and select the best vegetal tannin sources that complement the phenolic structure of wine.
- ✓ Constantly improve production and purification methods for raw materials.
- ✓ Build a greater understanding of the enological implications of tannin usage.
- ✓ Develop the methods of tannin application in accordance with implemented enological practices.

Thanks to its expertise, LAFFORT® guarantees consistent quality formulation.

### THE PURPOSE OF TANNINS IN WINEMAKING

Hydrolyzable tannins (mainly ellagic from oak or chestnut, and gallic from chestnut galls) and condensed tannins (proanthocyanidic from grapes or exotic woods) are used in winemaking for different purposes:

- ✓ Unstable protein precipitation.
- ✓ Protection and stabilization of color.
- ✓ Protection against oxidation.
- ✓ Reductive character minimization.
- ✓ Structure enhancement.
- ✓ Improves clarification.
- ✓ Regulates redox phenomena.



### THE IDP PROCESS

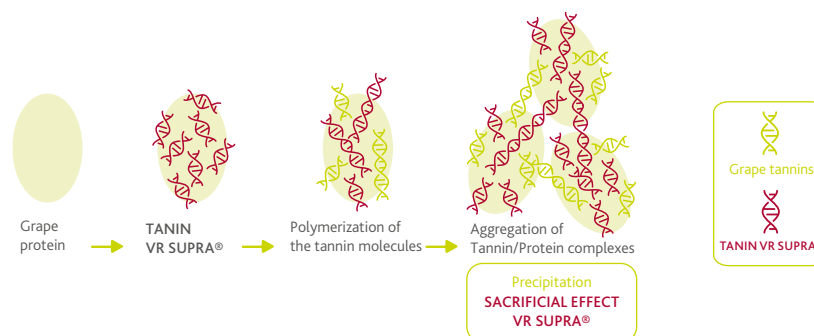
All LAFFORT® tannins benefit from the unique formulation Instant Dissolving Process (IDP); a revolutionary process for ease of use! IDP enables perfect solubility in wine and thus no preliminary dissolution of the tannins in water is required. Homogenous mixing into the bulk of the must or wine is, however, advised. It is recommended to carry out a systematic pump-over or other homogenizing action during the application.



### THE SACRIFICIAL EFFECT OF TANIN VR SUPRA® !






When grapes are crushed, the proteins in the must bind to the tannins and start to precipitate. The first tannins available are skin tannins, which are generally silkier and softer than seed tannins which are extracted later, and they are also the most important for the structure of the wine. By adding TANIN VR SUPRA® directly to grapes, the proteins in the must interact with it, thus preserving the skin tannins.

#### Model of interaction TANIN VR SUPRA® - Proteins



# FERMENTATION

The essential element

OBJECTIVE	GRAPE OR MUST TYPE	TANNIN	DOSAGE	NOTE
Botrytized grapes, anti-oxidant action, laccase inhibition.		TANIN VR SUPRA® TANIN VR SUPRA® ÉLÉGANCE	10 - 80 g/hL (100 - 800 ppm), according to the health of the grapes.	Add as soon as possible to grapes, even before arrival in the winery. Perform laccase test in case of <i>Botrytis</i> .
		TANIN GALALCOOL®	5 - 20 g/hL (50 - 200 ppm), according to the health of the grapes.	
Protein precipitation and skin tannin preservation.		TANIN VR SUPRA® TANIN VR SUPRA® ÉLÉGANCE	10 - 50 g/hL (100 - 500 ppm)	Sacrificial effect. Add as soon as possible to grapes.
Protein precipitation.		TANIN GALALCOOL®	5 - 20 g/hL (50 - 200 ppm)	
Color stabilization.		TANIN VR COLOR® TANIN VR GRAPE®	15 - 80 g/hL (150 - 800 ppm)	Add during the first third of fermentation.
Structure contribution. Compensation for tannin deficiency.		TANIN VR GRAPE® TANIN VR SUPRA® TANIN VR SUPRA® ÉLÉGANCE	10 - 40 g/hL (100 - 400 ppm) 10 - 80 g/hL (100 - 800 ppm) 10 - 80 g/hL (100 - 800 ppm)	

## TANIN VR SUPRA®

Instantly dissolving (IDP) ellagic and proanthocyanidic tannin preparation.

TANIN VR SUPRA® combines the effects of different tannins, selected and prepared for optimal technological efficiency, without adding bitterness, to facilitate:

- **Anti-oxidant** action providing protection of the must and the color.
- Wine **structure** improvement by supplementation of the midpalate.
- Inhibition of natural oxidation enzymes (laccase, polyphenol oxidase) during harvesting of *Botrytis* affected vintages (more efficiently than SO<sub>2</sub>).
- Sacrificial effect: preserves the grape tannins from precipitation with the grape proteins, to favor indigenous tannin/anthocyanin reactions.

Dosage: 10 - 80 g/hL (100 - 800 ppm).



1 kg  
5 kg

## TANIN VR SUPRA® ÉLÉGANCE

An instantly dissolving (IDP) formulation of proanthocyanin and ellagic tannins.

TANIN VR SUPRA® ÉLÉGANCE has been formulated to limit the astringency effect when tannin is added during fermentation. It allows for more precise management of extraction and maceration, mainly for the most delicate grape varieties (such as Pinot Noir) or when making red wines in a fruitier or lighter style. It is used under the same conditions as TANIN VR SUPRA®.

Dosage: 10 - 80 g/hL (100 - 800 ppm).



1 kg  
5 kg

# FERMENTATION

The essential element

## TANIN VR COLOR®

Instantly dissolving (IDP) catechin tannin preparation. Specially formulated to stabilize wine color.

TANIN VR COLOR® is a non-astringent tannin which can be integrated into all profiles of wine color.

TANIN VR COLOR® is used to improve the active tannin/anthocyanin ratio in such cases:

- Grapes harvested at sub-optimal phenolic ripeness.
- Grape varieties with a naturally poor tannin/anthocyanin ratio.
- Varieties that have **color management** problems (extraction/stabilization).

Dosage: 10 - 80 g/hL (100 - 800 ppm).



1 kg  
5 kg

## TANIN GALALCOOL®

Granulated gallic tannin preparation, to be used for white and rosé juice/must.

TANIN GALALCOOL® is a highly purified extract of chestnut gall tannins, with physio-chemical properties that are particularly well adapted to white and rose must fermentation, including:

- **Inhibition of natural oxidation enzymes** (laccase, polyphenol oxidase), more efficiently than SO<sub>2</sub>.
- Precipitation of some of the **unstable proteins**, as efficiently as bentonite but without aroma loss.
- Facilitates clarification.

Dosage: 5 - 20 g/hL (50 - 200 ppm).

**OPTION TANIN GALALCOOL® SP - See P. 63.**



500 g

## TANIN VR GRAPE®

Instantly dissolving (IDP) grape proanthocyanidic tannin preparation.

During the fermentation phase, TANIN VR GRAPE® allows:

- Compensation for **natural grape tannin deficiency**.
- Stabilization of color due to the formation of **tannin-anthocyanin** polymeric pigments.
- Thanks to the very high quality of its extraction, TANIN VR GRAPE® contains only a negligible quantity of phenolic acids (*Brettanomyces* substrates).

Dosage: 10 - 40 g/hL (100 - 400 ppm).

**OPTION TANIN VR SKIN® - See P. 62.**



1 kg

## TANIN OENOLOGIQUE

Ellagic tannins, intended for the fermentation of red, white and rosé musts.

TANIN OENOLOGIQUE is an extract of ellagic chestnut tannins, particularly suited to the protection of musts from oxidation by:

- **Inhibiting natural oxidation enzymes** (laccase, tyrosinase) in association with SO<sub>2</sub>.
- Protecting against oxygen.
- Precipitating some of the **unstable proteins**, in association with bentonite.
- Facilitating clarification.

Dosage: 8 - 15 g/hL (80 - 150 ppm).



5 kg

**Find Out More:** Discover our **IDP** video on our website, in the **LAFFORT & YOU** section.

## FOCUS

# TANIN VR SUPRA® & TANIN VR COLOR®: THE WINNING TEAM

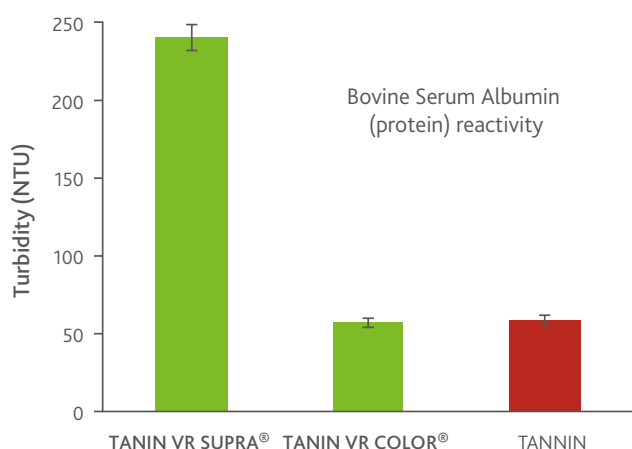
## TANNINS IN WINEMAKING HAVE 4 POINTS OF INTEREST:

- ✓ The "sacrificial" effect.
- ✓ The anti-oxidant effect.
- ✓ The co-pigmentation effect in the presence of color components.
- ✓ The effect of stabilization in the presence of acetaldehyde.

## PRECIPITATION OF PROTEINS OR "SACRIFICIAL" EFFECT

Grape proteins combine and precipitate with phenolic compounds. This precipitation reduces the natural amount of grape tannins and can be limited due to the "sacrificial" effect: by using extra tannins that will combine specifically to the proteins. This "sacrificial" effect can be evaluated in the laboratory by measuring the tannins reactivity with a reference protein such as BSA.

**TANIN VR SUPRA®** provides a **strong protective effect** for natural grape phenolic compounds. Its **reactivity is 5 times superior** than other fermentation tannins.



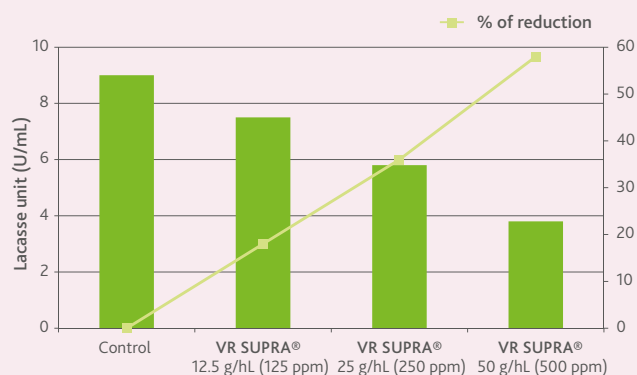
## THE ANTIOXIDANT EFFECT

The use of tannins has always been linked to their ability to moderate the effects of oxygen. They have antioxidant properties and protect the oxidizable compounds. It has been proven that **30 g/hL (300 ppm)** of **TANIN VR SUPRA®** added in increments during fermentation reduces the amount of dissolved  $O_2$  three-fold in must at the beginning of the fermentation which limits the oxidation risk of easily oxidizable compounds.



## THE INHIBITION OF LACCASE ACTIVITY

The presence of *Botrytis* is most often accompanied by a polyphenol oxidase (laccase), which is highly damaging. Due to the precipitation of proteins (the sacrificial effect) and the rapid consumption of  $O_2$  by the tannins (antioxidant effect), **TANIN VR SUPRA®** ensures an effective reduction of these harmful oxidase activities.





## FOCUS

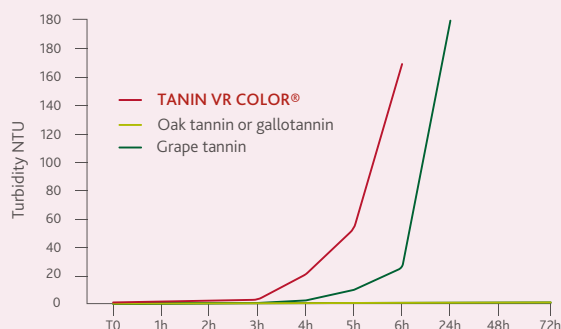
## THE CO-PIGMENTATION EFFECT

The phenomenon of co-pigmentation results from the molecular association of colored pigments such as anthocyanins with other more or less colored pigments (tannins, phenolic acids...) leading to complexes (co-pigments) having a color intensity greater than that of the colored pigment alone. Co-pigmentation seems to play an important role in the color of young wines. Red wines that are the richest in co-pigments present a more intense color from the earliest stages of winemaking and it also seems more durable over time. **TANIN VR SUPRA®** and **TANIN VR COLOR®** are two tannins with good co-pigmentation ability.

## CONDENSATION EFFECT (STABILIZATION OF COLOR)

Acetaldehyde molecules are involved in stabilizing simple colored phenolic structures through reactions leading to more complex molecules. The efficiency of the tannin/anthocyanin bond via an acetaldehyde bridge can be simply demonstrated by saturating a tannin solution with acetaldehyde and then observing the evolution of turbidity over time. A benchmarking study has been done with many tannins available on the market using this method: **TANIN VR COLOR®** was more than 100 times more reactive than the closest competitor product.

Change in turbidity



Results of ethanal test with 4 products of the market. **TANIN VR COLOR®** is the most reactive to acetaldehyde (ethanal), key step in the color stabilization and formation of tannin-anthocyanin complexes.

## SPECIFIC CASE: LACK OF PHENOLIC MATURITY

When harvest is not at optimal phenolic ripeness, the qualities of **TANIN VR SUPRA®** and **TANIN VR COLOR®** are complementary.

Thanks to its remarkable "sacrificial" effect, **TANIN VR SUPRA®** helps protect the natural extractable grape tannins from precipitating with naturally occurring proteins, while **TANIN VR COLOR®** brings balance to the tannin/anthocyanin ratio and promotes the production of stable colored compounds.

Whenever the vintage looks like a difficult one with challenges for grapes with optimal phenolic ripeness, the use of proper tannins, for example, **TANIN VR SUPRA®** and **TANIN VR COLOR®** will be a key point to successful fermentations.

	TANIN VR SUPRA®	TANIN VR COLOR®
"Sacrificial" effect	*****	*
Anti-laccase reaction	*****	**
Antioxidant effect	****	***
Co-pigmentation effect	***	****
Condensation effect (Color stabilization)	*	*****

**TANIN VR SUPRA®** is added to the must after the crusher or during the first pump over (if no evidence of *Botrytis*) (20 - 80 g/hL / 200 - 800 ppm according to the sanitary state of the harvest). **TANIN VR COLOR®** is added during the first third of the alcoholic fermentation during the color extraction phase at 10 to 30 g/hL (100 - 300 ppm).





# SPECIFIC TREATMENTS

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
CHARBON ACTIF PLUS GR	Granulated activated carbon. <b>Tint removal and decolorization.</b>	20 - 100 g/hL (200 - 1000 ppm).	1 kg 5 kg
GEOSORB® GR	Granulated activated carbon. Decontaminant for fermenting musts and new wines. <b>Reduction in geosmin and octenone content.</b>	Action on geosmin: 15 - 25 g/hL (150 - 250 ppm). Action on octenone: 35 - 45 g/hL (350 - 450 ppm).	5 kg



## OPTIMIZED DECOLORIZATION

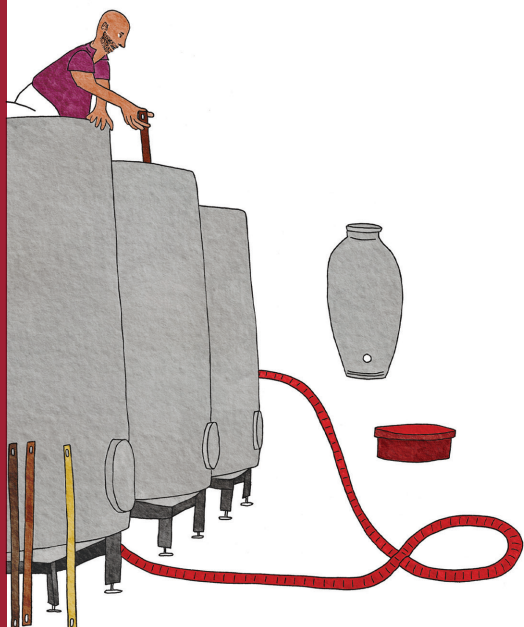
In AF, consider the combined use of POLYMUST® NATURE and CHARBON ACTIF PLUS GR.

- Color stabilization and removal of oxidized compounds.
- Selective adsorption of unstable proteins from wine, to initiate protein stabilization.

## OTHER

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
SUPRAROM®	Preparation containing condensed tannins, potassium metabisulfite and ascorbic acid. Preventive and curative treatment for must oxidation.	10 - 25 g/ton.	1 kg
SULFIREDOX	Copper sulfate solution dissolved in water at 25 g/L. <b>For the elimination of reduced character in wines.</b>	2 - 10 mL/hL	1 L





58

## YEAST PRODUCTS

POWERLEES® LIFE	58
POWERLEES® ROUGE	58
MANNOSWEET® - New in 2022	59
MANNOFEEL®	59
AUTOLEES®	60
OENOLEES®	60

61

## ENZYMES

Wine clarification	61
--------------------	----

62

## TANNINS

Aging tannins	62
QUERTANIN® range	64

66

## FINING

Sensory Refinement	66
Oxidation treatment	68

69

## STABILIZATION

Microbial stabilization	69
Colloidal stabilization	71
Protein stabilization	72
Tartaric stabilization	73

75

## CLEANING AND PRESERVATIVES



# YEAST PRODUCTS

Innovation born from nature



## POWERLEES® LIFE

Formulation of inactivated yeasts rich in reducing compounds including reduced glutathione, to conserve and refresh wines during aging.

POWERLEES® LIFE was selected during a research programme to study alternatives to sulfites for the protection of wines during their conservation. The specific inactivated yeasts that go into the composition make it possible to:

- Protect wines from premature oxidation during aging, with or without added sulfites.
- Significantly slow down the oxygen consumption by oxidizable compounds in the wine.
- Preserve wine color.
- Refresh the aromatic profile of already oxidized wines.

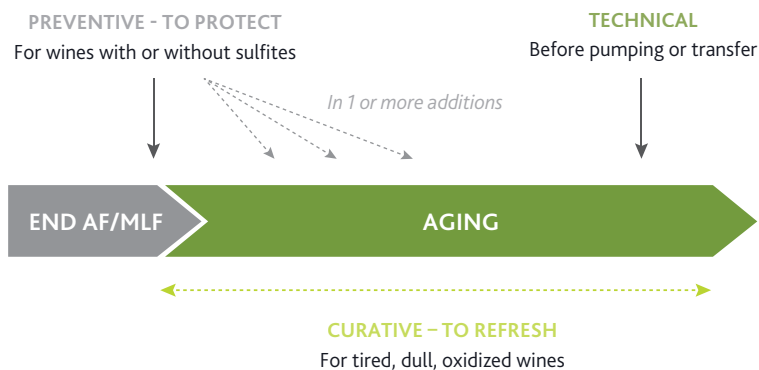
POWERLEES® LIFE can be added once or several times as from the end of fermentation and throughout the aging period. It is a complementary solution to SO<sub>2</sub> in a strategy of reducing the doses of sulfur used.

Dosage: 10 - 40 g/hL (100 - 400 ppm).



1 kg

### POWERLEES® LIFE - Possible uses



*Preventive and curative use cases for all types of wine.*



## POWERLEES® Rouge

Specific preparation of inactivated yeasts and β-glucanases, for fining wines.

Developed by LAFFORT®, POWERLEES® Rouge provides yeasts constituents that help soften wines during fermentation and aging.

- The enzyme action accelerates the sensory fining.
- Extraction of components with high sensory potential (sapid peptides from Hsp12 protein): β-glucanase helps the fast extraction of peptides present at the cell walls of the inactivated yeast and from yeast autolysis fragments.
- Contributes to wine stabilization through fining and the diffusion of mannoprotein fragments from yeast.
- Allows the winemaker to rebuild lees in wines racked after fermentation.
- Specially adapted to wines for early release.

Dosage: 15 - 40 g/hL (150 - 400 ppm).



1 kg

# YEAST PRODUCTS

Innovation born from nature

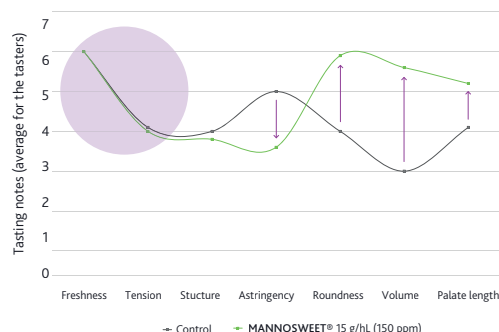
NEW IN 2022

MannOsweet®  
PURE FINESSE

100% natural preparation of specific pure mannoproteins and vegetal polysaccharides for colloidal and tartaric stabilization while preserving the sensation of volume and roundness on the palate.

- Contributes to stabilization of coloring matter with a dose of 5 g/hL (50 ppm).
- Respects the aromatic profile of the wine.
- Excellent filterability: MANNOSWEET® does not affect the filterability of the wine.
- Addition of MANNOSWEET® as a finishing treatment before bottling.

Dosage: 5 - 40 g/hL (50 - 400 ppm).



## Tasting results

Blend of Grenache / Syrah / Mourvèdre treated with 15 g/hL (150 ppm) MANNOSWEET® after 9 months' aging. In addition to contributing to stabilization of coloring matter, the wine is perceived as less astringent, rounder, with more volume and length on the palate while retaining aromatic freshness. Tasting carried out by a trained panel.

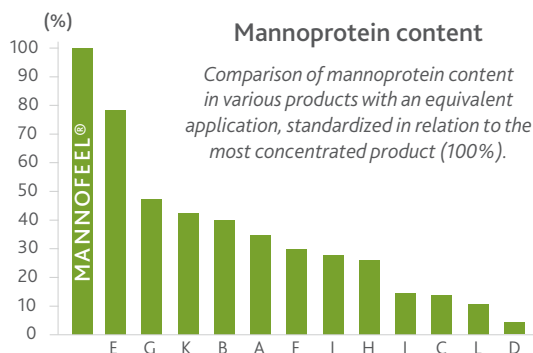


Mann(feel)®  
PURE MANNOPROTEINS

MANNOFEEEL® is the result of global research by LAFFORT® on mannoproteins to identify and understand the mechanism of action and production. The selected mannoproteins in MANNOFEEEL® significantly increase the perception of volume, roundness and length on the palate while aiding tartrate stability.

- Pure product, 100% mannoproteins. Natural compound present in wine.
- Respects the freshness and fruit in wine.
- 100% soluble with an immediate impact.
- Participates in colloidal and tartaric stabilization of wine.

Dosage: 25 - 150 mL/hL.



## MANNOFEEEL® does not alter wine filterability

		MANNOFEEEL®			
		Control	25 mL/hL	50 mL/hL	100 mL/hL
Clogging index at 1h	CI	40	40	33	38
	IVIC - 1h	1	1	1	1
Clogging index at 4h	CI	40	38	40	37
	IVIC - 4h	1	1	1	1



# YEAST PRODUCTS

Innovation born from nature



OENOLEES® and AUTOLEES® are enological products derived from natural constituents found in wine and obtained using innovative and patented production processes. These products are paving the way for a new type of enology: more natural, more specific while enhancing and preserving the integrity of wine.

## AUTOLEES®

Specific preparation of an extract of yeast cell walls (mannoproteins) rich in sapid peptides (Patent EP 1850682) and polysaccharides.

- Contributes to increasing the **sweetness** sensation in wines.
- Allows the winemaker to better **counter-balance acidity and bitterness**.
- Can be used just prior to bottling.

Dosage: 10 - 30 g/hL (100 - 300 ppm).



1 kg

## OENOLEES®

Specific preparation of yeast cell walls with a high sapid peptide content for premium red wine fining (Patent EP 1850682).

OENOLEES® contributes to improving the sensory quality of wine by:

- **Reducing aggressive sensations:** the cellular walls have a refining action that promotes elimination of certain polyphenols responsible for bitterness and astringency.
- **Increasing sweet sensations:** OENOLEES® has a high content of a specific peptide fraction that is released naturally by yeasts during autolysis and has an excessively low perception threshold (only 16 mg/L compared to 3 g/L for sucrose).

Dosage: 20 - 40 g/hL (200 - 400 ppm).



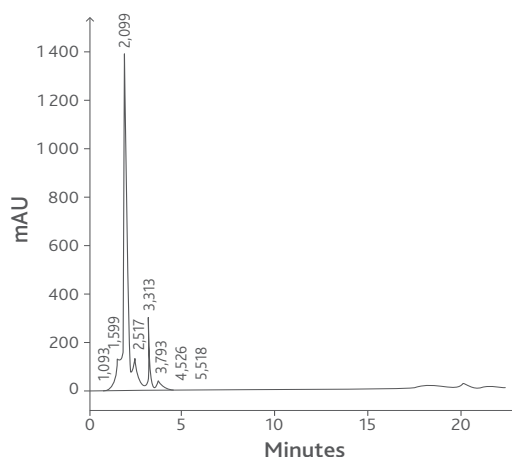
1 kg  
5 kg



## Hsp12 - PATENT EP 1850682

A large amount of R&D work (A. Humbert's thesis, 2005; Patent EP1850682, 2006; Marchal et al., J. Agric. Food Chem. 2011) have made it possible to understand the origin of the sapid fraction derived from yeast during its autolysis. These discoveries have now been used to select specific yeast derivatives, rich in sapid peptides derived from the protein Hsp12 (Heat Shock Protein, 12 kDa), for the efficient formulation of preparations such as OENOLEES® and AUTOLEES®.

*Figure: Detection by HPLC C18 RP of the peptides derived from the Hsp12 membrane protein in a fraction of derivatives from selected yeasts.*





# WINE CLARIFICATION

## Natural accelerators

### UTILITY OF ENZYME PREPARATIONS FOR WINE STABILIZATION AND PREPARATION:

Early enzyme treatment during aging secures several practical aspects of wine management:

- Clarification of finished wines: facilitates microbial management.
- Depectinization: optimizes the preparation of wines for bottling (fining, filtration).

Two formats are available:

- Microgranulated formulation: **LAFAZYM® CL** - dosage: 2 - 4 g/hL (20 - 40 ppm).
- Liquid formulation: **LAFAZYM® 600 XL<sup>ICE</sup>** - dosage: 1 - 4 mL/hL.

### EXTRALYSE®

Specific to post-fermentation clarification and aging on lees, for the production of rounded wines.

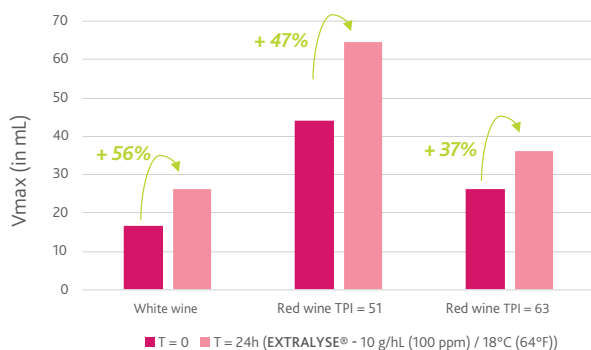
- Micro-granulated preparation of pectolytic enzymes and  $\beta$ -(1-3; 1-6) glucanases with secondary activities.
- Brings roundness and softness to the wine by releasing larger quantities of yeast-derived molecules.
- Improves the filterability and clarification of wines especially in case of wines affected by *Botrytis cinerea*.

Dosage: 6 - 10 g/hL (60 - 100 ppm).



250 g

#### Improves filterability



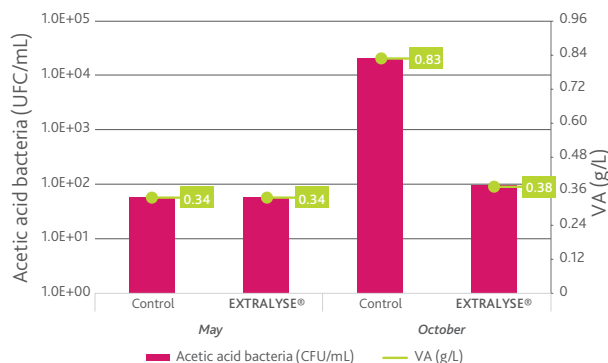
Improvement in the filterability of wines treated with **EXTRALYSE®**.

Dose: 10 g/hL (100 ppm). Contact time: 24h at 18°C (64°F).

Vmax = maximum volume at clogging.

Makes it possible to assess wine filterability.

#### Reduces the microbial load



Impact of treatment with **EXTRALYSE®** on the acetic acid bacteria population and VA of a wine during aging.

Use of **EXTRALYSE®** favors hydrolysis of long-chain colloids, responsible for clogging filters. The Vmax index shows a remarkable improvement in filterability for the wines treated with **EXTRALYSE®**.

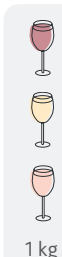
**EXTRALYSE®** decreases the microbial load in wines by promoting the sedimentation of suspended particles containing microorganisms.

### LYSOZYM

Designed for microbial management of Gram-positive bacteria.

- Micro-granulated muramidase enzyme preparation. Degrades Gram+ lactic acid bacteria cell wall.
- Delays the action of lactic acid bacteria, reducing the need for SO<sub>2</sub>.
- Strengthens the action of SO<sub>2</sub> on the sweet white wines and improves microbiological stability.
- In red winemaking, avoids premature start of MLF.





Dosage: 10 - 50 g/hL (100 - 500 ppm).



1 kg

# AGING TANNINS

The essential element

OBJECTIVE	WINE TYPE	TANNIN	DOSAGE
Balance or wine structure improvement.		TANFRESH® TANIN GALALCOOL® SP TANIN VR SKIN®	0.5 - 6 g/hL (5 - 60 ppm) 2 - 5 g/hL (20 - 50 ppm) 2 - 10 g/hL (20 - 100 ppm)
		TANIN VR SKIN® TAN'COR® TAN'COR GRAND CRU® QUERTANIN® RANGE	2 - 10 g/hL (20 - 100 ppm) 10 - 30 g/hL (100 - 300 ppm) 5 - 30 g/hL (50 - 300 ppm) 0.5 - 20 g/hL (5 - 200 ppm)
Regulation of oxidation reduction phenomena.		TANFRESH® TANIN GALALCOOL® SP	0.5 - 6 g/hL (5 - 60 ppm) 2 - 5 g/hL (20 - 50 ppm)
		QUERTANIN® RANGE TAN'COR GRAND CRU®	0.5 - 20 g/hL (5 - 200 ppm) 10 - 20 g/hL (100 - 200 ppm)
Stabilization of color.		TANIN VR SKIN® TAN'COR GRAND CRU®	20 - 40 g/hL (200 - 400 ppm) 5 - 30 g/hL (50 - 300 ppm)

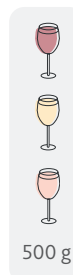
## TANIN VR SKIN®

New preparation of proanthocyanidic tannins from grape skins.

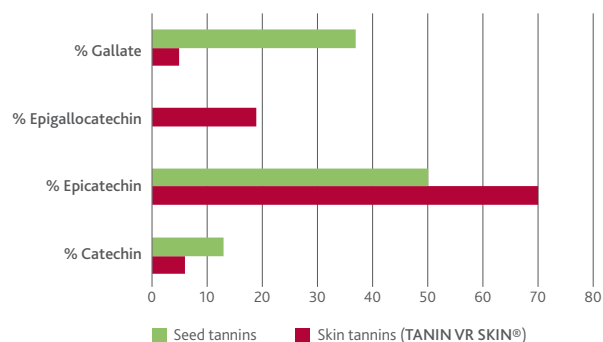
Due to its specific nature (grape skin tannin) TANIN VR SKIN® allows:

- Compensation for natural grape tannin deficiency (lack of phenolic maturity or adverse tannin-anthocyanin ratio).
- Stabilization of color due to the formation of tannin-anthocyanin combinations.
- Improved clarification.
- Refinement of wine structure and palate length.

Dosage: 5 - 40 g/hL (50 - 400 ppm).

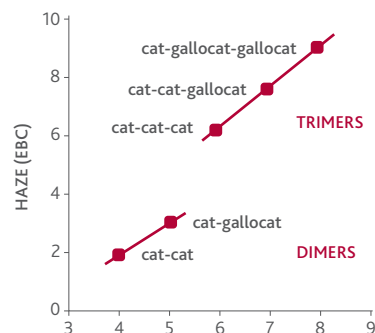


### Distribution of procyanidins in seed and skin tannins



Seed tannins have a much higher proportion of gallate substituents (37%) than skin tannins (5%), and it is these compounds that react with proteins. TANIN VR SKIN® is a preparation naturally low in gallate compounds, present mainly in the grape seed.

### Reactivity of procyanidins with proteins



The reactivity of tannins with proteins increases with the degree of polymerization but also according to the gallate content. A catechin dimer will therefore be less reactive with proteins than this same dimer bound to a gallate radical.

TANIN VR SKIN® is structurally less reactive with proteins and therefore less astringent.

**Find out more:** watch our IDP video on our website, in the LAFFORT & YOU section.

# AGING TANNINS

The essential element

TANNINS

## TAN'COR GRAND CRU®

Preparation of proanthocyanidic tannins derived from grapes and ellagic tannins from oak. Utilizes LAFFORT®'s Instant Dissolving Process (IDP). For use during red wine maturation.

After the fermentation phase or during maturation, TAN'COR GRAND CRU® is used to:

- Enhance and modify the wine's structure and palate length.
- Stabilize color by combining the remaining free anthocyanins.
- Regulate oxidation-reduction phenomena.

Dosage: 5 - 30 g/hL (50 - 300 ppm).



1 kg

## TAN'COR®

Proanthocyanidic and ellagic tannin preparation. Utilises LAFFORT®'s Instant Dissolving Process (IDP). For use in red wine maturation.

TAN'COR® combines the properties of ellagic and proanthocyanidic tannins specially prepared for the treatment of red wines after the fermentation phase or during maturation, and is used to:

- Enhance and modify the structure of the wine and prepare it for maturation.
- Protect the wine with regards to oxidation phenomena.
- Regulate oxidation-reduction phenomena.

Dosage: 10 - 30 g/hL (100 - 300 ppm).



1 kg  
5 kg

## TANFRESH®

Instantly dissolving (IDP) ellagic and proanthocyanidic tannin preparation based on grape tannins.

- To refresh white and rosé wines (against oxidation, atypical aging).
- To boost structure and mouthfeel.
- To help eliminate reductive odors.

Dosage: 0.5 - 6 g/hL (5 - 60 ppm).



250 g

## TANIN GALALCOOL® SP

Preparation of pure gallic tannins.

TANIN GALALCOOL® SP has a specially adapted formulation that respects the sensory balance of wines on the palate while maintaining the same enological properties as TANIN GALALCOOL® (See P. 53).

Dosage: 2 - 5 g/hL (20 - 50 ppm).



1 kg



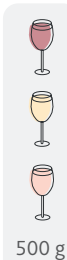
# QUERTANIN® RANGE

The essential element

## QUERTANIN® RANGE

A variety of preparations of "stave wood"- quality ellagic tannins, extracted from oak heartwood, or ellagic tannins sourced from oak heartwood and gallic tannins in instant-dissolving form (IDP), for the maturation of white, rosé and red wines.

- Regulates oxidation-reduction phenomena during maturation in barrels or during micro-oxygenation.
- With used barrels, the **QUERTANIN®** range allows the recreation of a medium rich in ellagic tannins similar to a new barrel.
- After the addition, it is recommended to carry out normal rackings until fining or bottling preparation.

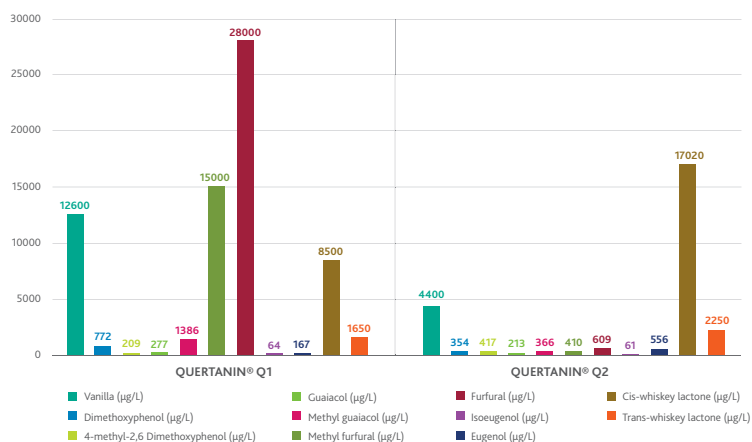


500 g



QUERTANIN® Q1	QUERTANIN® Q2
French & American oak	American oak
Medium plus toast	Heavy toast
High aromatic intensity	Medium aromatic intensity
Minimal structure impact	Significant structure impact
Vanilla, coconut, warm spice notes	Whiskey lactone (coconut) coffee, cocoa
Enhances dark fruit profile	Enhances mineral notes and refreshes fruit
Dosage: 20 - 75 ppm	

## Volatile Aromatic Compounds





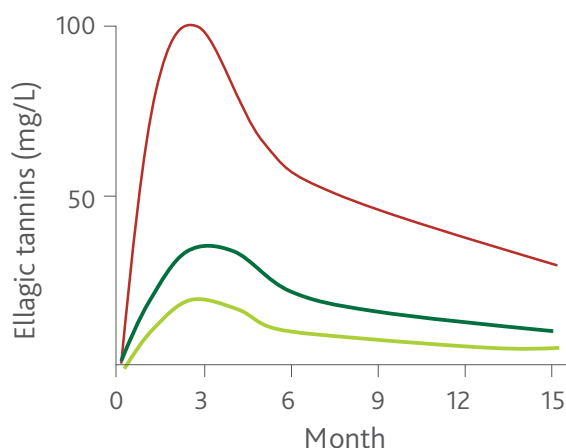
# QUERTANIN® RANGE

The essential element

TANNINS

The QUERTANIN® products are complex, high quality oak preparations. QUERTANIN® products enhance wine structure and palate length while increasing a wines aromatic profile and building complexity. The comprehensive range can improve the oak character normally imparted by oak aging, such as vanilla, mocha, and smoky-spicy clove. Each tannin in the range has a unique aroma profile, created with the different barrel toast levels as reference. QUERTANIN® can be used individually or in combination.

PRODUCTS	TYPE	APPLICATION	DOSAGE (ppm)
QUERTANIN®	Light toast French oak	Antioxidant properties to protect wine during aging. Eliminates reductive character. Lifts floral and fruit aromatics. Traditional and elegant profile.	10 - 75
QUERTANIN® SWEET	Medium toast French oak	Rich vanilla aromatics with perception of sweetness. Lifts red fruit such as cherry, red currant and strawberry. Masks green character.	20 - 100
QUERTANIN® CHOC	Medium plus toast French oak	Gives flavor profile of wine aged in new barrels. Lifts notes of blackberry, plum and blueberry. Hints of chocolate and mocha give a perception of sweetness.	20 - 100
QUERTANIN® PLUS	Medium plus toast American oak	Lifts red fruit flavors while adding warm spice aromas and caramel notes. Masks green character and adds perception of sweetness. Builds midpalate length without adding astringency.	20 - 100
QUERTANIN® INTENSE	Heavy toast French oak	Increases flavor profile of coffee, toasted almonds, spice and clove. Enhances structure and gives perception of wine aged in new barrel. Good for masking 'off' aromas.	10 - 75
QUERTANIN® Q1	Medium plus toast French & American oak	High aromatic intensity of toasted almond, vanilla and coconut, giving a perception of sweetness. Brings out dark fruit profile and enhances midpalate weight.	20 - 75
QUERTANIN® Q2	American oak	Heavy toast, medium aromatic intensity, significant structure impact, high in whiskey lactone giving notes of cocoa, coffee, toasted coconut. Refreshes fruit and mineral notes.	20 - 75



- New barrel (limousin)
- Used barrel - 1 wine (limousin)
- Used barrel - 2 wines (limousin)

Tannin content extracted from the oak is lower in used barrels. The ellagic tannin protective effect is decreased and the wine becomes subject to premature oxidation. Adding QUERTANIN® allows recreation of the buffering qualities provided by tannins extracted from new barrels thus protecting the wine from the oxidation phenomena.



# SENSORY REFINEMENT

## GELATINS

All our gelatines are of porcine origin and systematically developed according to their winemaking application.

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
GECOLL® SUPRA	Eliminates astringent tannins.	40 - 100 mL/hL	1 L 5 L 20 L
GELAROM®	Brings out the sensory potential of the wine.	30 - 60 mL/hL	1 L 5 L 20 L
GELATINE EXTRA N°1	Highly purified heat soluble gelatin. Fining of red wines for aging.	6 - 10 g/hL (60 - 100 ppm)	1 kg

## OTHER PRODUCTS FOR STABILIZATION AND SENSORY FINE TUNING

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
ICHTYOCOLLE	Fish-based (isinglass) fining agent suitable for fining fine white and rosé wines. Restores high <b>sensory clarity and remarkable brilliance</b> to treated wines.	0.5 - 1.5 g/hL (5 - 15 ppm).	250 g
SILIGEL®	Colloidal silica solution that may be used in combination with all organic fining agents.	20 - 100 mL/hL. Use 0.5 to 1 mL of <b>SILIGEL®</b> for 1 mL of gelatin. Add <b>SILIGEL®</b> prior to gelatin.	1 L 5 L 20 L
VEGECOLL®	Potato protein isolate for red wine phenolic fining during aging or pre-bottling.	3 - 10 g/hL (30 - 100 ppm).	500 g 5 kg

# SENSORY REFINEMENT

Based on vegetable proteins



## VEGEFINE®

Vegetable proteins (potato protein isolate) for wine clarification.

- Non-animal, non-GMO.
- Strongly reactive with phenolic compounds.
- Small quantity of lees after sedimentation.
- Rapid clarification.
- No risk of over-fining.

Dosage: Fining red wines: 2 - 8 g/hL (20 - 80 ppm), Fining red press wines: 5 - 15 g/hL (50 - 150 ppm),  
Fining white and rosé wines: 2 - 15 g/hL (20 - 150 ppm).



## POLYMUST® BLANC

Association of vegetable protein (pea) with PVPP for the preventive treatment of oxidation in white and rosé wines.

- Prevention of oxidation.
- Elimination of oxidizable phenolic compounds liable to trap aromas and distort the color.

Dosage: 30 - 80 g/hL (300 - 800 ppm).



## POLYMUST® ROSÉ

Association of PVPP with vegetable protein (potato protein isolate) for the fining of white and rosé wines.

- Stabilization of the color and elimination of oxidized compounds.
- When used on finished wine, it is best to rack within 5 days following treatment.

Dosage: 5 - 20 g/hL (50 - 200 ppm).



## POLYMUST® PRESS

Association of PVPP, calcium bentonite and vegetable protein (potato protein isolate) for the preventive fining of press wines and the reduction of oxidized character.

- Refining red press wines: clarification, stabilization of the coloring matter, reduction of astringency, greenness and metallic notes, microbiological stabilization.

Dosage: 15 - 50 g/hL (150 - 500 ppm) for red press wines.



## POLYMUST® NATURE

Combination of vegetable protein (pea) and bentonite (sodium and calcium) suitable for fining wine.

- Remarkable clarification effect.
- Preventive and curative treatment of polyphenol oxidation in white and rosé wines.
- Contributes to the stabilization of coloring matter in red wines.
- Contributes to protein stabilization.

Dosage: White and rosé wines: 20 - 80 g/hL (200 - 800 ppm), Red wines: 10 - 15 g/hL (100 - 150 ppm), Red press wines: 10 - 20 g/hL (100 - 200 ppm).



# OXIDATION TREATMENT

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
POLYMUST® BLANC	Blend of vegetal protein (pea) and PVPP. Preventive treatment of oxidation of white and rosé wines.	30 - 80 g/hL (300 - 800 ppm)	1 kg
CASEI PLUS	Potassium caseinate. Treatment of oxidation phenomena and maderization in wines.	20 - 60 g/hL (200 - 600 ppm)	1 kg 5 kg
POLYLACT®	Combination of PVPP and casein. Preventive and curative treatment of the oxidation of wines (white and rosé).	15 - 90 g/hL (150 - 900 ppm)	1 kg 10 kg
ARGILACT®	Combination of casein and bentonite. Treating wines (white and rosé) against oxidation.	40 - 100 g/hL (400 - 1000 ppm)	1 kg 25 kg
VINICLAR® P	Granulated preparation of PVPP. Preventive and curative treatment of the oxidation of wines.	20 - 50 g/hL (200 - 500 ppm)	1 kg



**LAFFORT® USA ARE PROUD DISTRIBUTORS OF POLYCLAR™ V & POLYCLAR VT FROM ASHLAND.**

POLYCLAR™ V and POLYCLAR VT wine stabilizers are based on proven polyvinylpolypyrrolidone (PVPP) technology. This provides effective and highly selective reduction of polyphenols that cause oxidative discoloration, haze or loss of fresh aroma and flavor characteristics.

More specifically POLYCLAR wine stabilizers result in:

- Prevention of 'pinking' and 'browning' reactions in white and sparkling wines.
- Improved wine clarity in bottle.
- Enhanced aroma and flavor in red wines - preserving more of the highly desirable fresh, fruity character.
- Reduction in excessive astringency or color when needed.

## POLYCLAR™ V

POLYCLAR™ V wine stabilizer is a highly effective 100% PVPP wine stabilizer with an average particle size around 25 µm. It is optimized for maximum, fastacting reduction of problematic polyphenols. POLYCLAR™ V wine stabilizer is the preferred option for use in wine due to its high surface area, which permits maximum efficacy. It is usually added to wine after initial clarification, during or after tartaric stabilization, or before pre-bottling filtration. If added during the filtration process, a minimum contact time of 5 minutes is recommended. A diatomaceous earth filter should also be used.

Dosage: 5 - 60 g/hL (50 - 600 ppm).

## POLYCLAR VT

POLYCLAR VT wine stabilizer is a grade of 100% PVPP with an average particle size of around 140 µm. It is designed for addition to vessels, where faster settling is required. The larger particle size facilitates settling of the stabilizer which allows the majority of the product to be left behind with the lees at racking. A typical contact time of between 3 to 10 days is required, although there are no adverse effects from leaving Polyclar wine stabilizer in contact with the wine for longer periods. Filtration is still needed to produce a bright wine, but the amount of solids present should be much lower.

Dosage: 5 - 70 g/hL (50 - 700 ppm).

# MICROBIAL STABILIZATION

## OENOBRETT®

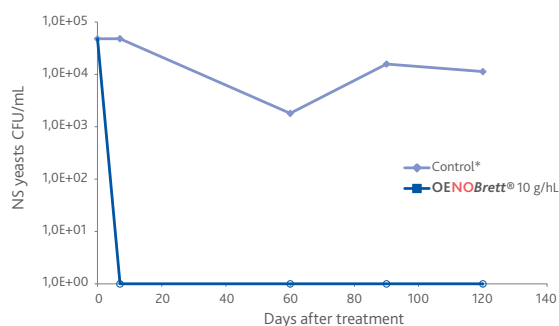
Preparation based on chitosan of fungal origin and enzymes, to combat *Brettanomyces* yeasts.

- Disruption of the membrane and the cell space by chitosan.
- The synergistic effect of enzymes accelerate the settling of lysed cells. The decrease of the *Brettanomyces* population is significant and thus prevents spoilage.
- The antimicrobial action of OENOBRETT® is an essential tool within a SO<sub>2</sub> reduction strategy.

Dosage: 10 g/hL (100 ppm).

23 g  
(barrel  
dose)  
250 g  
2.5 kg

### Effectiveness of OENOBRETT® on wine contaminated with *Brettanomyces*



Example of the effectiveness of treatment with 10 g/hL (100 ppm) of OENOBRETT® on a wine naturally contaminated with *Brettanomyces*. The concentration of 4EP + 4EG in the wine at the time of treatment was 332 µg/L. 4 months after treatment, the untreated wine reached a volatile phenol concentration of 2252 µg/L while the treated wine remained at the initial concentration.

# MICROBIAL STABILIZATION

NEW IN 2022

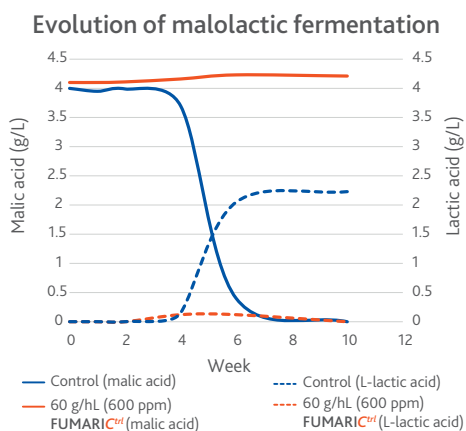
## FUMARIC<sup>ctrl</sup>

Pure fumaric acid for controlling the growth and activity of the lactic acid bacteria responsible for malolactic fermentation in wine.

2.5 kg  
25 kg

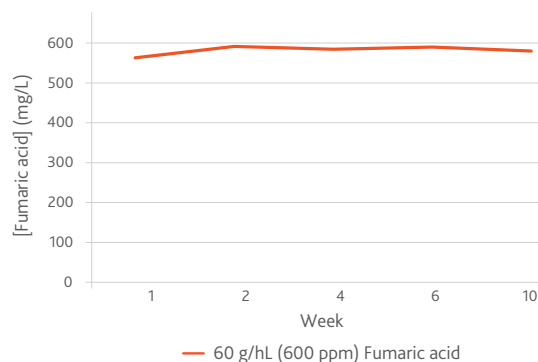
- Avoids the onset of MLF.
- Can stop MLF while in progress.
- Preservation of malic acid in wines.
- Tool for making wines with reduced SO<sub>2</sub> or with no sulfite added.

Dosage: 30 - 60 g/hL (300 - 600 ppm).



Experimental result demonstrating the ability of fumaric acid to block malolactic fermentation. L-lactic acid is still not detected 10 weeks after treatment while MLF is completed in the control.

## Monitoring of fumaric acid concentration (mg/L)



The preservation of the fumaric acid concentration shows its stability over time (10 weeks) in a study on wine with no *S. cerevisiae* fermentation activity.

## MICROCONTROL®

Formula made from chitosan and inactivated yeast for reducing the microbial load (unfavorable microorganisms). Biocontrol product.

250 g

- Reduction of the overall microbial load (non-*Saccharomyces* yeasts, yeast, bacteria\*).
- A wine fermentation tool for use in a SO<sub>2</sub> reduction sequence.
- Improvement in the clarification of wines.

Dosage: 5 g/hL (50 ppm).

\*Reduction in microbial populations by binding.



# COLLOIDAL STABILIZATION

## STABIVIN®

Pure Verek arabic gum solution with high grade protection index for stabilizing coloring matter in red wines.

Hydrophilic colloid which aims to counter hazes and colloidal deposits, allowing the wine to retain maximum clarity:

- Stabilizes coloring matter.
- Increases protection with regard to metallic or protein casses.

Dosage: 70 - 150 mL/hL.

1 L  
5 L  
20 L

## STABIVIN® SP

Gum arabic solution manufactured from highly purified gums.

- Due to its specific manufacturing procedure and the strict selection of the arabic gum used, **STABIVIN® SP** contributes to the colloidal stabilization and structure of the wines (softness and mouthfeel).
- Very low clogging index.
- Softening of wines by "coating" tannins.
- **STABIVIN® SP** is an arabic gum solution with low SO<sub>2</sub> concentration (2 g/L / 2 000 ppm).

Dosage: 100 - 300 mL/hL.



Gum arabic is obtained from the sap of a specific variety of acacia (Acacia verek) from selected African forests.

1 L  
5 L  
20 L



## OENOGOM® INSTANT

Pure gum arabic in rapid dissolving micro-granular form (IDP process).

- Stabilization of the coloring matter of red wines.
- Softening of wines by "coating" the tannins.
- Recommended for the production of wines without SO<sub>2</sub>.

Dosage: 20 - 100 g/hL (200 - 1000 ppm).

2.5 kg  
25 kg

# PROTEIN STABILIZATION

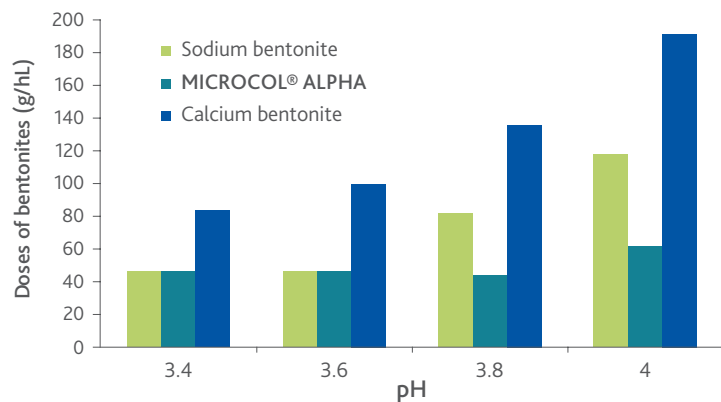
## MICROCOL® ALPHA

High quality natural sodium microgranular bentonite with a high adsorption capacity. Intended for protein stabilization in wines over a large pH range.

1 kg  
5 kg  
25 kg

- Stabilizing properties in regard to heat-sensitive proteins.
- Wide stabilizing action spectrum.
- High clarifying capacity and compact lees.
- Aromatic preservation.
- Helps color stabilization.
- Improves wine brightness.

Dosage: 10 - 80 g/hL (100 - 800 ppm).



### Deproteinization and wine pH

*MICROCOL® ALPHA provides a stabilizing action with respect to proteins, even when the wine pH is high.*

## MICROCOL® FT

Natural sodium-calcium bentonite for protein stabilization of wines during cross-flow filtration.

15 kg

- Due to its high purity, MICROCOL® FT contains very little crystalline silica, which is responsible for the abrasion of membranes.
- The particle size is controlled, which avoids clogging the filters or having residues of micro-particles after filtration.

Dosage: 30 - 80 g/hL (300 - 800 ppm).

**Find Out More:** Watch our **MICROCOL® ALPHA** video on our website, in the **LAFFORT & YOU** section.

# TARTARIC STABILIZATION

## MANNOSTAB® LIQUIDE 200

Contains the only mannoprotein naturally present in wines with the ability for potassium tartrate stabilization: MP40.

It is enzymatically extracted from the yeast cell wall according to a patented process (Patent N° 2726284) which preserves and ensures the tartaric stabilization capacity of MP40.

- Inhibition of potassium bitartrate salts crystallization.
- Neutral sensory impact to the wine.
- Natural compound already present in the wines.
- Stabilizes white, rosé and red wines ; still and sparkling wines ; filtered and unfiltered wines.
- No waste, no water or energy consumption.

Dosage: 50 - 150 mL/hL.



1 L  
10 L

Sampling date	27/06	30/06	02/07	04/07	07/07
Control					
MANNOSTAB® LIQUIDE 200					

Microscopic observation of potassium bitartrate crystals evolution at -4°C (25°F) in solutions with and without MANNOSTAB® LIQUIDE 200.

## CELSTAB®

CELSTAB® is a solution of cellulose gum, a highly purified polymer of vegetable origin (from wood) with a low degree of polymerization and lower viscosity. Its liquid formulation at a concentration of 100 g/L facilitates its incorporation in wine.

- Intended for wine stabilization in relation to potassium bitartrate crystallization.
- CELSTAB® is a highly purified cellulose gum. Its composition is uniform (only one peak on HPLC).
- Inhibits microcrystal nucleation and growth phases (through disruption of surfaces responsible for the formation of crystals).
- CELSTAB® has a very high inhibitory power (by optimal degree of substitution), and allows stabilization of highly tartaric-unstable wines.
- CELSTAB® is the liquid CMC with the lowest SO<sub>2</sub> concentration on the market.

Dosage: 100 mL/hL.



1 L  
5 L  
20 L

# TARTARIC STABILIZATION

## PRACTICAL APPROACH TO TARTARIC STABILIZATION

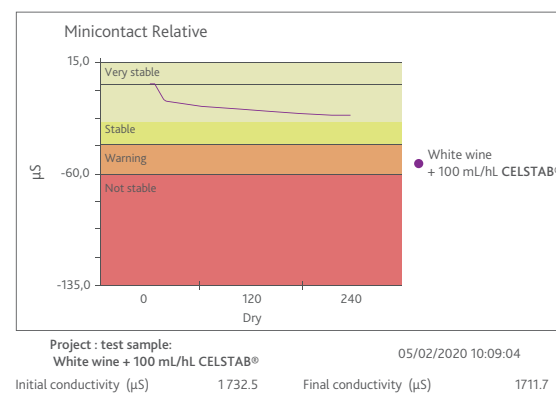
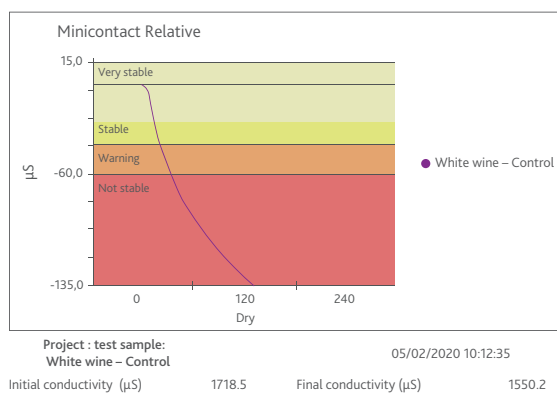
Thanks to its expertise on colloidal stabilization of potassium bitartrate, LAFFORT® offers a solution adapted to each quality and category of wine to optimize treatment.

DIT VALUE (%)	> 20	< 20
Category of wine	Quick to Market.	Premium - aging wines. (6 months minimum)
Calcium (mg/L)	< 60	< 60
Recommended treatment	CELSTAB®	MANNOSTAB® LIQUIDE 200
Treatment dose	100 mL/hL	50 - 150 mL/hL
White and rosé wines	Direct treatment	Natural stabilization
Red and rosé wines	-	Natural stabilization

### DEGREE OF TARTARIC INSTABILITY: DIT (%)

Stability threshold (white, red, rosé wines): < 5% (under measurement conditions in our laboratory).

### Tartaric stabilization of a wine by CELSTAB®



Stabilization check after treatment with CELSTAB® at 100 mL/hL on a white wine. Analysis by MINI CONTACT test (CHECKSTAB method).  
The drop in conductivity indicates that the wine treated with CMC is considered "very stable" after treatment.

# CLEANING AND PRESERVATION

REFER TO THE LOCAL LEGISLATION FOR THE MAXIMUM SULFUR DIOXIDE LEVEL IN WINE.

PRODUCT	DESCRIPTION	DOSAGE	PACKAGING
<b>SOLUTION 10</b>	Neutralized aqueous solution of sulfur dioxide	10 mL releases 1 g of SO <sub>2</sub> .	10 L
<b>POTASSIUM METABISULFITE</b>	Pure potassium bisulfite in powder.	1 g of potassium metabisulfite releases 0.5 g of SO <sub>2</sub> .	1 kg
<b>OENOSTERYL® 2</b>	Effervescent tablets of potassium bisulfite.	Each tablet releases 2 g of SO <sub>2</sub> .	Box of 48 tablets. Bulk case of 1080 tablets.
<b>OENOSTERYL® 3</b>	Effervescent tablets of potassium bisulfite.	Each tablet releases 3 g of SO <sub>2</sub> .	Available in bulk case of 891 tablets.
<b>OENOSTERYL® 5</b>	Effervescent tablets of potassium bisulfite.	Each tablet releases 5 g of SO <sub>2</sub> .	Box of 42 tablets. Bulk case of 918 tablets.
<b>SOUFRE DISCS** 2.5 g - 5 g - 10 g</b>	Burnable sulfur discs.	Conservation of empty barrels: burn between 2 and 4 g/hL (20 and 40 ppm) of sulfur (repeat the operation regularly according to the storage conditions). Sulfuring after barrel cleaning: burn between 1 and 3 g/hL (10 and 30 ppm) once the barrels are drained.	Box of 1 kg
<b>SULFUR WICKS.</b>	Burnable 33 g sulfur wicks.		Box of 500 g

*\*\*The production of SO<sub>2</sub> can vary depending on how damp the barrels are.*

**Find Out More:** Watch our **OENOSTERYL®** video on our website, in the **LAFFORT & YOU** section.

## REGENERATION AND UNCLOGGING OF FILTER MEMBRANE UNITS

Aiming to support our partners during all steps of winemaking, **LAFFORT®** offers a range of cleaning products, specially developed to regenerate and unclog the filter membrane units. Based on an enzymatic technology, it allows a more efficient cleaning of cross flow filters and filter cartridges.



### DECAPOL® **EXTRA**Life

Enzymatic detergent created to decompose organic residues in filtering systems (cross flow filters and filter cartridges).

5 kg

- Free of phosphate and surfactants (can be directly applied to filter cartridges).
- Strong oxidizer.
- Suitable for everyday use or for unclogging programs.
- Used in a closed circuit or CIP.

Instructions for use / dose: consult product packaging.



### DECAPOL® **DEEP**Clean

Enzymatic detergent created to decompose organic residues in filtering systems (cross flow filters).

5 kg

- Moderate oxidizer.
- Appropriate for everyday use or for unclogging programs.
- Specific for cleaning tangential filters.
- Used in a closed circuit or CIP.

Instructions for use / dose: consult product packaging.



# LAFFORT®

## THE ORGANIC COMMITMENT

### Organic Wine

The products for use in Organic Wine or Wine Made with Organic Grapes are supervised by the EU Regulation n° 203/2012 and the National Organic Program (NOP) administered by the United States Department of Agriculture (USDA). Many products are also approved by the CCOF.

### The Certifications

The list of LAFFORT® products used within the regulated framework of Organic wine and/or NOP is available on our website. We have also chosen external certification from Ecocert in France. [www.ecocert.fr](http://www.ecocert.fr).

For specific applications, consult your own USDA accredited certifying body. CCOF approvals are noted here, but must be verified by CCOF for your own application. Many other products are also eligible for certification.

### To Find our Certificates

Go to [www.laffortusa.com](http://www.laffortusa.com), Quality and Compliance / Quality and Compliance Certificates.



### CCOF Approved for use in "Made with Organic Grapes":

TAN'COR®  
TAN'COR® GRAND CRU  
QUERTANIN® SWEET  
TANIN GALALCOOL®  
TANIN VR SUPRA®

TANIN VR COLOR®  
TANIN VR SUPRA® ELEGANCE  
TANIN VR GRAPE  
GELAROM®  
CASEI PLUS



### CCOF Approved for use in "Made with Organic Grapes" and "Organic Wine":

ACTIFLORE® F33\*  
ACTIFLORE® ROSE\*  
ACTIFLORE® B0213\*  
ZYMAFLORE® X5\*  
ZYMALFORE® X16\*  
ZYMAFLORE® VL3\*  
ZYMAFLORE® VL2\*  
ZYMAFLORE® VL1\*  
ZYMAFLORE® CX9\*  
ZYMAFLORE® ST\*  
ZYMAFLORE® F15\*  
ZYMAFLORE® FX10\*  
ZYMAFLORE® F83\*  
ZYMAFLORE® RB2\*  
ZYMALOFRE® RX60\*  
ZYMAFLORE® 011BIO\*  
LAFAZYM® AROM

LAFAZYM® EXTRACT  
LAFAZYM® CL  
LAFASE® HE GRAND CRU  
DYNASTART®\*  
SUPERSTART® BLANC\*  
SUPERSTART® ROUGE\*  
FRESHAROM®\*  
MALOSTART®  
BI-ACTIV®  
OENOLEES®\*  
AUTOLEES®\*  
MANNOSTAB®\*  
GELATINE EXTRA N°1\*  
MICROCOL® ALPHA\*  
LACTOENOS® 450 PREAC  
LACTOENOS® SB3 DIRECT



*\*Must demonstrate commercial unavailability for organic equivalent for use in organic wine.*



# NOBILE®

L'œnologie du bois

CHIPS & GRANULARS	79
STAVES & BLOCKS	81
BARREL REFRESH	83
NOBISPARK	84

# NOBILE®

The enology of wood

**LAFFORT**'s enological oak brand, **NOBILE®** offers practical and innovative solutions that reveal the full expression of your wines.

## MATERIAL SELECTED

Carefully selected for their enological quality, all oak lots are "barrel quality" and are subject to strict traceability standards. Thanks to our knowledge of the aromatic potential of oak from different origins (*Quercus petraea*, *Quercus robur*, *Quercus alba*), we can select and assemble the wood in order to limit the natural variability and ensure reproducibility.

The oak is seasoned for a minimum period of **24 months** in the open air. **NOBILE®** controls the maturation by monitoring the evolution of wood compounds responsible for the enological potential of each product.

## PRECISION TECHNOLOGY

**As a producer of wood for use in enology**, **NOBILE®** boasts technologically advanced production equipment.

Extremely delicate, the heating operations are carried out by hot air convection, providing homogeneously heated products from the surface through to the center, or by other specific methods for reproducing heated gradients comparable to barrel toasting.

Experience and control of the release of volatile compounds from the wood, and of the heating techniques can ensure aromatic and tannic reproducibility for elaborate flavor profiles.

## DOSAGE & CONTACT TIME

The dosage or quantity, depending on the alternative used, must be considered and will be based on the characteristics of the wine's style. Contact time is defined by tasting throughout aging. For more usage tips, consult the **NOBILE®** team, specializing in the enology of wood.





# CHIPS & GRANULARS

A full range of high quality products combining tradition, expertise, innovation and research

## COMPLEX TOAST



**NOBILE®  
BASE  
Chips**

- ▶ Volume & roundness.  
Without toasted notes.



**NOBILE®  
SWEET VANILLA  
Chips**

- ▶ Lush vanilla  
& marshmallow flavors.



**NOBILE®  
CHERRY SPICE  
Chips**

- ▶ Sweet entry,  
black fruits & spicy.



**NOBILE®  
DARK ALMOND  
Chips**

- ▶ Roasted complexity  
& dark chocolate.



## CLASSIC TOAST



**NOBILE®  
FRESH THERMO TREATED  
Chips & Granulars**

- ▶ Freshness, fruit  
& structure.



**NOBILE®  
SWEET  
Chips & Granulars**

- ▶ Vanilla & toasted.



**NOBILE®  
INTENSE  
Chips**

- ▶ Volume & coffee.



**NOBILE®  
AMERICAN BLEND  
Chips & Granulars**

- ▶ Caramel & smoky.

## UNTOASTED OAK



**NOBILE® FRESH  
GRANULAR 24M  
Granulars**




- ▶ Antioxidant & structure.



**NOBILE® AMERICAN  
FRESH GRANULAR  
Granulars**

- ▶ Fruit & lactones.

## AGING OBJECTIVES

	STAVES <b>7</b> MM	STAVES <b>12</b> MM	STAVES <b>18</b> MM
 <b>RESPECTS THE FRUIT WITHOUT TOASTED NOTES</b>	<b>FRESH</b> Structure & fruit		<b>18 - XBASE</b> Volume & sweetness
 <b>AROMATIC</b>	<b>SENSATION</b> Vanilla & toasted notes  <b>INTENSE</b> Chocolate & roasted notes	<b>DULCE</b> Sweet, dulce de leche & caramel	<b>18 - XTREME</b> Roasted coffee & mocha
 <b>COMPLEXITY SIMILAR TO BARREL AGING</b>	<b>RÉVÉLATION</b> Structure & fruit	<b>ELITE</b> Complex & traditional	<b>18 - DIVINE</b> Burgundy barrel style

## THE NOBILE® TOASTING PROCESSES

### HOMOGENEOUS TOASTING

Toasting program dedicated to reproducing complex aromatic expression.

HOMOGENEOUS  
TOASTING

### GRADIENT TOASTING

Surface heating process which creates a heating gradient identical to a traditional barrel.

GRADIENT  
TOASTING

### DOUBLE TOASTING

The precise selection of oak combined with double toasting achieves a good balance between the ellagitannins and polysaccharides naturally present in oak, developing an aromatic complexity similar to barrel aging.

DOUBLE  
TOASTING

### SOFT OAK

Exclusive to the NOBILE® 18 mm range, the "Soft Oak" method is used to optimize the toasting process of the Staves. This pre-heating program contributes to the creation of unique characteristics.

SOFT  
OAK  
PROCESS





# STAVES & BLOCKS

Character and complexity whilst respecting the fruit

STAVES  
**18**  
MM

## HOMOGENEOUS TOASTING



18 - XBASE

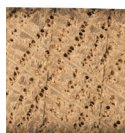
► Intensity and palate weight.  
Fruity, without overt oak characters.



18 - XTREME

► Expression of ripe fruit.  
Sweetness with mocha notes and roasted coffee.

## GRADIENT TOASTING



18 - DIVINE

► Gives texture. Extends the fruit to a complex finish (such as the elegance of Burgundian barrels).

STAVES  
**12**  
MM

## DOUBLE TOASTING



ELITE

► Toasted nuances.  
Volume. Similar to traditional barrel aging.

## HOMOGENEOUS TOASTING



DULCE

► Roundness & sweetness.  
Dulce de leche & caramel.

STAVES  
**7**  
MM

## HOMOGENEOUS TOASTING



FRESH

► Freshness, fruit & structure.



SENSATION

► Sweetness, vanilla & toasted.



INTENSE

► Volume, roasted coffee & chocolate.

## GRADIENT TOASTING



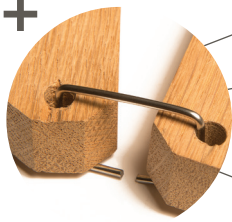
RÉVÉLATION

► Structure & aromatic complexity.



AMERICAN  
RÉVÉLATION

► Sweetness, spice bread & lactone.

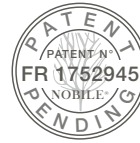


Innovative attachment system for ultra-easy implementation.

20 to 100% new oak equivalent (1 **NOBILE®** **BARREL REFRESH** = ± 20% new oak).

Maximizes the beneficial oxygen from barrels.

Barrel preservation.



## CUSTOM MADE



**BARREL REFRESH SPECIAL**



A custom blend of 7 & 12 mm profiles can be made to specification to achieve particular characteristics and style.

**BARREL REFRESH SPECIAL 18**



A custom blend of 7, 12 & 18 mm profiles can be made to specification to achieve particular characteristics and style.

Profiles available (refer to the Staves range): **FRESH, SENSATION, INTENSE, RÉVÉLATION, AMERICAN RÉVÉLATION, ELITE, DULCE, 18-XBASE, 18-XTREME, 18-DIVINE.**

## OXYGEN AND OAK

**During aging, the wine needs oxygen to evolve.**

Oxygen contributes to the stabilization of color, the softening of tannins and the integration of wood compounds. The quantity of oxygen in contact with the wine must be controlled throughout aging, adapted to the quality of the wine, the cellaring potential or the desired consumption time after purchase.



# BARREL REFRESH

Give new life to your barrels

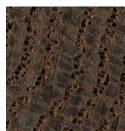
BARREL REFRESH  
**18**  
MM

## HOMOGENEOUS TOASTING



18 - XBASE

► Intensity and palate weight.  
Fruity, without overt oak characters.



18 - XTREME

► Expression of ripe fruit.  
Sweetness with mocha notes and roasted coffee.

## GRADIENT TOASTING



18 - DIVINE

► Gives texture. Extends the fruit to a complex finish (such as the elegance of Burgundian barrels).

BARREL REFRESH  
**12**  
MM

## DOUBLE TOASTING



ELITE

► Toasted nuances.  
Volume. Similar to traditional barrel aging.

## HOMOGENEOUS TOASTING



DULCE

► Roundness & sweetness.  
Dulce de leche & caramel.

BARREL REFRESH  
**7**  
MM

## HOMOGENEOUS TOASTING



BARREL REFRESH  
SENSATION

► Sweetness, vanilla & toasted.

## GRADIENT TOASTING



BARREL REFRESH  
RÉVÉLATION

► Structure & aromatic complexity.

Find out more: watch our **BARREL REFRESH** video on our website, at **LAFFORT & YOU** (video) or at [www.nobile-oenologie.com](http://www.nobile-oenologie.com).



# NOBISPARK



Aromatic persistence and smooth effervescence

## CONCEPT

The search for the finest balance between the natural compounds of oak and sparkling wines during alcoholic fermentation has led us to develop **NOBISPARK**. This enological bidule is the result of a project to develop the use of oak during the second fermentation.

Used in the same way as a classic bidule, **NOBISPARK** does not require any specific equipment when it is inserted after filling the bottle.



## NOBISPARK RANGE

Improves the aromatic persistence of wines on the palate and reinforces the smoothness of the effervescence.



**NOBISPARK  
FRESH**



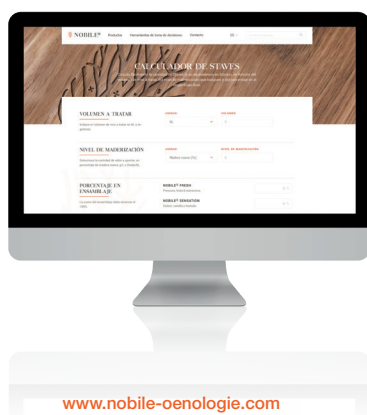
Brings a sensation of sweetness and volume while preserving the integrity, freshness and fruit of the initial blend. No toast flavors.



**NOBISPARK  
SENSATION**



Brings complexity and toast flavors, perfectly integrated by the 2<sup>nd</sup> fermentation and keeping the fruit intact.



## DISCOVER OUR WEBSITE ENTIRELY DEDICATED TO OAK FOR WINEMAKING

A complete website to find all the products we offer and our decision-making tools to help you create the best oak-wine balance.

With our **calculator**, easily estimate your need in Staves (and its equivalent in Blocks) depending on the volume of wine to be treated and the required level of oaking and complexity.



## Seriously rosé

LAFFORT® is keenly aware of the highly technical nature of producing rosé wines with numerous complex hues and aromas. Via our experimental center and a team of dedicated staff from different specialist fields, we have expanded our expertise to offer a range of targeted products adapted for producing superior rosé wines.



## KEYS STEPS DURING ROSÉ WINEMAKING

### Protection against oxidation

To avoid the formation of quinones and preserve the aromas, it is essential to implement all available techniques: **evaluate good practice in the winery** (avoid air intake, check gaskets, fittings, etc.), **apply rigorous processes and use inert gases**.

### Refrigeration and cooling capacity

Cold conditions limit enzyme activity in terms of color extraction and oxidation by polyphenol oxidases. It is therefore essential to **work on these pre-fermentation phases as quickly as possible at low temperature**.

### Pressing

The objective for rosé wines that are pressed directly is **fast, qualitative release of juices** to obtain the best aromas without extracting color. It is strongly recommended to use enzymes during the filling of the press.

### Fermentation

The choice of yeast strain and nutrition both help direct and optimize the aromatic profile of a wine according to the required style.

### Fining

**Early fining** of rosé wines, on must or during alcoholic fermentation, helps **act on the phenolic compounds that trap aromas**, and allows wine color to develop and wine structure to be modified. Appropriate fining will help produce high quality rosé wines.

### Stabilization

At the end of the process, certain choices can alter the aromatic profile or color of wines; stabilization options are available that respect the quality and style of the wine.



The **LAFFORT®** team is available for any further information or advice.

Do not hesitate to contact us!



**LAFFORT**

*l'œnologie par nature*



## Our seriously rosé selection...

PROCESS OPTIMIZATION	Pressing	LAFAZYM® PRESS * LAFASE® XL PRESS *
	Clarification	LAFAZYM® CL * LAFAZYM® 600 XL <sup>ICE</sup> * LAFASE® XL CLARIFICATION
AROMATIC OPTIMIZATION	Aromatic thiols revelation	LAFAZYM® THIOLS <sup>[+]</sup> * (must and wines in fermentation)
	Terpene aroma revelation	LAFAZYM® AROM (end of AF and finished wines)

\* Purified enzymes



### BIOPROTECTION

#### ZYMAFLORE® KHIO<sup>MP</sup>

BIOProtection at low temperatures, suitable for stabulation. Strong capacity to consume oxygen in musts.

#### ZYMAFLORE® EGIDE<sup>TDMP</sup>

BIOProtection on grapes and harvest reception equipment.



ZYMAFLORE®  
KHIO<sup>MP</sup>



ZYMAFLORE®  
EGIDE<sup>TDMP</sup>

### YEAST

#### ZYMAFLORE® XAROM

#### ZYMAFLORE® X16

#### ACTIFLORE® ROSÉ

#### ZYMAFLORE® X5

#### ZYMAFLORE® DELTA

#### ZYMAFLORE® XORIGIN

#### ZYMAFLORE® VL1



AROMATIC  
STRENGTH

AROMATIC  
ELEGANCE



ZYMAFLORE®  
DELTA



ZYMAFLORE®  
X5



ZYMAFLORE®  
X16



ZYMAFLORE®  
XAROM

YEAST REHYDRATION	<b>SUPERSTART®</b> <i>Blanc &amp; Rosé</i>	To be used when rehydrating the yeast. Yeast rehydration product with a high vitamin and mineral content for optimising yeast metabolism throughout fermentation.
NUTRIENT	<b>NUTRISTART® ORG,</b> <b>NUTRISTART® AROM</b> & <b>THIAZOTE® PH</b>	Total nutrition, either 100% organic, a blend of mineral and organic, or 100% mineral, to correct nitrogen deficiencies in musts.
AROMATIC PROTECTION	<b>FRESHAROM®</b>	To be used 1/3 of the way through AF. Formulation rich in reductive metabolites promoting the assimilation of glutathione precursors, for the aromatic preservation of wines.



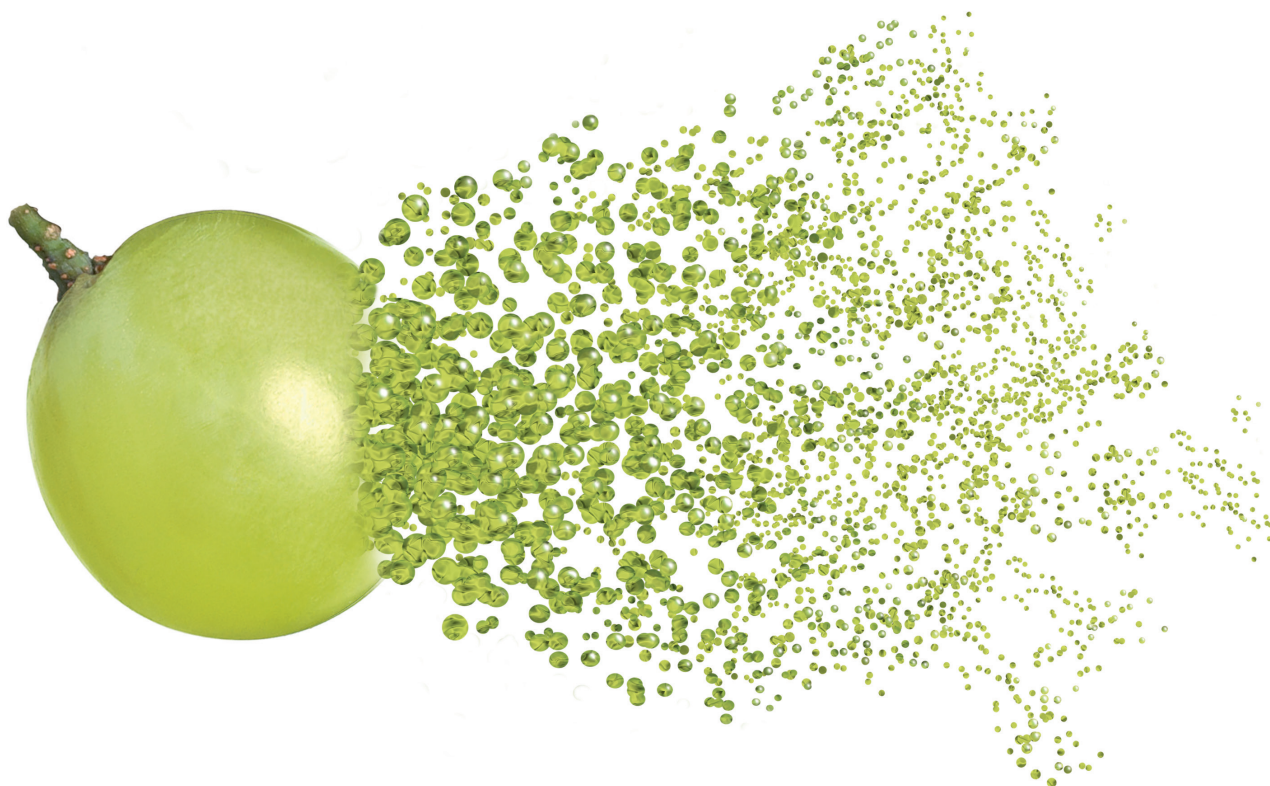
## To each rosé a specific fining...

Our expertise in the field of fining products has allowed us to select a range of products adapted to each situation, allowing you to create great rosé wines. The products can have a broader spectrum of action than those proposed below based on the matrix of the wines to be treated. For further advice please contact your LAFFORT® Technical Representative.

FINING	OBJECTIVE	RECOMMENDATIONS
	Controlling color intensity and refining the wine	<p><b>VEGEMUST®</b> Vegetable proteins (potato protein isolate, pea). Effective clarification. Reduction of the phenolic content.</p> <p><b>POLYMUST® BLANC</b> Vegetable protein (pea), PVPP. Eliminates oxidizable phenolic compounds.</p> <p><b>VEGEMUST® + CHARBON ACTIF PLUS GR</b> Vegetable proteins (potato protein isolate, pea) + activated carbon. Color reduction. Color stabilization.</p> <p><b>POLYMUST® ROSÉ</b> PVPP, plant protein (potato protein isolate). Stabilizes hue, reduces phenol acids.</p> <p><b>VEGEFINE®</b> Vegetable proteins (potato protein isolate). Significant action on oxidizable polyphenol.</p>
	Controlling oxidation	<p><b>POLYLACT®</b> (PVPP, potassium caseinate). Inhibits browning.</p>



PROTEIN STABILIZATION	<b>MICROCOL® ALPHA</b>	Natural sodium bentonite respecting color and aromas while also having good protein removal capacity.
	<b>MICROCOL® FT</b>	Natural calcium-sodium bentonite, intended for protein stabilization of wines during tangential filtration.
TARTARIC STABILIZATION	<b>CELSTAB®</b>	CMC for tartaric stabilization to be used after a laboratory trial.
	<b>MANNOSTAB® LIQUIDE 200</b>	Natural mannoprotein for tartaric stabilization of potassium bitartrate salts.



# LAFFORT spark®

---

## ...BUBBLES BY NATURE

The production of quality sparkling wine follows a sequence of stages that must be optimized to achieve the final desired product. For each stage LAFFORT® has gathered under the LAFFORT® SPARK range the products best suited not only to produce **traditional sparkling wines**, but also the products enabling the production of sparkling wines using the **Charmat method**.



# For each base wine, a specific strategy



**BIOProtection, SO<sub>2</sub> reduction and O<sub>2</sub> consumption.**  
**ZYMAFLORE® EGIDE<sup>TDMP</sup> AND ZYMAFLORE® KHIO<sup>MP</sup>**

## Non-Saccharomyces yeasts for BIOProtection of the harvest.

- Allows the medium to be colonized without fermentation activity, to limit predominance of the indigenous flora.
- Particularly suited to the strategy of reduced sulfite additions to musts, as well as the strategy of delayed sulfite additions to red musts.
- Protection of musts during transport in tanker.
- **ZYMAFLORE® KHIO<sup>MP</sup>**: Strong ability to consume oxygen in musts.

## Juice clarification

**LAFAZYM® CL & LAFAZYM® 600 XL<sup>ICE</sup>**

## Purified pectolytic enzymes for quick must settling.

- Quick and complete depectinization.

## Fining & color of musts

### Cuvée / Free run juice

#### VEGEFINE®

100% potato protein isolate - Elimination of phenolic compounds.

#### POLYMUST® PRESS

Removes the oxidizable and oxidized phenolics.

### Taille / Press juice

#### CHARBON ACTIF PLUS GR

Selected activated carbon to decolorize tinted juice.

## Malolactic fermentation strategy

**LACTOENOS® B16 STANDARD**

## Oenococcus oeni strain selected for low pH base wines.

- Very resistant strain particularly adapted to low pH levels found in base wines. Pre-acclimatization is achieved in the cellar (Step by step protocol available on our website).

## TECHNICAL TOOLS



- Implementation of MLF starter.
- Implementation of yeast starter for secondary fermentation.
- Preparation of tirage mixture.

## Fermentation of base wines: a question of style...

### CLASSIC



#### ZYMAFLORE® SPARK

Strain isolated in Champagne, tested, validated and recommended by the microbiology laboratory of the CIVC technical centre.



#### ZYMAFLORE® 011 BIO



Strain isolated in Champagne. Selected for its remarkable fermentation performance. (Certified Organic).



#### ZYMAFLORE® CX9

Expresses notes of lemon zest, toasted almond and fresh hazelnut. Particularly recommended to reinforce the richness of wines in the event of a non-MLF strategy.

## AROMATIC AND VARIETAL EXPRESSION



**ZYMAFLORE® X5**



**ZYMAFLORE® VL3**



**ZYMAFLORE® X16**



**ZYMAFLORE® VL1**

## Tartaric stabilization

**MANNOSTAB® LIQUIDE 200**

Liquid formulation of a specific mannoprotein (MP40 – Patent No. 2726284), naturally present in wine, with the property of inhibiting crystallization of potassium bitartrate.

- Inhibits the crystallization of potassium bitartrate salts.
- Stabilizes white, red and rosé sparkling wines; filtered or unfiltered.

*With the traditional method, addition is made before bottling to prevent tartrate precipitation during aging on lees. It is also possible to make an addition on disgorging.*

#### CELSTAB®

Solution of cellulose gum. CELSTAB® is a highly purified cellulose polymer of vegetal origin, with a low degree of polymerization and viscosity.

- The liquid (10% solution) formula makes it easy to incorporate into the base wine.

*Under traditional method, the addition is made entirely before tirage.*

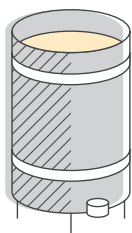


# Traditional Method

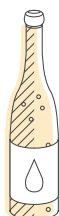
Elegance, finesse, complexity



## Secondary fermentation



### CLEANS<sup>spark</sup> effect



### SUPERSTART<sup>®</sup> spark

Yeast rehydration preparation adapted to sparkling wine conditions (Patent FR2736651).

- Combination of growth and survival factors to ensure a complete "prise de mousse".



### ZYMAFLORE<sup>®</sup> spark

Yeast recommended for fine, elegant and full sparkling wines.

- Develops tertiary aromas for fine, complex and elegant sparkling wines.

*Tested and validated by the microbiological laboratory of the CIVC (Comité interprofessionnel du vin de Champagne).*



### CLEANS<sup>spark</sup>

Riddling adjuvant (bentonite/alginate).

- Quick and complete removal of particles and sediments in bottles after aging "sur lies".



### TANSPARK

Combination of gallic and ellagic tannins in liquid form.

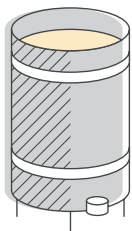
- Rebalances redox potential of the base wine, reinforces its structure and confers brilliance to the finished sparkling wine.



# Charmat Method

Freshness, simplicity, sophistication

## Secondary fermentation



### SUPERSTART<sup>®</sup> spark

Yeast rehydration nutrient designed to adapt the active dry yeast to sparkling wines conditions (Patent FR2736651).

- Combination of growth and survival factors to ensure a complete "prise de mousse".



### ZYMAFLORE<sup>®</sup> X5

Yeast selected for fresh and aromatic wines

- High production of varietal and secondary aromas (boxwood, grapefruit, exotic fruits).



OR

### ZYMAFLORE<sup>®</sup> X16

Yeast for aromatic and modern sparkling wines.

- High production of secondary aromas (white peach, white flowers, yellow fruits).



### FRESHAROM<sup>®</sup>

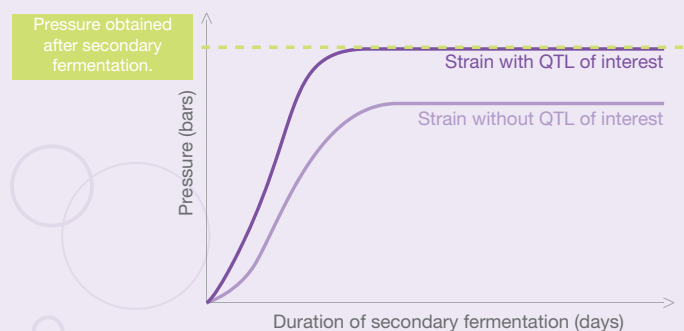
Specific preparation of inactivated yeast with high protective power (5.3%).

- Allows for increased aromatics, as well a better aging potential in sparkling wines.
- Participates actively to the bubble finesse and foam persistence. Addition at tirage.

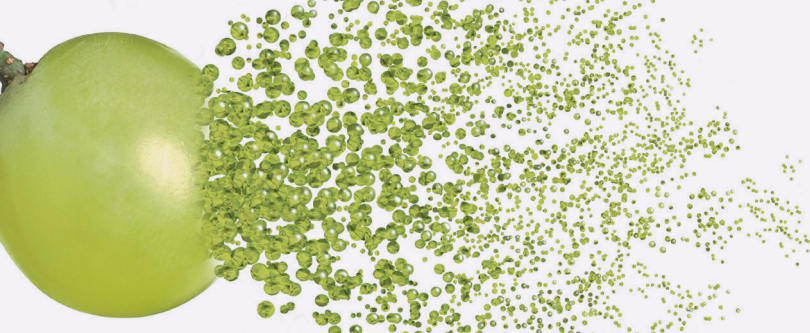


## Yeasts selected for their ability to achieve secondary fermentation

The robustness of certain yeasts to "prise de mousse" used to be based on empirical criteria. However, this is now explained by the presence of several genetical markers (QTL) that determine their resistance to low pH (< 2.8) and high pressures (Marti-Raga, 2017).

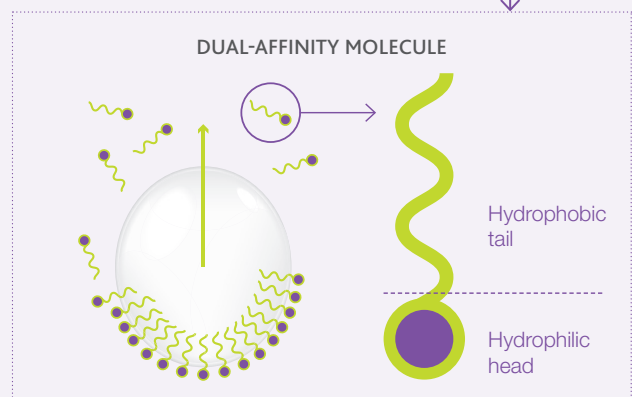
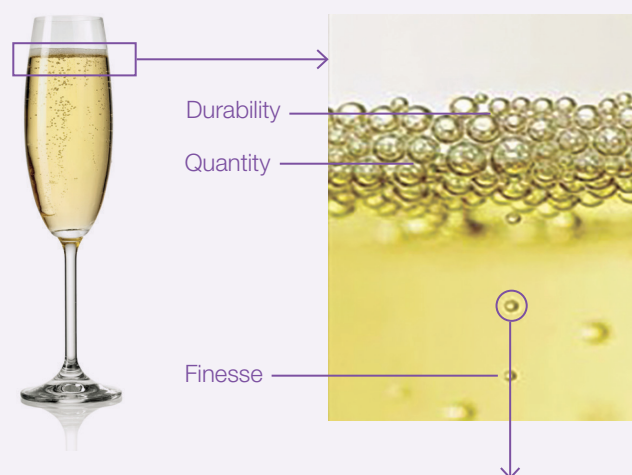


LAFFORT<sup>®</sup> takes these genetic criteria into consideration when recommending yeasts suitable for the secondary fermentation.



## MANNOSPARK<sup>®</sup>, THE AESTHETICS OF EFFERVESCENCE

### MECHANISM AND INTERACTIONS IN THE BUBBLE-FORMING PROCESS



Sparkling wines contain greater or lesser quantities of surfactant macromolecules from grapes and yeasts. They play a fundamental role in the lifespan and quality of the bubbles in a glass.

From its birth, the bubble is charged with CO<sub>2</sub>, its growth is directly linked to the concentration of dissolved CO<sub>2</sub> in the wine. Then it detaches from its nucleation site and rises to the surface. During its journey, it captures the surfactant molecules in the wine, including mannoproteins.

When the bubbles reach the wine's surface, the surfactant macromolecules play their **protective** role by prolonging their lifespan and thus promoting the formation of the collar.

In terms of the aesthetics of effervescence in wine, the "pinnacle" for tasters is to observe **fine, elegant and persistent** bubbles in the glass regularly supplying a **generous and stable** collar (rim of foam) to form a harmonious foam.

### ROLE OF MANNOPROTEINS IN BUBBLE AESTHETICS

The research programme (SPUM) on the aesthetics of effervescence, launched by LAFFORT<sup>®</sup> in 2014 in collaboration with Pr. Gérard Liger-Belair's team at the University of Reims Champagne Ardenne, allowed us to study the effect of the different mannoprotein fractions of yeast, then to demonstrate their impact on the quality and stability of the wine foam.

MANNOSPARK<sup>®</sup> is a specific formulation resulting from this study, for improvement in the size of the bubbles, and the thickness and stability of the collar, in order to obtain a harmonious and persistent foam in sparkling wines.



Comparison of bubble collar and size under standardized serving conditions for a Crémant rosé (bottle fermented, 12 months on lees). Photo taken 1 min, then 10 min after pouring. The wine treated with MANNOSPARK<sup>®</sup> shows a more generous collar of bubbles, which is more stable over time.



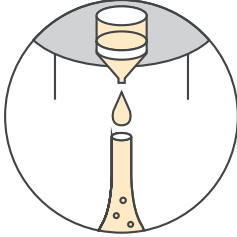
Molecular and Atmospheric Spectrometry Group (GSMA), a joint research unit between CNRS and the University of Reims Champagne Ardenne (URCA). Bubble Physics Laboratory, Pr. Gérard Liger-Belair.



# Quality of bubbles

The quality of the foam is essential for customer satisfaction

## At tirage



### OENOLEES®

Specific preparation of yeast cell wall extract. (Patent EP 1850682).

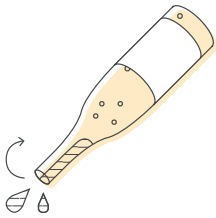
- Accelerates the development of “on lees” aging characters.
- Optimizes foam finesse and persistence.



### MANNOSPARK®

Specific yeast cell wall mannoproteins (Patent 2726284).

- Reinforces tartaric and colloidal stabilization.
- Restores the foaming properties of wines.
- Refines the size of bubbles to ensure their elegance.
- Promotes persistence of foam at the surface of the glass.
- Allows the formation of a more generous rim of foam, that is more stable over time.



## At disgorging

### AUTOLEES®

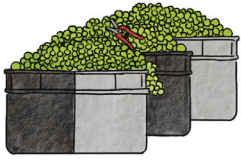
Specific preparation of yeast cell wall extract (Mannoproteins), rich in sapid peptide content and polysaccharides (Patent EP 1850682).

- Enables to significantly lower the quantity of liqueur.
- Allows the winemaker to delicately balance both acidity and bitterness.
- Actively participates in restitution of the foaming properties of the sparkling wines.



## NOBISPARK

The search for the finest balance between the natural compounds of oak and sparkling wines during alcoholic fermentation has led us to develop **NOBISPARK**. This enological bidule enables the second fermentation under oak, for more complex and more elegant Traditional Method wines.



96 FERMENTATION RESTART PROTOCOL

98 BENCH TRIALS

100 LAFFORT® LINKS





# Fermentation restart protocol

## Alcoholic fermentation

For 100 hL of wine in stuck AF

### 1 PRELIMINARY OPERATION ON STUCK WINE

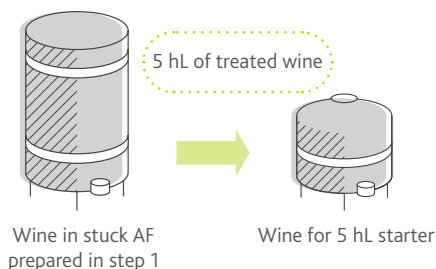
- Rack/centrifuge avoiding air.
- Adjust wine temperature to 20°C (68°F).
- Adjust SO<sub>2</sub> at 1 - 2 g/hL (10 - 20 ppm).
- Add:
  - For white wines: **BI-ACTIV®**: 40 g/hL (400 ppm).
  - For red wines: **OENOCCELL®**: 40 g/hL (400 ppm).
- Mix wine anaerobically every 12 hours for 24 hours.
- Move on to step 2.



### 2 PREPARATION OF THE YEAST INOCULUM

#### 2.1. Preparation of the wine for the yeast inoculum

- Take 5 hL of the volume of the treated stuck wine from step 1.
- Adjust the alcohol to 8%, the sugar content to 20 g/L and the temperature to 20°C (68°F).
- Add **THIAZOTE® PH**: 20 g/hL (200 ppm) to this volume of wine and mix thoroughly.



#### 2.2. Yeast preparation

- Prepare 60 L of water at 40°C (104°F).
- Add the yeast rehydration nutrient **SUPERSTART® SPARK** or **SUPERSTART® ROUGE**: 30 g/hL (300 ppm) of the volume of wine to be treated, then homogenize.
- Add **ACTIFLORE® B0213**: 30 g/hL (300 ppm) of the volume of wine to be treated, then homogenize.



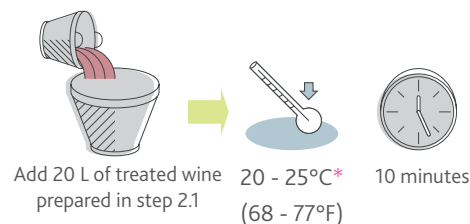
Water + **SUPERSTART® SPARK/ROUGE** + **ACTIFLORE® B0213**

- Wait 20 minutes, then homogenize.



- Add immediately 20 L of treated wine from step 2-1.
- Wait 10 minutes, let cool to 20°C (68°F) and **maintain the temperature between 20 - 25°C (68 - 77°F)**.
- The total time of the yeast rehydration must not exceed 45 minutes.

*\*Check with a thermometer.*

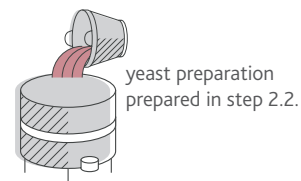


# Fermentation restart protocol

## Alcoholic fermentation

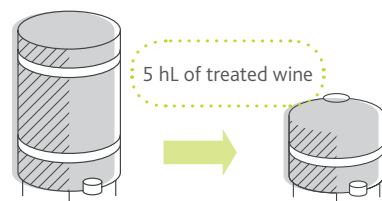
### 2.3. Acclimatization of the yeast preparation

- Add the yeast preparation (Step 2.2) to the prepared wine for the yeast inoculum (step 2.1).
- Measure the Brix and maintain the inoculum at 20°C (68°F) with aeration until 0.5°Brix (avoid the total exhaustion of sugars in the inoculum and a fall in the yeast activity). Aerate as soon as AF starts.
- Double the volume with treated wine (step 1) at 20°C (68°F).
- Measure the Brix and maintain again the inoculum at 20°C (68°F) until 0.5°Brix. Aerate again when fermentation becomes active.



Starter 5 hL prepared in step 2.1

Double the volume when density = 0.5° Brix

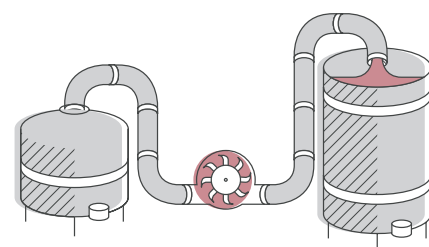


Stuck fermented wine prepared in step 1

Starter 10 hL

### 3 INCORPORATION OF YEAST INOCULUM IN THE TANK

- Add the yeast inoculum to the treated wine (step 1), maintain at 20°C (68°F).
- Add 30 g/hL (300 ppm) of **NUTRISTART® ORG** to the total volume of the tank to the treated wine (Step 1).



Starter 10 hL prepared in step 2.3

Stuck fermented wine prepared in step 1

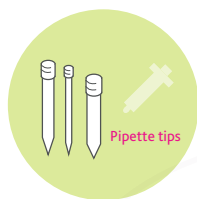
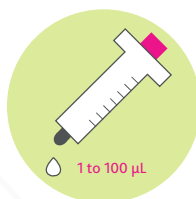
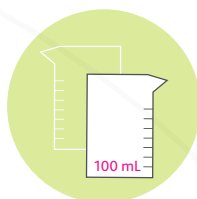
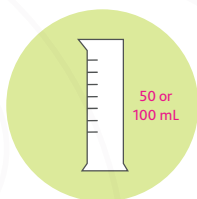
**Find out more:** discover our **RESTARTING FERMENTATION PROTOCOL** on our website, in the **LAFFORT & YOU** section.

## BENCH TRIALS

Bench trials are an essential step in determining dosage rates for treatments during wine aging. With fining treatments, you want to add just enough product to remove the unwanted character, but not over-fine the wine and remove aromatics or desired texture. With tannin and mannoprotein treatments, each wine has a “sweet spot” where the mouthfeel comes into balance and this can only be found through bench trialing different dose rates.

The team at LAFFORT® wants to make the bench trial process as painless as possible. With the correct tools, bench trials can be quick and easy.

### TOOLS



### TIPS

- 1 - For powder or granulate products:** Prepare a 5% solution 2 hours ahead (exception with ICHTYOCOLLE® – prepare a 1% solution).
- 2 - For liquid products:** Use product directly (no dilution necessary).
- 3 - Make a plan:** Write down your dosage rates and calculate the volume of bench trial solution needed for each sample.
- 4 - Organize the workspace:** Label all wine sample bottles/glasses before adding the bench trial solution.
- 5 - Homogenize bench trial solutions** right before pipetting into wine sample.
- 6 - Mix wine samples** thoroughly after addition.
- 7 - Fining agents** require 2 – 4 days of settling. Look for compact lees layer at bottom of sample bottle, then decant clean wine for sensory analysis.
- 8 - Structure building tannins:** TANIN VR GRAPE®, TAN’COR GRAND CRU®, TAN’FRESH®, TANIN GALALCOOL SP® are best evaluated after 48 hours of contact time with the wine.
- 9 - Finishing products:** QUERTANIN® range, AUTOLEES®, MANNOFEEL®, and STABIVIN SP® can be added and tasted immediately after mixing into wine sample.

## LAFFORT® CONVERSION CHART

ppm or mg/L	100	200	300	400	500	600	700	800	900	1000
g/hL	10	20	30	40	50	60	70	80	90	100
lbs/1,000 gal	0.8	1.7	2.5	3.3	4.2	5.0	5.8	6.7	7.5	8.3

mL/hL	1	5	10	20	30	40	50	100	200	300
mL/1000 gal	38	189	379	757	1,136	1,514	1,893	3,785	7,570	11,355
mL/gal	0.04	0.19	0.38	0.76	1.14	1.51	1.89	3.79	7.57	11.36

1 gal = 3.785 L	12 x 750 mL case = 2.37753 gal
1L = 1000 mL	1 barrel = 225 L = 59 gal
1hL = 100L = 26.40 gal	1 ton = 165 gal approx
1 lbs = 454 grams	1g/L = 0.1%
1 US ton = 2000lbs = 907 kg	1 metric ton = 1000 kg = 2205 lbs

## LAFFORT® BENCH TRIALS DOSAGE - GRANULATES

Soluble products, such as the **QUERTANIN®** range and **AUTOLEES®**, can use this table for direct addition and tasting immediately afterwards.

Fining treatments need time to settle before evaluating. In general, 2 - 4 days is the recommended settling time. Look for a compact lees layer at the bottom of the sample bottle, then decant clean for sensory evaluation.

Dosage	Volume of Wine Sample			
	50 mL	100 mL	250 mL	375 mL
10 ppm	10 µL	20 µL	50 µL	75 µL
20 ppm	20 µL	40 µL	100 µL	150 µL
30 ppm	30 µL	60 µL	150 µL	225 µL
40 ppm	40 µL	80 µL	200 µL	300 µL
50 ppm	50 µL	100 µL	250 µL	375 µL
60 ppm	60 µL	120 µL	300 µL	450 µL
70 ppm	70 µL	140 µL	350 µL	525 µL
80 ppm	80 µL	160 µL	400 µL	600 µL
90 ppm	90 µL	180 µL	450 µL	675 µL
100 ppm	100 µL	200 µL	500 µL	750 µL
125 ppm	125 µL	250 µL	625 µL	938 µL
150 ppm	150 µL	300 µL	750 µL	1125 µL
200 ppm	200 µL	400 µL	1000 µL	1500 µL

### FOR POWDER OR GRANULATE PRODUCTS.

Prepare a 5% solution, e.g. 2.50 grams dissolved in 50 mL water. Mix thoroughly and allow solution to swell for two hours before use.

Using the table at left, add the indicated number of microliters of the solution to the trial sample to achieve the specified ppm.

Exception – for **ICHTYOCOLLE®**, prepare a 1% solution and multiply the volume indicated by 5.

Tannin and Autolees samples can be dissolved in a 12% alcohol solution instead of water when making the 5% bench trial solution.

\*µL = microliters.

## LAFFORT® BENCH TRIALS DOSAGE - LIQUIDS

Soluble products, such as **STABIVIN® SP**, can use this table for direct addition and tasting immediately afterwards.

Fining treatments, such as gelatins, need time to settle before evaluating. In general, 2 - 4 days is the recommended settling time. Look for a compact lees layer at the bottom of the sample bottle, then decant clean for sensory evaluation.

Dosage	Volume of Wine Sample			
	50 mL	100 mL	250 mL	375 mL
10 mL/hL	5 µL	10 µL	25 µL	38 µL
20 mL/hL	10 µL	20 µL	50 µL	75 µL
30 mL/hL	15 µL	30 µL	75 µL	113 µL
40 mL/hL	20 µL	40 µL	100 µL	150 µL
50 mL/hL	25 µL	50 µL	125 µL	188 µL
60 mL/hL	30 µL	60 µL	150 µL	225 µL
70 mL/hL	35 µL	70 µL	175 µL	263 µL
80 mL/hL	40 µL	80 µL	200 µL	300 µL
90 mL/hL	45 µL	90 µL	225 µL	338 µL
100 mL/hL	50 µL	100 µL	250 µL	375 µL
125 mL/hL	63 µL	125 µL	313 µL	469 µL
150 mL/hL	75 µL	150 µL	375 µL	563 µL
200 mL/hL	100 µL	200 µL	500 µL	750 µL

### FOR LIQUID PRODUCTS.

Use directly.

Using the table at left, add the indicated number of microliters to the trial sample to achieve the specified dose rate in mL/hL.

\*µL = microliters.



# LAFFORT® LINKS

Use your phone's camera to access these videos and protocols through the QR codes below.

## 1 Yeast Rehydration Video.

This video includes specific time, temperatures, techniques, and equipment needed for carrying out a yeast rehydration for healthy and clean fermentations. A great tool for training your cellar crew before harvest.



## 2 Flotation Video.

Flotation is a dynamic clarification technique that saves time and energy in the cellar and optimizes juice quality. LAFFORT® offers two products especially adapted to this technique: a high-performance enzyme preparation for depectinization and a fining agent for effective flocculation. This video illustrates the steps needed to clarify the must within a few hours and which can quickly be inoculated with yeast.



## 3 Barrel Sulfur Additions with SO<sub>2</sub> Tablets Video.

A quick and efficient way to add SO<sub>2</sub> to your wine. The OENOSTERYL® tablets are self-dissolving tablets of potassium metabisulfite and potassium bicarbonate. Each tablet is sealed individually to keep them fresh until use. Watch a video illustrating how easy and efficient they are to use.



## 4 Smoke Taint Protocol.

Forest fires and exposure of grapes to smoke has become a major winemaking issue. Wines that are 'smoke tainted' receive negative comments from both winemakers and consumers, such as smoky, burnt, campfire, and ashtray. There are several winemaking techniques that can be used to mitigate the effects of smoke character in wines, and are addressed by the following protocols.



## 5 Frost Taint Protocol.

When wine grapes are exposed to frost and extreme cold temperatures, an unusual and unpleasant floral note is found in red wines made from grapes picked after the frost. This is a protocol on how to mitigate this character in wines made from frost exposed fruit.



## 6 Nutrient Calculator.

Laffort has an easy-to-use calculator for fermentation nutrition.



## 7 Tools for Acidification in Must and Wines.

Tartaric, malic and lactic acid are all authorized for use in wine. They differ in their structure, their acidification capacity and their sensory impact. This protocol lets you make the right choices based on your wine's parameters and the desired objective.







# LAFFORT® LINKS

Use your phone's camera to access these videos and protocols through the QR codes below.

1

## Winemaking Protocols.

General winemaking protocols and guides to wine treating materials to maximize quality and efficiency.



4

## Sparkling Wine Downloads.

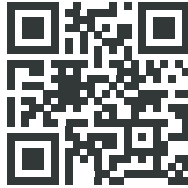
Protocols and research articles on sparkling wine.



2

## Fining Product Protocols.

Videos to help in effective preparation and use of VEGECOLL®, GELATINE EXTRA N°1 and MICROCOL® ALPHA.



5

## Rosé Downloads.

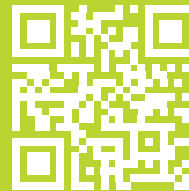
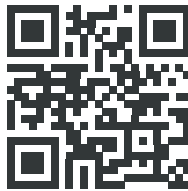
Protocols and research articles on the production of rosé wines, with style guides especially on the Provence style.



3

## Dealing With Climate.

Protocols for dealing with all aspects of climate during harvest, ranging from Botrytis to heat stroke.



All of our locations  
and Technical  
Representatives.

tecnologie  
ricerca  
innovación

# LAFFORT® QUALITY COMMITMENT

As part of our global quality management policy, we continuously strive to meet your needs to the best of our ability. Certificates are available on the LAFFORT® website, confirming the quality of LAFFORT® products in regards to the following points.

- ISO 22000 certificate.
- Ecocert certificate for certified organic products according to European Regulation (EU) 848/2018 and its amendments.
- List of LAFFORT® products available for use in organic winemaking and/or the US National Organic Program's (NOP) winemaking regulations.
- General attestation.
- List of allergenic products.
- Statement on animal welfare.
- Packaging: suitability for contact with foodstuffs and environmental.
- Vegan certificates.



# INDEX

## A

ACTIFLORE® B0213 .....	19
ACTIFLORE® CEREVISIAE .....	20
ACTIFLORE® D.ONE .....	20
ACTIFLORE® F5 .....	20
ACTIFLORE® F33 .....	19
ACTIFLORE® RMS2 .....	20
ACTIFLORE® ROSÉ .....	18 & 87
ARGILACT® .....	67
AUTOLEES® .....	60 & 94

## B

BARREL REFRESH NOBILE® .....	82
BI-ACTIV® .....	26
BLOCKS NOBILE® .....	80

## C

CASEI PLUS .....	50 & 67
CELTAB® .....	73, 88 & 90
CHARBON ACTIF PLUS GR .....	56, 68 & 90
CLEANS PARK® .....	91
CHIPS & GRANULARS NOBILE® .....	79

## D

DÉCAPOL® DEEPCLEAN .....	98
DÉCAPOL® EXTRALIFE .....	98

## E

EXTRALYSE® .....	41, 42 & 61
------------------	-------------

## F

FRESHAROM® .....	27, 87 & 92
FUMARIC <sup>tr1</sup> .....	70

## G

GECOLL® SUPRA .....	50 & 66
GELAROM® .....	66
GÉLATINE EXTRA N°1 .....	66
GEOSORB® GR .....	56

## I

ICHTYOCOLLE .....	66
-------------------	----

## L

LACTOENOS® 450 PreAc .....	31
LACTOENOS® B7 DIRECT .....	31
LACTOENOS® B16 STANDARD .....	31 & 90
LACTOENOS® SB3 DIRECT .....	31
LAFASE® BOOST .....	42
LAFASE® FRUIT .....	40
LAFASE® HE GRAND CRU .....	40
LAFASE® XL PRESS .....	37 & 87
LAFASE® XL CLARIFICATION .....	39, 41 & 87
LAFASE® XL EXTRACTION ROUGE .....	40
LAFASE® XL FLOT .....	42
LAFAZYM® 600 XL <sup>ICE</sup> .....	39, 87 & 90
LAFAZYM® AROM .....	38 & 87
LAFAZYM® CL .....	39, 41, 87 & 90
LAFAZYM® EXTRACT .....	37
LAFAZYM® PRESS .....	37 & 87
LAFAZYM® THIOLS <sup>[+]</sup> .....	38 & 87
LYSOZYM .....	61

## M

MALOBOOST® .....	33
MANNOFEEL® .....	59
MANNOSPARK® .....	94
MANNOSWEET® .....	59
MANNOSTAB® LIQUIDE 200 .....	73, 88 & 90
MICROCOL® ALPHA .....	50, 72 & 88
MICROCOL® FT .....	72 & 88
MICROCONTROL® .....	70

## N

NOBISPARK® .....	84 & 94
NUTRISTART® .....	23
NUTRISTART® AROM .....	23 & 87
NUTRISTART® ORG .....	23 & 87

## O

OENOCCELL® .....	26
OENOBRETT® .....	69
OENOGOM® INSTANT .....	71
OENOLEES® .....	27, 60 & 94
OENOSTERYL® 2, 3 & 5 G .....	75

# INDEX

## P

POLYLACT®	50, 67 & 88
POLYMUST® BLANC	49, 65, 67 & 88
POLYMUST® NATURE	49 & 65
POLYMUST® PRESS	49, 65 & 90
POLYMUST® ROSÉ	49, 65 & 88
POTASSIUM METABISULPHITE	75
POWERLEES® LIFE	58
POWERLEES® ROUGE	28 & 58

## Q

QUERTANIN®	64
QUERTANIN® CHOC	64
QUERTANIN® INTENSE	64
QUERTANIN® PLUS	64
QUERTANIN® Q1	64
QUERTANIN® Q2	64
QUERTANIN® SWEET	64

## S

SILIGEL	66
SOLUTION 10	75
STABIVIN®	71
STABIVIN® SP	71
STAVES NOBILE®	80
SULFIREDOX	68
SULFUR WICKS	75
SUPERSTART® BLANC & ROSÉ	22 & 87
SUPERSTART® ROUGE	22
SUPERSTART® SPARK	22, 91 & 92
SUPRAROM®	56

## T

TAN'COR®	63
TAN'COR GRAND CRU®	63
TANFRESH®	63
TANIN GALALCOOL®	53
TANIN GALALCOOL® SP	63
TANIN CENOLOGIQUE	53
TANIN VR COLOR®	53
TANIN VR GRAPE®	53
TANIN VR SKIN®	62
TANIN VR SUPRA®	52
TANIN VR SUPRA® ÉLÉGANCE	52
TANSPARK®	91
THIAZOTE® PH	26
TURBICEL®	26

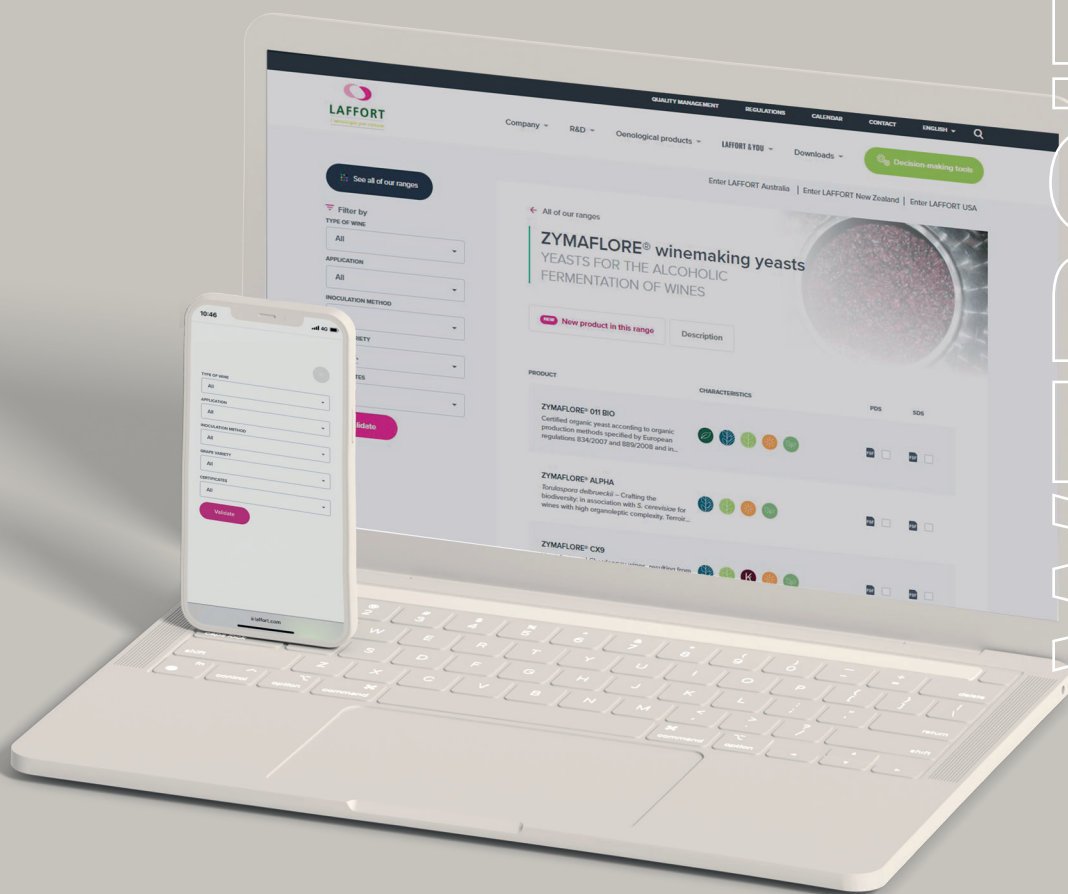
## V

VEGEFINE®	47, 65, 88 & 90
VEGEFLOT®	48
VEGEMUST®	47 & 88
VINICLAR® P	50 & 67

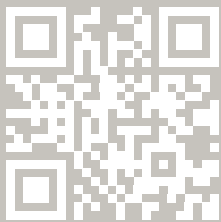
## Z

ZYMAFLORE® 011 BIO	11 & 90
ZYMAFLORE® ALPHA <sup>TD</sup> N.SACCH.	8
ZYMAFLORE® CX9	15 & 90
ZYMAFLORE® DELTA	14 & 87
ZYMAFLORE® EGIDE <sup>TDMP</sup>	4, 87 & 90
ZYMAFLORE® F15	13
ZYMAFLORE® F83	13
ZYMAFLORE® FX10	12
ZYMAFLORE® KHIO <sup>MP</sup>	4, 87 & 90
ZYMAFLORE® OMEGA <sup>LT</sup>	8
ZYMAFLORE® RB2	13
ZYMAFLORE® RB4	13
ZYMAFLORE® RX60	12
ZYMAFLORE® SPARK	17, 90 & 91
ZYMAFLORE® ST	16
ZYMAFLORE® VL1	16, 87 & 90
ZYMAFLORE® VL2	16
ZYMAFLORE® VL3	16 & 90
ZYMAFLORE® X5	14, 87, 90 & 92
ZYMAFLORE® X16	15, 87, 90 & 92
ZYMAFLORE® XAROM	11 & 87
ZYMAFLORE® XORIGIN	15 & 87
ZYMAFLORE® XPURE	12

# NEW AT LAFFORT®



WEBSITE



## LAFFORTUSA.COM

Advanced search filters.

Optimized access to documentation.

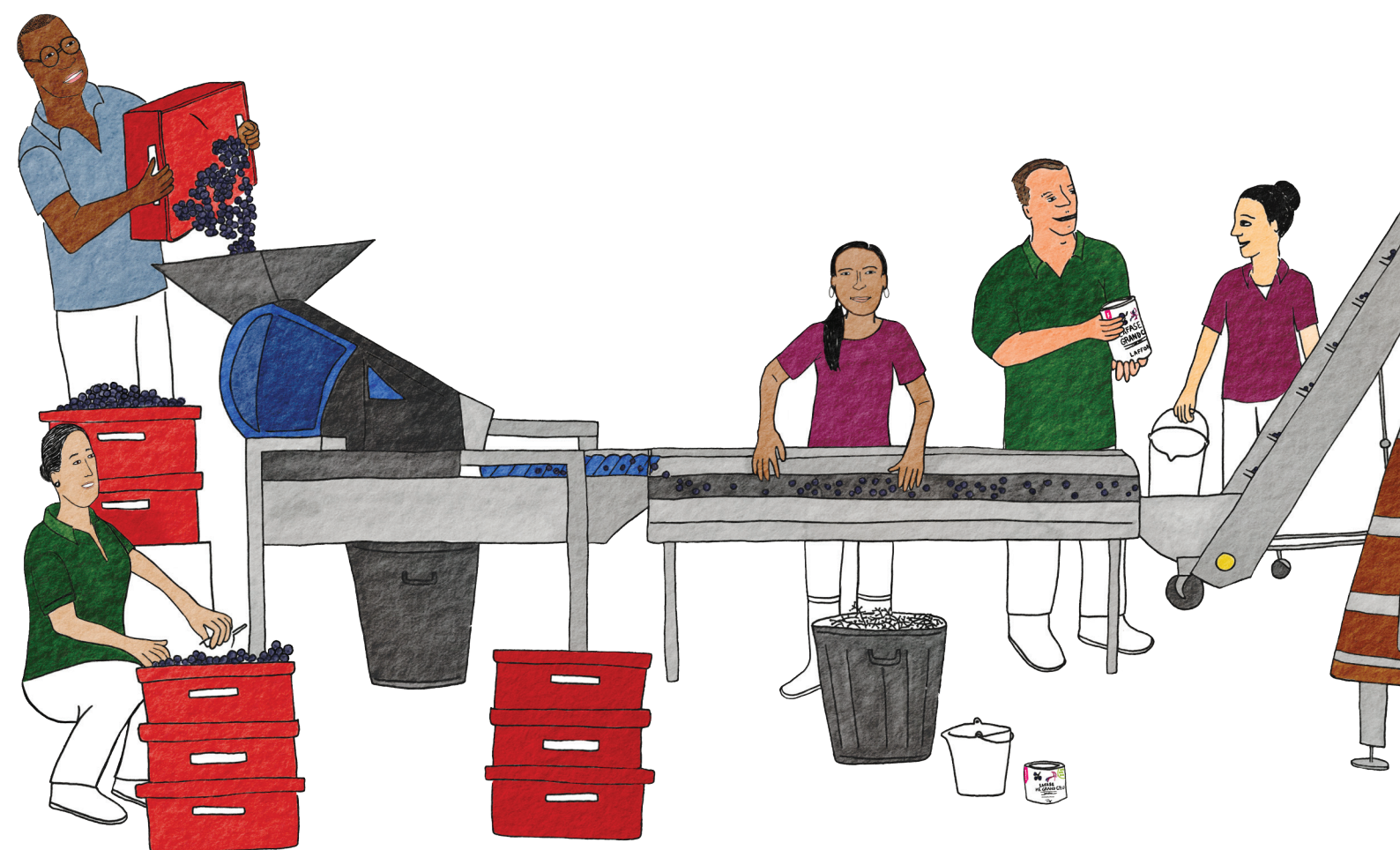
Identification of products that can be used in specific winemaking applications (Vegan, Kosher, allergen-free, organic, etc.).



### LAFFORT

*l'œnologie par nature*





# LAFFORT

*l'œnologie par nature*



The cover of the 2022 catalog is an opportunity to showcase an artist from our region, who also draws inspiration from wine. Bordeaux artist Audrey Bakx created this triptych for LAFFORT®, illustrating the daily life of the men and women who work to produce wine.

Audrey Bakx