

Catalog 23



LAFFORT
l'œnologie par nature

LAFFORT

Dear winemakers,

Always with the aim of providing Oenology with modern tools, LAFFORT® and its unique Oenology Research & Development unit continue to offer new solutions for winemakers.

Our CSR certification, and our commitment to responsible and innovative oenology, clearly demonstrate our determination to meet your concerns, particular when it comes to climate change.

With **BIO**Protection and **BIO**Acidification, we are continuing to offer new tools this year, always inspired by nature: **ZYMAFLORE® KLIMA**, a yeast with low alcohol production for fresher wines, **LACTOENOS® BERRY Direct**, a robust lactic acid bacterium with a differentiating style marked by freshness, the new **OENOFINE®** fining range based on **BIO**Sourced ingredients as an alternative to PVPP, along with other developments to be discovered on our new products page.

There, you will also find **NOBILE®**, with a range of chips specifically intended for spirits.

Our choices and innovations confirm our commitment to **precision oenology inspired by nature**.

We thank you for the trust you have placed in LAFFORT® and all its teams and partners and wish you all the best for this 2023 vintage.

Philippe GUILLOMET
General Manager



2023

LAFFORT® new in



Finding a replacement for PVPP is a real concern for many winemakers. Through its know-how in the selection of raw materials and production, LAFFORT® is able to offer two distinct preparations. The synergy between their ingredients means that OENOFINE® PINK and OENOFINE® NATURE can replace PVPP in its various applications.

OENOFINE® PINK is a powerful tool for managing the hue of musts and wines.

OENOFINE® NATURE plays a specific role in the elimination of oxidised and oxidisable phenolic compounds.

Their high concentration of inactivated yeasts means that they can be used to treat sensations of bitterness and to refine the wine.

OENOFINE® PINK

Preparation based on inactivated yeasts, patatin, activated carbon and sodium bentonite.

P. 47, 68 & 90

OENOFINE® NATURE

Preparation based on inactivated yeasts, vegetable proteins (patatin & pea protein) and calcium bentonite.

P. 47, 68 & 90



EXTRACLEAR®

Formulation of pectolytic enzymes with strong secondary activity, for the clarification of wines and preparation for bottling.

This liquid enzyme preparation has been selected for its strong capacity to clarify even the most difficult wines. EXTRACLEAR® accelerates all mechanisms contributing to wine clarification and microbiological stabilisation. It has a very wide spectrum of action due to its strong secondary activity. The hydrolysis of long-chain clogging colloids significantly improves the filterability of wines, thus preserving their organoleptic potential.

P. 43 & 63

LAFASE® DISTILLATION

Formulation of pectolytic enzymes with very low pectin methyl esterase activity (low release of methanol) for pressing grapes intended for distillation base wine.

LAFASE® DISTILLATION optimises press cycles, increasing the yield of high-quality juice by avoiding the crushing and maceration phenomena responsible for the production of higher alcohols and vegetal compounds. This enzymatic preparation accelerates the hydrolysis of soluble pectin in the must, thus improving quality during decanting and flotation.

P. 44

STABIMAX®

Selection of 100% Acacia Verek gum arabic for the stabilisation of colouring matter in red wines.

Through our expertise in the selection of raw material and the production of gum arabic, we can offer STABIMAX®, a pure and filterable gum that preserves the quality of wines and filtration media.

P. 74



LAFFORT® new in

2023

ZYMAFLORE® KLIMA

Saccharomyces cerevisiae yeasts selected for its ability to reduce the alcohol content and preserve wine acidity.

The result of a selection programme assisted by molecular markers, ZYMAFLORE® KLIMA can restore the balance of wines from grapes adversely affected by global warming. Due to its low alcohol yield and its ability to preserve acidity, wines fermented using ZYMAFLORE® KLIMA are lively and show fresh aromas. This strain is suitable for the production of harmonious red, white and rosé wines, well balanced and with elegant aromas, while respecting varietal flavours and terroirs. Its low production of volatile acidity and SO₂ provides wines in a clean, precise and modern style.

P. 10



LACTOENOS® BERRY Direct

A strain of *Oenococcus oeni* selected for its fermentation performance and its ability to enhance fruit intensity and freshness in wines.

The result of a mass selection programme in collaboration with the IFV, LACTOENOS® BERRY Direct has a particularly slow citric acid degradation metabolism, with significant retention of its initial concentration. LACTOENOS® BERRY Direct is recommended for the production of fresher wines with more intense fruit expression.

P. 30

NOBILE® SPIRIT RANGE

A full range of high-quality chips developed specifically for spirits.

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NOBILE®
L'œnologie du bois

NOBILE® FRUIT SHINE

FRENCH OAK



HOMOGENEOUS
TOASTING

NOBILE® BOURBON CASK

AMERICAN OAK



HOMOGENEOUS
TOASTING

NOBILE® OLD RESERVE

AMERICAN OAK



SOFT
OAK
PROCESS

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BIOPROTECTION

non-*Saccharomyces* yeasts



ZYMAFLORE® KHIO^{MP}

DIRECT INOCULATION

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.

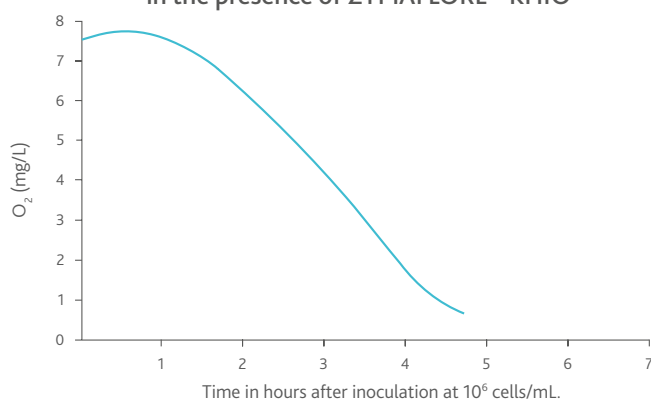
- Colonisation of the medium and maintenance of the population at very low temperature (0°C (32°F)).
- Protection of the must against oxidation due to its strong capacity to consume dissolved oxygen.
- Limits the predominance of potentially undesirable indigenous microorganisms.
- Good compatibility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

Dose: 2 - 5 g/hL (20 - 50 ppm) of ZYMAFLORE® KHIO^{MP} directly on grapes or must (healthy harvest); with or without rehydration. 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^{MP}



ZYMAFLORE® KHIO^{MP} 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.

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® ÉGIDE^{TDMP}

DIRECT INOCULATION

A formulation of two strains (*Torulaspora delbrueckii* and *Metschnikowia pulcherrima*) for use in harvest BIOProtection on grapes, musts and equipment, as an SO₂ reduction strategy.

- Colonisation of the medium without any detected fermentation activity.
- Restriction of the growth of indigenous flora.
- Establishment of the *Saccharomyces cerevisiae* strain selected for the AF is facilitated.
- BIOProtection of the medium in a wide variety of situations (grapes, equipment, juice transport).

Dose: 2 - 5 g/hL (20 - 50 ppm) of ZYMAFLORE® ÉGIDE^{TDMP} directly, rehydrated or non-rehydrated, on grapes or must (healthy grapes). Then inoculate with *Saccharomyces cerevisiae* at 20 g/hL (200 ppm) for the alcoholic fermentation.

500 g

Focus

See Focus P. 5 for the application of ZYMAFLORE® ÉGIDE^{TDMP} to equipment.

ZYMAFLORE® ÉGIDE^{TDMP} BIOPROTECTION OF EQUIPMENT

WHY?

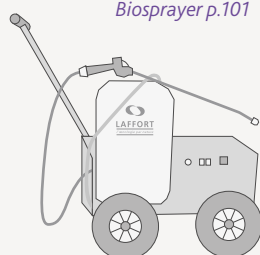
- To limit the predominance of undesirable microorganisms on the surface of equipment in contact with grapes.
- To avoid (microbiological) spoilage linked to the contamination of grapes.

ZYMAFLORE® ÉGIDE^{TDMP} is a formulation based on two strains of the species *T. delbrueckii* and *M. pulcherrima* suitable for many oenological BIOProtection applications.

BIOPROTECTION OF WHAT TYPE OF EQUIPMENT?

- Harvesting machine.
- Grape trailer.
- Grape reception equipment.
- Must transport tanker.
- Harvesting crate.

Biosprayer p.101



CONCENTRATION OF ZYMAFLORE® ÉGIDE^{TDMP} IN THE SPRAYER: 50 g/L

Equivalent ZYMAFLORE® ÉGIDE^{TDMP} on the grapes: 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 mn.
- Harvesting machine: 2 - 3 L of solution - 4 to 5 mn.

ZYMAFLORE® ÉGIDE^{TDMP} solution can be stored for 5 - 6 hours at 25°C (77°F).

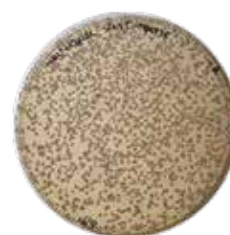
SPRAYING ZYMAFLORE® ÉGIDE^{TDMP} ON EQUIPMENT

Microbiological analysis of grapes in the cellar, with and without prior application of ZYMAFLORE® ÉGIDE^{TDMP} 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 moulds and potentially undesirable microorganisms on grapes at the end of the picking day.



BIOProtection with ZYMAFLORE® ÉGIDE^{TDMP}: absence of moulds with exclusive and progressive colonisation of *Torulaspora delbrueckii* and *Metschnikowia pulcherrima* (identification and population level of 9.6×10^6 cells/mL confirmed via qPCR analysis).



TESTIMONY

"I have been using ZYMAFLORE® ÉGIDE^{TDMP} for the past 5 or six years. The primary reason for using ZYMAFLORE® ÉGIDE^{TDMP} is to extend our cold maceration time on Pinot Noir before fermentation. This has also enabled us to do the cold maceration with lower levels of sulphur. We have noticed lower levels of volatile acidity post fermentation and that the onset of fermentation, whether inoculated or not is more homogeneous and with very little production of ethylacetate during the very initial start of the fermentation. To summarize, we have not only seen prolonged cold maceration at lower sulphur levels but also cleaner and more homogeneous fermentations with lower volatile acidity."

ANDRIES BURGER
Winemaker, Paul Clüver

FOCUS

BIOPROTECTION

HOW AND WHY?

- **BIOProtection** consists of adding a living organism to occupy an 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 risk of wine spoilage.

PREREQUISITES

- Microorganisms selected from the grape and/or must microflora.
- Microorganisms with low fermentation activity at the inoculated dose able to colonise the medium.
- Selection of high-quality strains from among oenological species.

TWO **BIO**PROTECTION SOLUTIONS FROM LAFFORT®

Characteristics of the two **BIO**Protection solutions from LAFFORT®:

ZYMAFLORE® ÉGIDE ^{TDMP} Mixture of 2 strains of the species <i>Torulaspora delbrueckii</i> and <i>Metschnikowia pulcherrima</i>	ZYMAFLORE® KHIO ^{MP} Specific strain of the species <i>Metschnikowia pulcherrima</i>
Implantation capacity 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.



IMPACT OF SO₂ REDUCTION ON THE MICROBIAL POPULATION

Reducing SO₂ levels in must increases the microbiological pressure, resulting in larger indigenous populations compared to conventional sulphite additions. Depending on the oenological context, the effect can be variable, as shown below.

	SO ₂ -	SO ₂ +
<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 react in the same way to variations in SO₂ levels. *Hanseniaspora uvarum*, a detrimental yeast species known to produce volatile acidity, is particularly favored by lower SO₂ concentrations.

Using **BIO**Protection allows to reduce SO₂ doses without compromising wine quality.

Strong microbiological pressure in the must without added SO₂ can limit the implantation of the inoculated *S. cerevisiae* strain. Consequently, the production of undesirable compounds (ethyl acetate and VA) and SO₂-binding compounds is comparatively higher than in the **BIO**Protected modality without SO₂.

		No sulphite	No sulphite + ZYMAFLORE® ÉGIDE ^{TDMP}
Analysis during AF	Establishment of the <i>S. cerevisiae</i> strain	Negative	Positive+
	TL35 (mg/L)	74	61
Analysis post AF	Acétate d'éthyle (mg/L)	86	61
	VA (g/L H ₂ SO ₄)	0.22	0.13

Impact of using ZYMAFLORE® ÉGIDE^{TDMP} (5 g/hL (50 ppm)) during vinification with no sulphite added. Inoculation of a *S. cerevisiae* strain (20 g/hL (200 ppm)) after a 48h cold soak at 12°C (53°F).

FOCUS

BIOPROTECTION & OXYGEN CONSUMPTION

ZYMAFLORE® KHIO^{MP}

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

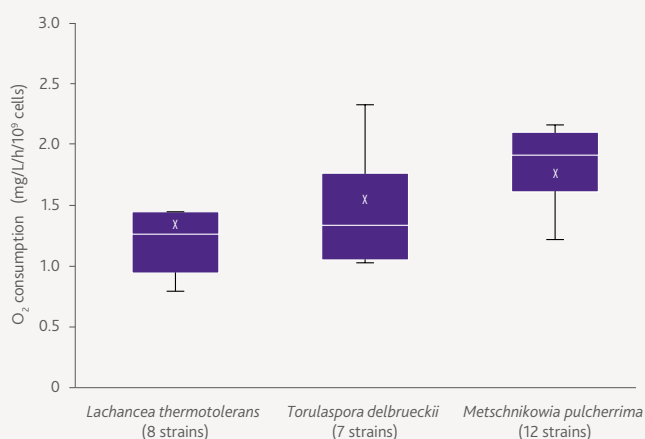
Selected strain of *Metschnikowia pulcherrima* with a high capacity to consume dissolved oxygen in musts while limiting the development of potentially undesirable indigenous flora.

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

- On white and rosé musts (stabulation).
- On grapes during cold soak.

The concentration of dissolved oxygen in musts varies with temperature, with lower temperatures resulting in higher O₂ solubility. ZYMAFLORE® KHIO^{MP} is capable of proliferating at low temperatures, thus providing adequate antioxidant activity in such scenarios.

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

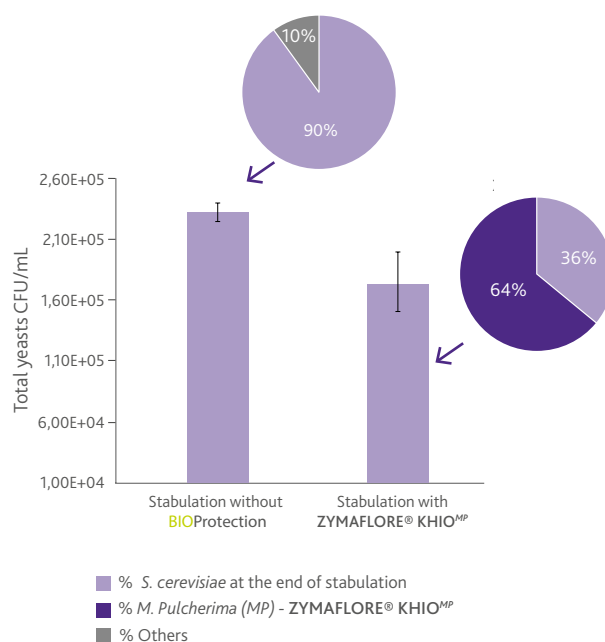


MORE BIOPROTECT project, 2021 -
Windholtz, S., Masneuf-Pomarède, I., Nioi, C.

BIOPROTECTION & CONTROL OF THE MICROBIAL POPULATION

The present of nutrient-rich solids during long pre-fermentation phases of musts (i.e., stabulation) can encourage the growth of indigenous microflora and lead to spontaneous alcoholic fermentation. This can compromise the clarification process and the implantation of a selected *S. cerevisiae* strain, thereby negatively affecting wine quality.

ZYMAFLORE® KHIO^{MP} limits the development of indigenous microflora.



Stabulation for 10 days at 4°C (39.2°F).

At the start of stabulation inoculation with ZYMAFLORE® KHIO^{MP} at 5 g/hL (50 ppm).

Control: Indigenous *S. cerevisiae* strains represent over 90% of the detected microflora at the end of stabulation.

BIOProtection: colonisation of ZYMAFLORE® KHIO^{MP} limits the development of indigenous *S. cerevisiae* yeasts and the risk of spontaneous fermentation during stabulation.

BIOACIDIFICATION

AROMATIC COMPLEXITY

non-*Saccharomyces* yeasts



ZYMAFLORE® ALPHA^{TD N. SACCH}

500 g

Yeast of the species *Torulaspora delbrueckii* that increases aromatic complexity and mouthfeel. All grape varieties.

- Brings out varietal and fermentation aromas.
- Adds **mouthfeel volume** through high polysaccharides production.
- Low volatile acidity production in high sugar and *Botrytis* infected musts.
- Inoculate with the chosen strain of *Saccharomyces cerevisiae* 24 to 72 hours after the addition of ZYMAFLORE® ALPHA^{TD N. SACCH} to secure the completion of alcoholic fermentation and to benefit from the sensory impact of ZYMAFLORE® ALPHA^{TD N. SACCH}.

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



ZYMAFLORE® OMEGA^{LT}



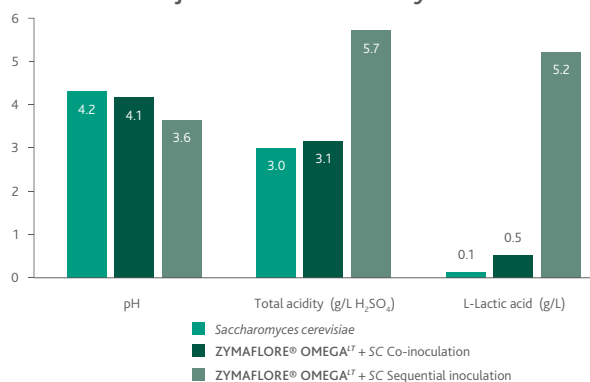
500 g

Yeast of the species *Lachancea thermotolerans* for the BIOAcidification of wines (red, white and rosé). Allows adjustment of the acid balance and favours a fresh organoleptic profile.

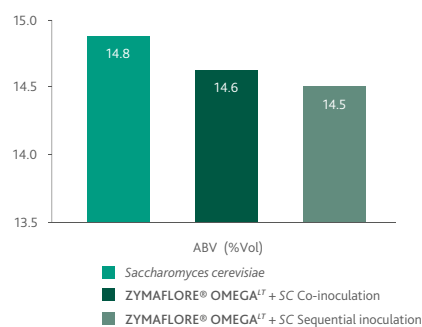
- Selected for its **strong ability to produce L-lactic acid** from fermentable sugars.
- **Decrease in the pH** and increase in the total acidity of wines accompanied by a slight reduction in alcohol content.
- Recommended for healthy and lightly sulphited harvests (less than 4 g/hL (40 ppm)).
- To be used in co-inoculation (simultaneous yeast additions) or in sequential inoculation with the chosen strain of *Saccharomyces cerevisiae* to complete the alcoholic fermentation. Sequential inoculation of *Saccharomyces cerevisiae* favours the expression of ZYMAFLORE® OMEGA^{LT}.
- Suitable for the preparation of batches used to increase acidity when blending: "oMEGA FRESH TANK" concept. [See Focus P. 9.](#)

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

Adjustment of the acidity



Adjustment of the alcohol level



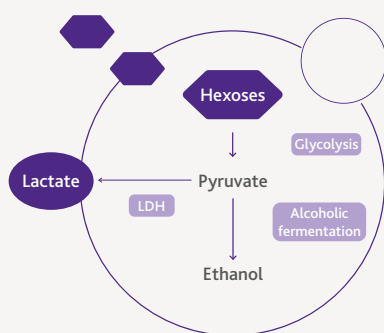
Wines resulting from co-inoculation (simultaneous yeast additions) or sequential inoculation with ZYMAFLORE® OMEGA^{LT} and a strain of *Saccharomyces cerevisiae*.
Conditions: Viognier, Australia, 2019; AF temperature 18 °C (64°F), pH 3.9 (Hranilovic et al. 2022).

FOCUS

BIOACIDIFICATION WITH *LACHANCEA THERMOTOLERANS*

Lachancea thermotolerans is a yeast naturally present on grapes. It has a unique ability to partially convert fermentable sugars (glucose + fructose) into L-lactic acid instead of ethanol during alcoholic fermentation.

Mechanisms of BIOAcidification by
Lachancea thermotolerans



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

The BIOAcidification capacity varies from one strain of *Lachancea thermotolerans* to another. Some strains produce very little lactic acid, while other strains produce high levels of this metabolite.

LAFFORT® SOLUTION



ZYMAFLORE® OMEGA^{LT}

Selected from over 100 *Lachancea thermotolerans* strains for its capacity to produce high levels of lactic acid, ZYMAFLORE® OMEGA^{LT} imparts freshness and restores wine balance.

The level of BIOAcidification induced by ZYMAFLORE® OMEGA^{LT} varies depending on the winemaking objectives and the vinification conditions, in particular the temperature of AF and the timing of *Saccharomyces cerevisiae* inoculation. Its metabolic activity is stronger at higher temperatures (>20°C (>68°F)) and in the absence of *Saccharomyces cerevisiae* (sequential inoculation).

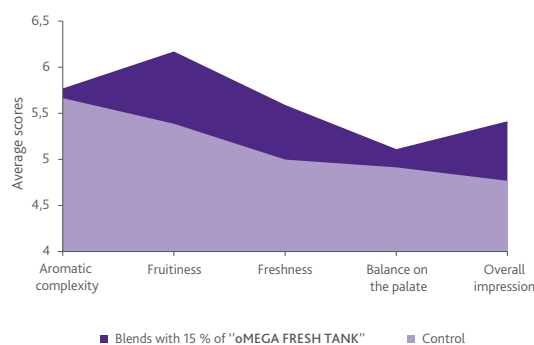
ANALYTICAL & SENSORY IMPACT

- Enhanced acidity perception and fresher organoleptic profiles of wines from warm climates/vintages.
- Decrease in pH and increase in total acidity of the wines, accompanied by a slight decrease in alcohol content.
- Colour stabilisation and increased ageing capacity.
- Alternative to traditional acidification using organic acids; exempt from labelling requirements.
- Enhanced microbial stability during aging due to lower pH resulting in higher levels of molecular SO₂.
- BIOControl activity against lactic acid bacteria. Inhibition of MLF with lactic acid production higher than 3 - 4 g/L.

"OMEGA FRESH TANK" CONCEPT

- Technological alternative: production of strongly acidified batches of wines "oMEGA FRESH TANK" to be used as blending components. Improvement of acidity parameters and aromatic profiles in wines.

Enhanced sensory profile of wines due to blending with a component fermented with ZYMAFLORE® OMEGA^{LT}



Sensory evaluation of 4 wines: comparison of control wines and blends with the addition of "oMEGA FRESH TANK". Control wines were made in 2022, 2021, 2020 and 2019, and blended with 15% of "oMEGA FRESH TANK" in 2023.

ZYMAFLORE® - ALL TYPES OF WINES

Saccharomyces cerevisiae yeasts

NEW IN 2023 - ALCOHOL/ACIDITY TUNING



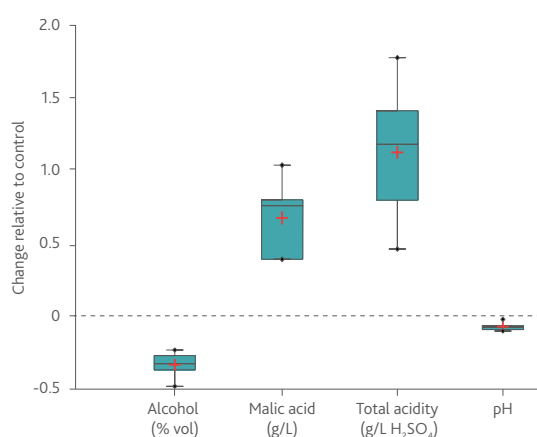
ZYMAFLORE® KLIMA

500 g

The result of a selection programme assisted by molecular markers, ZYMAFLORE® KLIMA can reduce the alcohol content of wine while preserving its acidity.

- Reduction in alcohol content by up to 0.5% vol.
- **Preservation or production of malic acid** during the AF: exceptionally fresh and lively wines.
- Suitable for the production of harmonious and well-balanced **red, white and rosé** wines.
- **Elegant aromas** respecting grape varieties and terroirs.
- Very low production of volatile acidity and SO₂.

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



Tuning of alcohol and acidity parameters in wines vinified with ZYMAFLORE® KLIMA compared with control yeasts.

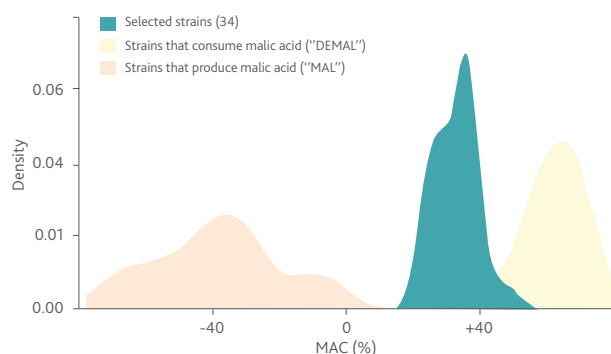
Cumulative results of field trials:

Reduction of alcohol and pH.

Increase in malic acid concentration and total acidity.

? Tuning acidity with *Saccharomyces cerevisiae*: patented expertise

The strain of *Saccharomyces cerevisiae* has a significant impact on the acidity level in the wine during AF, most strains partially consume the malic acid initially present in the grapes. Research by **BIOLAFFORT®** R&D has made it possible to increase this variability by using breeding techniques and selection assisted by Quantitative Trait Loci (QTL). The strains thus selected show a very pronounced capacity to either consume or produce malic acid during the AF, improving the balance of wines in various winemaking protocols.



The MAC ("Malic Acid Consumption") parameter represents malic acid consumption by *S. cerevisiae* during the AF.

The value is positive when malic acid is broken down, and negative when malic acid is produced (Vion et al. 2021).

ZYMAFLORE® - ALL TYPES OF WINES

Saccharomyces cerevisiae yeast



ZYMAFLORE® XarOm

AROMATIC EXPRESSION

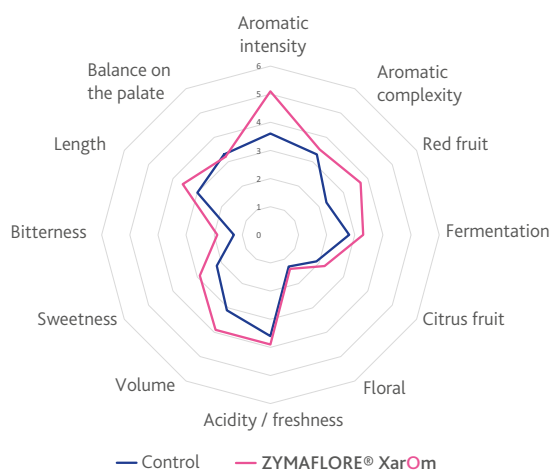
Yeast allowing intense production of fermentation aromas, (boiled sweets, strawberry, pineapple, etc.) and varietal aromas. All types of wine.

- Production of red, white and rosé wines with very great aromatic intensity.
- Suitable for vinification of many aromatic and neutral grape varieties.
- Genetic ability to preserve malic acid during AF.
- Very low production of volatile acidity.

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



500 g
10 kg



Wine inoculated 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

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.

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

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

500 g
10 kg

RED WINES

Saccharomyces cerevisiae yeasts



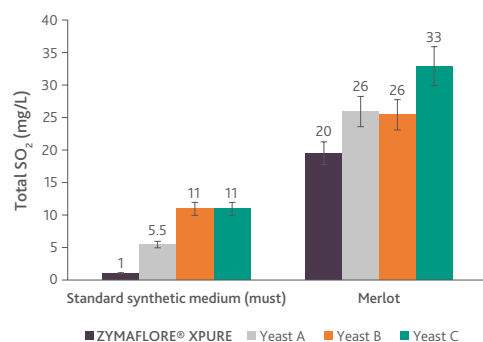
ZYMAFLORE® XPURE LOW SO₂

500 g
10 kg

Yeast for varietal red wines. Enhances aromatic purity.

- Suitable for vinification with reduced doses of sulphites for a low total SO₂.
- Low production of volatile acidity.
- Well 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.

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



ZYMAFLORE® XPURE allows for lower concentrations of total SO₂ at the end of the alcoholic fermentation.

Medium synthetic must, ABV: 13% vol.,
total SO₂: 20 mg/L (20 ppm). Merlot trial: ABV: 15% vol.,
total SO₂: 40 mg/L (40 ppm).



ZYMAFLORE® FX10 FRUCTOPHILIC YEAST

500 g
10 kg

Yeast for wines showing structured and silky tannins. Cabernet Sauvignon, Cabernet Franc, Merlot...

- Improved cell viability at high fermentation temperatures.
- Preserves **varietal specificity and terroir** (very low production of fermentation aromas).
- Good for ageing 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.

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



ZYMAFLORE® RX60 DIRECT INOCULATION

500 g
10 kg

Yeast for fruity, spicy red wines. Syrah, Grenache, Tempranillo and fruit forward wines...

- Very high aroma production (fresh currant and berry aromas).
- Low production of H₂S.
- LACTOENOS® BERRY *Direct* recommended in early co-inoculation to preserve aromatic freshness.

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

? Pratical advice

Consider **SUPERSTART® ROUGE** to optimise yeast viability in juice and must with high sugar concentration.

See P. 23.

RED WINES

Saccharomyces cerevisiae yeasts



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 ageing.

Dose: 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 colour **matter adsorbtion**.
- Good aptitude for expressing **typical aromas** like cherry/kirsch.

Dose: 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.

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

500 g



ZYMAFLORE® RB4

Yeast for aromatic wines, "primeur" style.

- 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**.

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

500 g

Pratical advice

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 ageing while raising its aromatic potential and fruit expression.

Dose: 2 to 4 g/L. **See P. 82.**

WHITE & ROSÉS WINES

Saccharomyces cerevisiae yeasts



ZYMAFLORE® X5

DIRECT INOCULATION

AROMATIC EXPRESSION

500 g
10 kg

Yeast for aromatic white wines with excellent thiol expression. Sauvignon blanc, Pinot Gris, Riesling, Gewürztraminer & rosé...

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

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

SELECTING YOUR YEAST STRAIN FOR HIGH-THIOL WINE VARIETIES

	ZYMAFLORE® DELTA	ZYMAFLORE® X5	ZYMAFLORE® VL3
Varietal expression	..... (grapefruit / 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)

? Practical advice

To increase the thiol concentration in your wines, think about [LAFAZYM THIOLS^{\[1\]}](#).

See our focus on aromas [P. 39](#).



ZYMAFLORE® DELTA

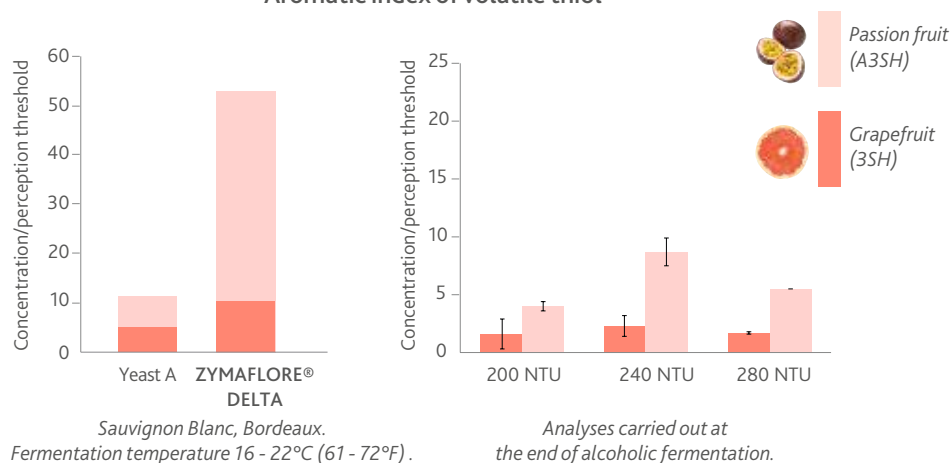
500 g

Yeast for aromatic white and rosé wines. Sauvignon Blanc, Viognier, Chenin Blanc, Gewürztraminer, Riesling, Pinot Gris...

- **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 sulphur-containing compounds even at high turbidities.

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

Aromatic index of volatile thiol



WHITE & ROSÉS WINES

Saccharomyces cerevisiae yeasts



ZYMAFLORE® XORIGIN

500 g

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

All types of grape variety.

- **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 vinification with reduced doses of sulphites, low total SO₂.
- Low production of volatile acidity.
- Very good fermentation capacities.
- POF(-) character [no formation of vinyl phenols]: **fine and clean aromatic profile**.

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



ZYMAFLORE® CX9

500 g
10 kg

Yeast resulting from selection from a great Burgundy vineyard and *breeding* technology. Chardonnay, Sémillon...

- 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 vinification.

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

Focus

#TYPICAL CHARDONNAY

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



ZYMAFLORE® X16

500 g
10 kg

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

- 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 H₂S.

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

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 & ROSÉS WINES

Saccharomyces cerevisiae yeasts



ZYMAFLORE® VL1

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

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

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

500 g
10 kg



ZYMAFLORE® VL2

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

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

Dose: 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, Gewürztraminer, Riesling, Colombard & Pinot Gris...

- Isolated from one of the best Sauvignon Blanc vineyards in Bordeaux.
- Good aptitude for expressing the **varietal aromas** such as volatils thiols from the odourless precursors in the must.
- **Volume** and **roundness** in the mouth, release of the protein Hsp12 (sensation of sweetness).

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

500 g
10 kg



ZYMAFLORE® ST

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

- Strain selected in Sauternes.
- Sensitive to SO_2 for arresting fermentation easily and **low production** of SO_2 binding compounds.
- Resistance to high sugar concentration.

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

500 g

Pratical advice

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 ageing while raising its aromatic potential and fruit expression.

Dose: 0.5 - 2 g/L (500 - 2000 ppm). **See P. 82.**

SPARKLING WINES

Saccharomyces cerevisiae yeasts



ZYMAFLORE® SPARK

FRUCTOPHILIC YEAST

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 SO₂ and alcohol levels.

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

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

500 g
10 kg
125 kg

Tested and validated by the laboratory for microbiological technical pole CIVC (Comité Interprofessionnel du Vin de Champagne).

? Practical advice

For the complete range of products for sparkling wines (SPARK range) and LAFFORT® recommendations. See P. 91.

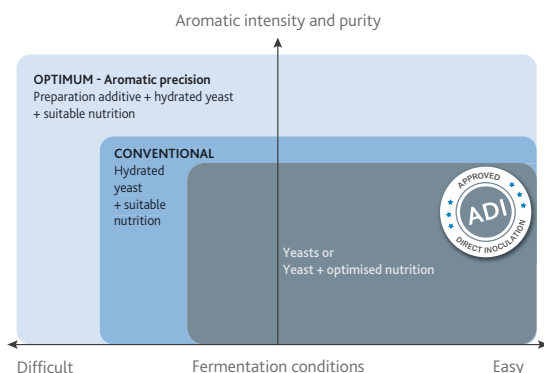
ADI - YEASTS APPROVED FOR DIRECT INOCULATION



LAFFORT® made available 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 range for easier application while preserving their intrinsic characteristics.

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 (low temperature, high fermentable sugar concentration, 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 characteristic of good winemaking practice for the production of quality wines.

Find out more:

Discover our **YEAST REHYDRATION** video on our website, at **LAFFORT & YOU** section.

ZYMAFLORE® SACCHAROMYCES

Yeast excellence

	Grape variety	Yeast	Alcohol Resistance* (%v/v)	Nitrogen Requirements	Optimal Fermentation Temperature	Fermentation Kinetics
RED WINE	Merlot, Cabernet Sauvignon, Cabernet Franc, Pinot Noir...	F15	16%	Medium	20 - 32°C 68 - 90°F	Rapid
	Grenache, Carignan, Sangiovese, Mourvedre, Syrah, Merlot...	F83	16.5%	Medium	20 - 30°C 68 - 86°F	Regular
	Cabernet Sauvignon, Petit Verdot, Malbec...	FX10	16%	Low	20 - 35°C 68 - 95°F	Regular
	Pinot Noir, Merlot, Gamay...	RB2	15%	Low	20 - 32°C 68 - 90°F	Regular
	Aromatic wines, "primeur" style...	RB4	15%	Low	20 - 30°C 68 - 86°F	Rapid
	Syrah, Grenache, Tempranillo...	RX60	16.5%	High	20 - 30°C 68 - 86°F	Regular
	Terroir highlight	XPURE	16%	Medium	15 - 30°C 59 - 86°F	Regular
WHITE & ROSÉ WINE	Wine balance	KLIMA	16%	High	14 - 30°C 57 - 86°F	Regular
	Aromatic intensity all grape varieties	XAROM	15%	High	14 - 30°C 57 - 86°F	Regular
	Organic certified yeast	011 BIO	16%	Low	14 - 26°C 57 - 79°F	Rapid
	Pinot Gris, Riesling, Pinot Blanc, Melon de Bourgogne, Sylvaner, Müller Thurgau...	XORIGIN	15.5%	Low	14 - 22°C 57 - 72°F	Rapid
	Chardonnay	CX9	16%	Medium	14 - 22°C 57 - 72°F	Regular
	Riesling, Pinot Gris, Viognier, Chenin, Vermentino, Gewurztraminer, Sauvignon Blanc	DELTA	14.5%	High	14 - 22°C 57 - 72°F	Regular
	Secondary fermentation (sparkling wines)	SPARK	17%	Low	10 - 32°C 50 - 90°F	Rapid
	Sweet wines	ST	15%	High	14 - 20°C 57 - 68°F	Regular
	Chardonnay, Semillon, Riesling, Gewurztraminer, Chenin, Muscat...	VL1	14.5%	High	16 - 20°C 61 - 68°F	Regular
	Chardonnay Semillon, Viognier	VL2	15.5%	Medium	14 - 20°C 57 - 68°F	Regular
	Sauvignon Blanc, Colombard...	VL3	14.5%	High	15 - 21°C 59 - 70°F	Regular
	Sauvignon Blanc, Colombard, Rolle, Manseng, Riesling...	X5	16%	High	13 - 20°C 55 - 68°F	Rapid
	Chenin, Chardonnay, Ugni Blanc, Colombard...	X16	16.5%	Medium	12 - 18°C 54 - 64°F	Rapid



ALL TYPE OF WINE

WHITE & ROSÉ WINE






* 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.

ACTIFLORE®

Saccharomyces cerevisiae yeasts

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 combining compounds...) and with the **aromas** (many potential off-flavours).

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® ROUGE** or **SUPERSTART® BLANC & ROSÉ** and a higher yeast dose rate for wines with high alcohol potential.

ACTIFLORE® ROSÉ

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**.

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

500 g
10 kg

Find out more:

Discover our **FERMENTATION RESTART PROTOCOL** on our website, at **LAFFORT & YOU** section.

ACTIFLORE®

Saccharomyces cerevisiae yeasts

ACTIFLORE® BO213

DIRECT INOCULATION

FRUCTOPHILIC YEAST

500 g
10 kg

Fermentation restart and clean aromatic profile.

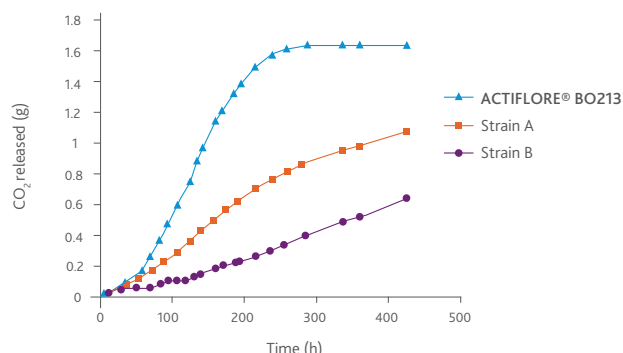
- Very strong ability to restart sluggish or stuck fermentations.
- Excellent fermentation capacity.
- Ferments at low temperatures (10 - 12°C (50 - 54°F)).
- Tolerates extremely high alcohol (18 % vol.) levels.

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

30 - 50 g/hL (300 - 500 ppm) for stuck fermentations. Fermentation restart protocol - See P. 104.

? Fructophilic character

S. cerevisiae metabolises 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. 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.



Fermentation kinetics at end of AF

Synthetic medium representative of a wine with stuck fermentation: 16 g/L fructose, no glucose and 13.5% vol. ethanol.

ACTIFLORE® F33

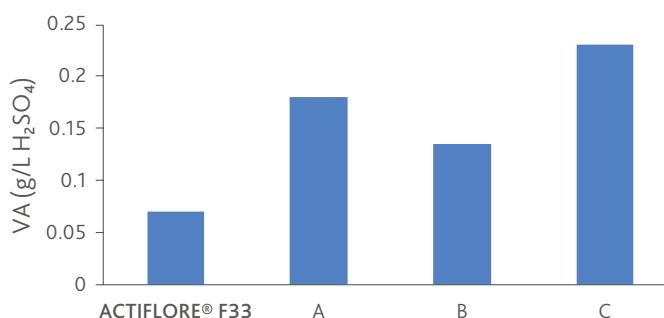
DIRECT INOCULATION

500 g
10 kg

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.

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



Volatile acidity at the end of AF

Cabernet Sauvignon; 13.5% vol., pH 3.6.

ACTIFLORE®

Saccharomyces cerevisiae yeasts

ACTIFLORE® F5

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 SO₂.
- Low production of higher alcohols, ethanal, ethyl acetate.

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

500 g

ACTIFLORE® CEREVISIAE

Starter yeast.

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

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

500 g
10 kg

ACTIFLORE® RMS2

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 H₂S.
- Also recommended for secondary fermentation of sparkling wines.

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

500 g
10 kg

ACTIFLORE® D.ONE

DIRECT INOCULATION

Yeast-based preparation associated with an activator. 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).

Dose: 30 - 40 g/hL (300 - 400 ppm) (depending on the potential alcohol).

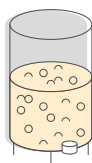
50 g/hL (500 ppm) in case of late inoculation.

5 kg

NUTRIENTS

The best for your yeasts

A stressful fermentation results in aroma defects and the production of factors that inhibit 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.



REGULAR FERMENTATION

Avoid rapid fermentation or heat spikes.

NEEDS

Nutritional balance between mineral and organic nitrogen.

RECOMMENDATION

Partially or completely correct with organic nitrogen (**NUTRISTART® range**) and not only with ammonium salts. Make two additions during the first third of fermentation.

HEALTHY FERMENTATION COMPLETION

Avoid stuck fermentations and possible organoleptic defects.

NEEDS

Yeast viability and vitality. Cell membrane resistant to acid and alcohol stresses.

RECOMMENDATION

Use yeast rehydration products during the rehydration phase to add sterols and long-chain fatty acids to strengthen the cell membrane (**SUPERSTART® range**).



CLEAN AROMATIC PROFILE

Low H_2S and sulphur compound production, low VA, low masking of aromas.

NEEDS

Stress minimisation and good cell membrane permeability.

RECOMMENDATION

Rehydrate the yeast with specific rehydration nutrients (**SUPERSTART® range**). Supplies yeasts with pantothenic acid (vitamin B5) naturally present in nutrients based on yeast derivatives to control/minimise H_2S production.

AROMATIC OPTIMISATION

Expression of varietal aromas and/or production of fermentation aromas.

NEEDS

Cell membrane permeability. Vitamins, minerals and precursors of fermentation esters (amino acids).

RECOMMENDATION

Supplies sterols during rehydration to ensure the fluidity of membrane transport (**SUPERSTART® range**). Nutrition quality and quantity to be determined in relation to desired aromatic profile.

YEAST PERFORMANCE OPTIMISATION

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.
- Significantly **reduce production** of VA and H₂S.
- 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.
- To be used particularly in cases of high potential alcohol, low turbidity white juice, low fermentation temperature or yeast restart cultures.
- To be added into yeast rehydration water.

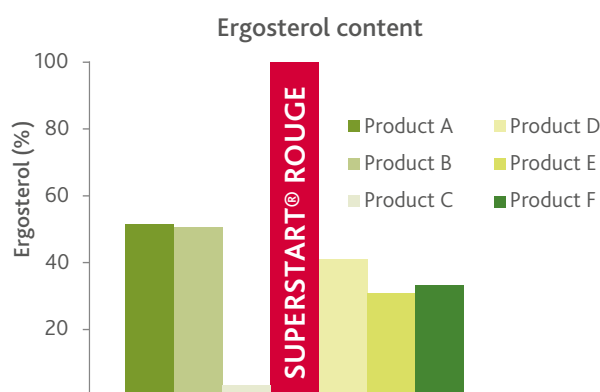
Dose: 20 - 30 g/hL (200 - 300 ppm) (increase the dosage for potentially high alcohol juice and must).

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.

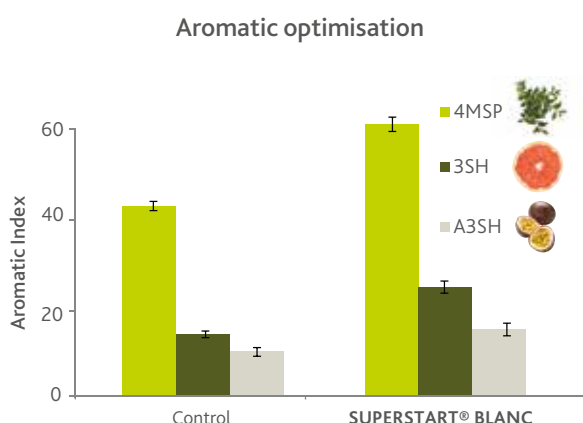
SUPERSTART® *Blanc* (white and rosé wines)

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



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

*This sterol gives yeast a higher resistance to ethanol.



Sauvignon Blanc. ABV 12.5%. ZYMAFLORE® X5.

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

4MSP: boxwood / A3SH: passion fruit / 3SH: grapefruit.

Practical advice

Use SUPERSTART® SPARK for secondary fermentation and starters for stuck fermentation.

See P. 93 & 94.

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) similar to those naturally present in grapes, highlighting wine organoleptic complexity.
- Glutathione-rich formula useful during vinification 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.

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



1 kg
5 kg
20 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...) favouring 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 SO₂, H₂S, 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.

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



200 g
1 kg
5 kg
20 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) of **NUTRISTART®** provides about 15 mg/L (15 ppm) assimilable nitrogen.

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



1 kg
5 kg
20 kg

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®	21 mg/L (21 ppm)		• • • •	• •	•

YEAST NUTRITION

The best for your yeasts

YEAST NUTRITION - OTHERS

	PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
NUTRITION	THIAZOTE®	Alcoholic fermentation activator (ammonium sulfate and thiamine). 10 g/hL (100 ppm) of THIAZOTE® provides 21 mg/L (21 ppm) assimilable nitrogen.	To be determined according to fermentation conditions (Initial YAN, potential alcohol...).	1 kg 5 kg 25 kg
	THIAZOTE® PH	Alcoholic fermentation activator (diammonium phosphate and thiamine). Suitable for organic according to Commission Regulation (EU) 848/2018. 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, probable alcohol...).	1 kg 5 kg 25 kg
DETOXIFICATION	BI-ACTIV®	A formulation of survival factors, yeast cell walls, inactivated yeast, and inert supporting elements. To be used when fermentation slows down or becomes stuck. Does not contain DAP.	30 - 60 g/hL (300 - 600 ppm).	1 kg 10 kg
	OENOCCELL®	Highly purified yeast cell walls. Stimulate and activate alcoholic fermentation.	20 - 40 g/hL (200 - 400 ppm), depending on the type of treatment.	1 kg
	OENOCCELL® BIO 	Yeast cell walls certified organic according to organic production methods in European regulation (EU) 848/2018, and complies with American regulations (NOP) on organic production.	20 - 40 g/hL (200 - 400 ppm), depending on the type of treatment.	1 kg
SUPPORT	TURBICEL®	Cellulose powder for over-clarified juice. 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 nutrition: nitrogen adjustment

Calculate organic and/or inorganic nitrogen additions to allow complete alcoholic fermentations, expressing the character of the harvest.

Find out more:

Discover our **DMT YEAST NUTRITION** on our website, at **LAFFORT & YOU** section.





YEAST NITROGEN NUTRITION

THE DEMAND FOR YEAST NITROGEN

The nitrogen sources that can be used by *Saccharomyces cerevisiae* are ammonium (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. However, 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 (d-30), at the point when the biomass is at its highest density. Consequently, irrespective of the initial nitrogen content, supplementary 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.

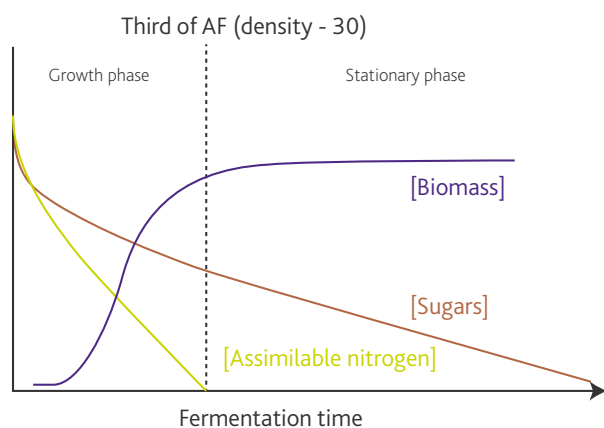
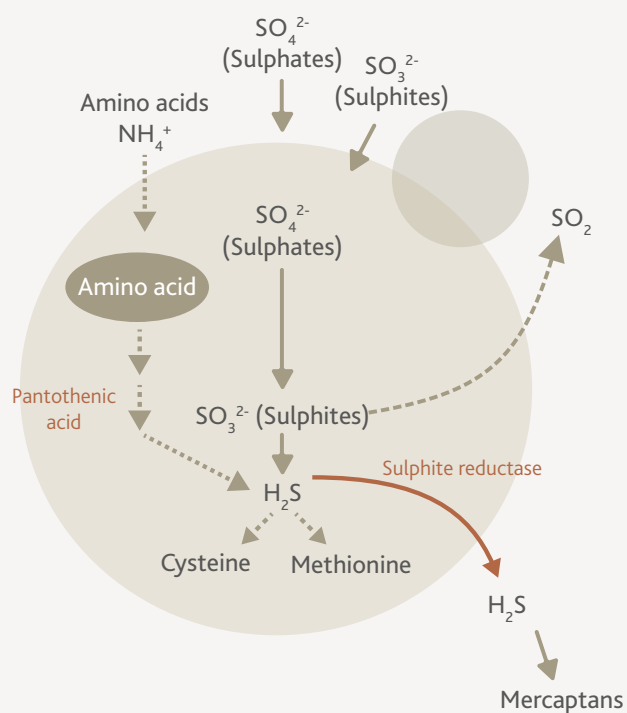


Figure 1: Assimilation of nitrogen and production of biomass during alcoholic fermentation.

Did you know?

The key enzyme in the production of H_2S is sulphite reductase. When the H_2S and amino acids pathways meet the sulphur amino acids (cysteine and methionine) are produced. Where there is an imbalance between these two pathways and a nitrogen deficiency, the precursors of these sulphur amino acids are limiting, leading to an accumulation of H_2S .



FOCUS

WHY ORGANIC NUTRITION ?

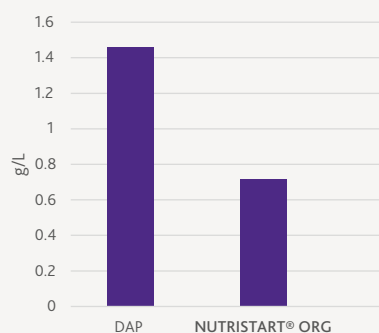
Organic nitrogen is supplied by adding yeast derivatives (usually autolysed yeast). In addition to amino acids, these yeast derivatives include lipids, vitamins and minerals which also contribute to the efficient performance of the yeast.

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 SO₂ and sulphur compounds (H₂S and mercaptans).
- Produce healthy, but not excessive, biomass.
- Limit the risk of stuck or sluggish fermentation.

Glucose + fructose at the end of AF



Total SO₂ at end of AF

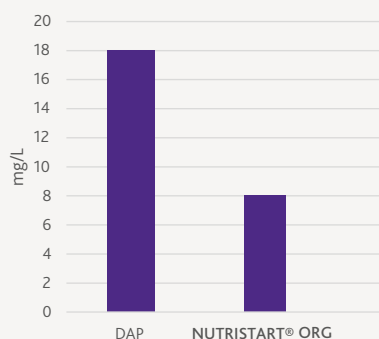


Figure 2: Concentrations of glucose + fructose and total SO₂ at the end of alcoholic fermentation. Must derived from Sauvignon Blanc (potential alcohol volume: 13.9%, initial assimilable N: 125 mg N/L), 2016.

At the one-third point of alcoholic fermentation, 35 mg N/L were added with DAP or NUTRISTART® ORG, deliberately making yeast conditions difficult.

ORGANOLEPTIC 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 sulphur 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).

These 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.

BACTERIA

Control of the malolactic fermentation

USE & PREPARATION OF LACTOENOS BACTERIA

The selection of oenological bacteria requires significant know-how and expertise to meet the oenological and technical requirements of winemakers. For this reason, the LACTOENOS® range of bacteria is the result of a demanding selection programme over several years.

WITHOUT REACTIVATION		PRIOR REACTIVATION	
All types of wine		Sparkling – low pH	Difficult conditions Curative MLF
LACTOENOS® B7 Direct LACTOENOS® BERRY Direct		Starter	
LACTOENOS® B7 Direct LACTOENOS® BERRY Direct		LACTOENOS B16 Standard	LACTOENOS B7 Direct
DIRECT SPRINKLING IN THE TANK		REACTIVATION IN MUST OR WINE (depending on the malic acid concentration)	REACTIVATION IN WINE Minimum 24 hours (depending on the malic acid concentration)
ACCLIMATISATION Sequential inoculation: 12 hours Early co-inoculation: 30 minutes		PREPARATION OF A STARTER 5 to 10 days Correction of pH	PREPARATION OF A STARTER 5 to 10 days

Find out more:

Consult our protocols "Reactivation of LACTOENOS® B16 STANDARD bacteria – Sparkling wines" and "Restarting the malolactic fermentation (MLF)" in the LAFFORT & YOU area of our website.

SPECIFIC CHARACTERISTICS OF THE STRAINS

<div> ● Red ● White ● Rosé </div>		LACTOENOS® B7	LACTOENOS® BERRY	LACTOENOS® 450	LACTOENOS® B16
INOCULATION METHOD		Direct		PreAc	STARTER
SENSORY PROFILE		Aromatic complexity	Fruit freshness	Neutral, respect for fruity character	Neutral
WINE TYPE		●●●	●●●	●●●	Sparkling Low pH
PHYSICO-CHEMICAL PARAMETERS	ALCOHOL (% VOL)	≤ 16	≤ 16	≤ 17	≤ 14
	pH	≥ 3.2	≥ 3.2	≥ 3.2	≥ 2.9
	TOTAL SO ₂ (mg/L)	≤ 60			
	TEMPERATURE	≥ 16°C (≥ 61°F)			
TIME OF INOCULATION	CO-INOCULATION(S)*	✓			
	SEQUENTIAL	✓			

*During the first few days of AF, the pH may fall by up to 0.2 units. Take this parameter into account when choosing the strain. Don't hesitate to contact your LAFFORT® representative to check on the time of inoculation and the quantity to add.

LACTOENOS® RANGE

Control of the malolactic fermentation

Bacteria are generally added after completion of the alcoholic fermentation. However, winemakers are increasingly opting for co-inoculation with yeast and bacteria, with addition of bacteria before completion of the alcoholic fermentation.

BENEFITS OF CO-INOCULATION:

1 SAVES TIME

Early microbiological and chemical stabilisation of the wine:

- Facilitates batch selection and blending before ageing.
- Optimises the preparation of wines for market.

2 SAVES MONEY

Reduction in energy consumption by taking advantage of the more favourable temperature during the AF.

+ Early co-inoculation (24 - 48 hours after *S.cerevisiae* inoculation):
Promotes the survival and establishment of bacteria under milder conditions (temperature, ethanol).

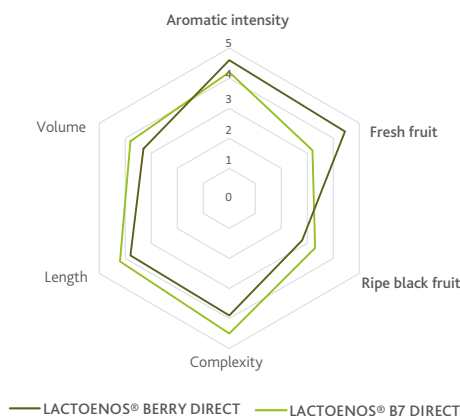
+ Late co-inoculation (end of AF at 1.010 density):
Limits microbial spoilage: the selected bacteria take over from the yeast to colonise the ecosystem and prevent growth of spoilage microorganisms.

SENSORY IMPACT OF SELECTED BACTERIA IN THE "Direct" RANGE

The LAFFORT® range includes two direct inoculation bacteria: LACTOENOS® BERRY *Direct* and LACTOENOS® B7 *Direct*. These reinforce the overall aromatic intensity of wines by virtue of their own sensory properties.

LACTOENOS® BERRY *Direct* has a very slow citric acid degradation metabolism, ensuring its preservation, accompanied by very low production of volatile acidity. Wines vinified with LACTOENOS® BERRY *Direct* are thus fresher, with more intense fruit expression.

Sensory profiles of the wines

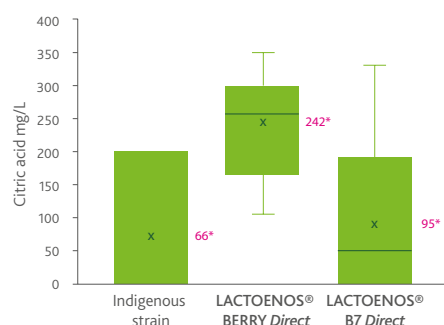


Red wine - Gamay - Sequential inoculation ABV 12.2% vol. - TA 3.8 g/L H_2SO_4 - pH 3.23 - Acide malique initial 1.32 g/L.

*Statistical validation - ANOVA test.

The wines are perceived as significantly different on tasting (Triangle test significant at 99%). The wine made with LACTOENOS® B7 *Direct* is perceived as complex with black fruit flavours, while that made with LACTOENOS® BERRY *Direct* is fresher and fruitier.

Citric acid concentration at end of MLF



Summary de 9 field trials (sequential inoculation).
Dose of bacteria: 1 g/hL (10 ppm).

*Mean citric acid concentrations.

? Did you know?

A temperature above 20°C (68°F) favours membrane fluidity and thus the diffusion of ethanol into the intracellular medium, resulting in a higher bacterial mortality rate. Aim for a temperature ≤ 20°C (68°F). For pH < 3.1 the maximum recommended temperature is 18°C (64°F).

LACTOENOS® RANGE

Control of the malolactic fermentation

NEW IN 2023

LACTOENOS® BERRY *Direct*

FRESHNESS AND FRUIT



Strain of the bacterium *Oenococcus oeni* for production of wines with a fresh and fruity sensory profile due to its ability to preserve citric acid and its very low production of diacetyl.

- The result of mass selection in association with IFV.
- Very slow citric acid degradation metabolism.
- Very low production of volatile acidity and diacetyl.
- Robust strain over a wide spectrum of pH, alcohol, SO₂ and temperature for all types of wine.
- The *Direct* process allows inoculation of LACTOENOS® BERRY *Direct* in must or wine without acclimatisation.
- Compatible with co-inoculation and sequential inoculation.

Dose: refer to packaging.



2.5 hL
25 hL
250 hL

LACTOENOS® B7 *Direct*

COMPLEXITY AND ROBUSTNESS

Strain of the bacterium *Oenococcus oeni* for the production of wines with great aromatic complexity.

- The *Direct* process allows inoculation of LACTOENOS® B7 *Direct* in must or wine without acclimatisation.
- Low production of volatile acidity.
- Efficient strain over a wide spectrum of pH, alcohol, SO₂, temperature and tannic structure.
- Particularly suitable under difficult conditions or for curative MLF.
- Compatible with co-inoculation and sequential inoculation.

Dose: refer to packaging.



2.5 hL
25 hL
250 hL

LACTOENOS® 450 *PreAc*

A pre-acclimatised 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.

Dose: refer to packaging.



50 hL
250 hL

LACTOENOS® B16 STANDARD

Bacteria to be reactivated in the form of a starter.

- Strain particularly suitable for the production of sparkling wines and wines at low pH.

Dose: refer to packaging.



50 hL
250 hL

? Practical advice

In instances where the wine displays limiting characteristics (low pH, high level of clarification, high TA or SO₂ 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. 32.



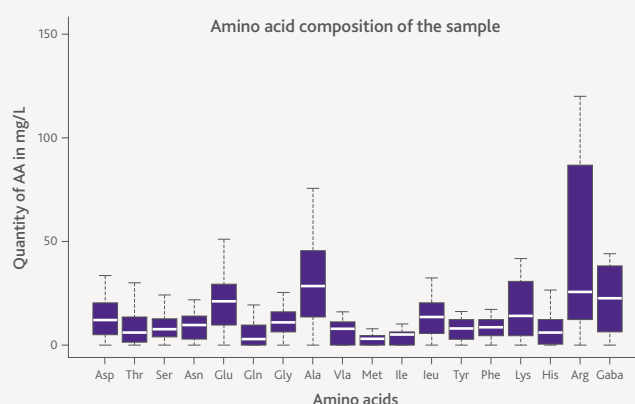
LACTIC ACID BACTERIA NUTRITION

Bacteria have specific nutritional needs that cannot be compared to those of *Saccharomyces cerevisiae* yeasts.

NUTRITIONAL NEEDS OF *OENOCOCCUS OENI*

Unlike *Saccharomyces cerevisiae*, *Oenococcus oeni* is not able to use the nitrogen contained in the 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 its growth (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 this level is routinely achieved, indicating that the amino acid concentration is not a limiting factor.



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 favour more complex sources, which it can metabolise 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 MALOBOOST®	++	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 MALOBOOST®	< 5%	35%	< 5%

Link between the capacity for growth of an *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 favoured in the medium enriched with yeast derivative B (MALOBOOST®), containing the highest percentage of medium-sized peptides (between 0.5 and 10 kDa).

BACTERIA NUTRITION

A specific yeast derivate

MALOBOOST®

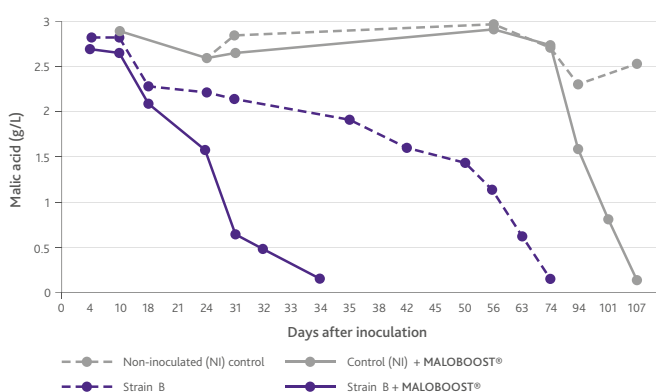
Nutrient adapted to the specific nutritional needs of lactic acid bacteria (*Oenococcus oeni*). Promotes a rapid start to the malolactic fermentation and optimal kinetics.

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



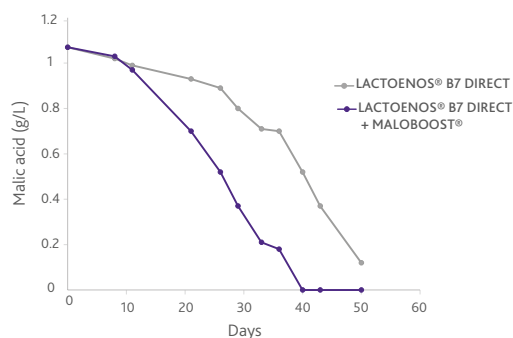
1 kg

MALOBOOST® and MLF kinetics



Cabernet Sauvignon reluctant to go through MLF.
MALOBOOST® (30 g/hL - 300 ppm). 24 hours before adding bacteria for the inoculated wine and at the same time for the non-inoculated wine.

MALOBOOST® in difficult condition

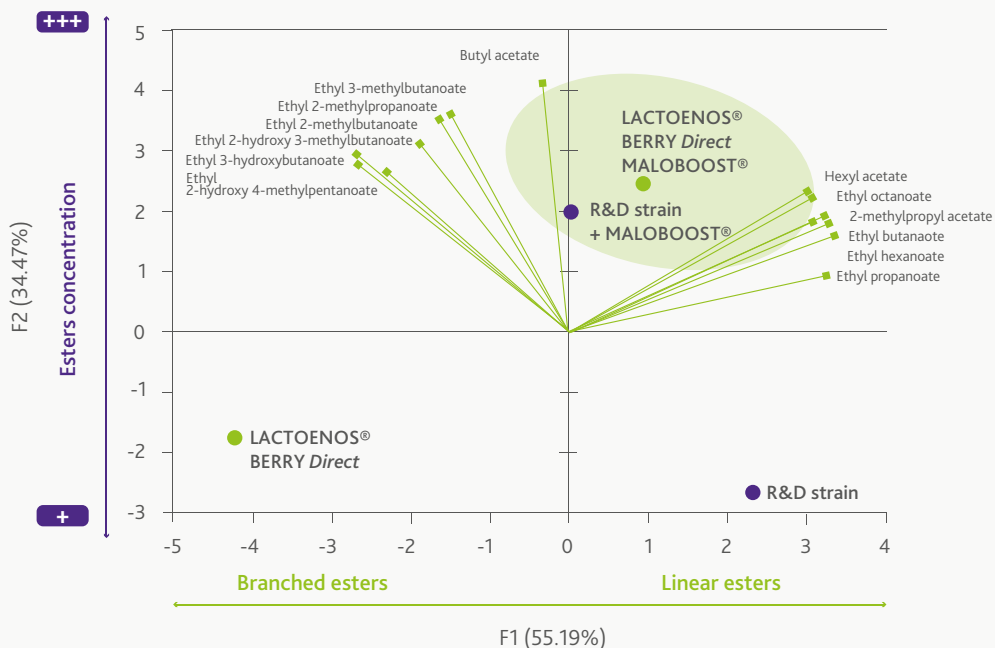


Chemical analysis of the wine at the end of AF.
Merlot: ABV: 14.6% vol. | pH 3.43 | L-malic acid 1.07 g/L |
MLF temperature: 20°C (68°F).
MALOBOOST® dose: 30 g/hL (300 ppm).

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

MALOBOOST® to enhance fruit intensity in wine.

Ester concentration at the end of MLF - Principal Component Analysis (PCA).



Comparison of MLF with two strains of selected lactic acid bacteria at 1 g/hL (10 ppm), with and without addition of MALOBOOST®.

Addition of MALOBOOST® (20 g/hL - 200 ppm) 24 hours before adding bacteria.

Chardonnay (ABV: 13.3% vol. pH 3.25 - TA 4.7 g/L H₂SO₄ - L-malic acid: 2.7 g/L).

Whatever the bacterium inoculated, MALOBOOST® promotes ester production.

LACTOENOS® RANGE

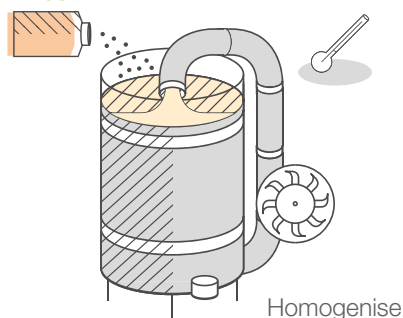
Control of the malolactic fermentation

LACTOENOS® DIRECT

DIRECT INOCULATION

Take out the sachet 30 minutes before inoculation

Direct



- Early co-inoculation
24 - 48 h after start of AF.
(16 - 30°C / 60 - 86°F).
- Late co-inoculation
1.010 density (<26°C / <78°F).
- Sequential inoculation
After AF, on running off
(20°C - 22°C / 68 - 71°F).
- Curative inoculation
(20°C - 22°C / 68 - 71°F).

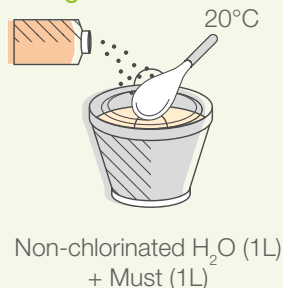
INOCULATION WITH ACCLIMATISATION

LACTOENOS® PREAC

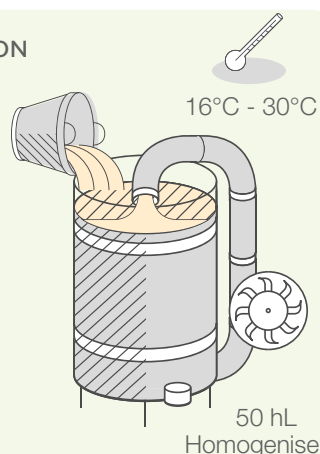
EARLY CO-INOCULATION

Preparation step

PreAc +
Energizer



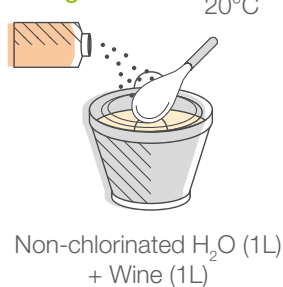
30 minutes



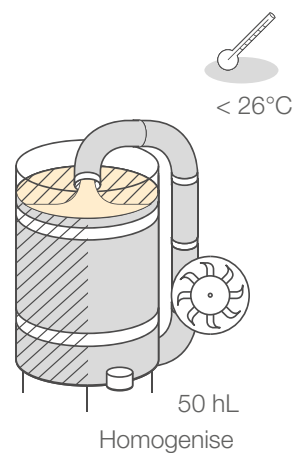
LATE CO-INOCULATION or SEQUENTIAL INOCULATION

Acclimatising phase

PreAc +
Energizer



12 hours



Find out more:

Discover our **MALOLACTIC FERMENTATION RESTART PROTOCOL** on our website, at **LAFFORT & YOU** section.

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 SO₂ 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 oxidised notes/ for more aromatic wines with better ageing potential.
- Inhibits wine browning mechanisms.

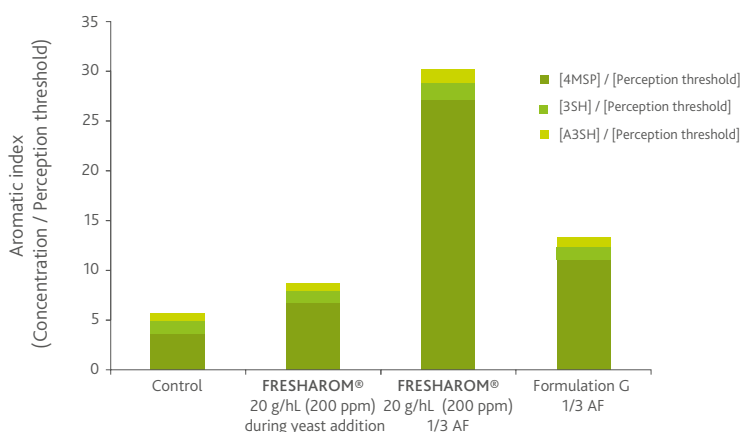
Dose: 20 - 30 g/hL (200 - 300 ppm).

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**.

AGEING ON LEES

OENOLEES® is an oenological 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 oenology: 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 of 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).

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



1 kg
5 kg

YEAST PRODUCTS

Innovations born from nature

EARLY MATURITY



POWERLEES® (Formerly POWERLEES® *Rouge*)

Specific preparation of inactivated yeast and β -glucanase, for fining wines.

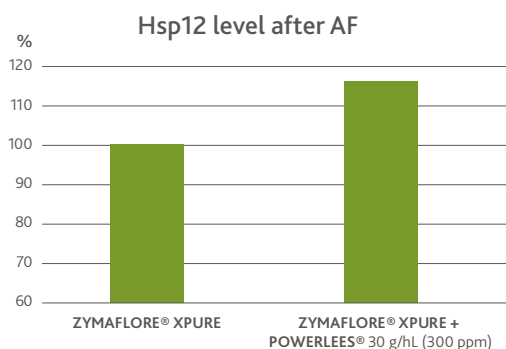
Developed by LAFFORT®, POWERLEES® provides yeasts constituents that help soften wines during fermentation and ageing.

- The enzyme action accelerates the **organoleptic 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 envelopes of the inactivated yeast and from yeast autolysis fragments.
- Contributes to wine stabilisation 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.

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



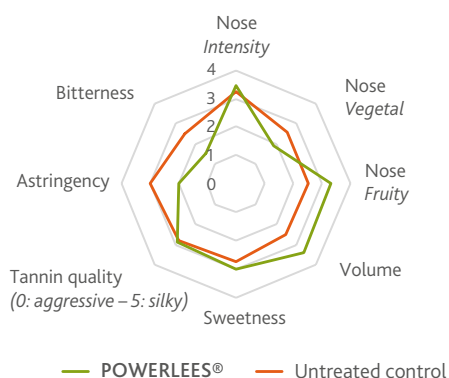
1 kg



POWERLEES® 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® at start of AF.*

Tasting profile after treatment with POWERLEES®



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

POWERLEES® (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.

ENZYMES

Natural accelerators

	Process															
	LAFASE® HE GRAND CRU	LAFASE® FRUIT	LAFAZYM® CL	LAFAZYM® PRESS	LAFAZYM® EXTRACT	EXTRALYSE®	LAFAZYM® AROM	LAFAZYM® THIOLS ¹	LAFASE® 600 XL ^{CE}	LAFASE® XL CLARIFICATION	LAFASE® XL PRESS	LAFASE® XL EXTRACTION ROUGE	EXTRACLEAR® LIQUIDE	LAFASE® XL FLOT	LAFASE® DISTILLATION	New
Form	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼	☼
FCE 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 / 41°F)								●	●					●		
Flotation			●					●	●			●	●			
Clarification of red grape musts treated by thermo-vinification								●	●		●					
Clarification of wines (free-run and/or press)			●											●		
Lees ageing					●											
Filtration					●									●		
Botrytised harvests (glucane presence)					●											
Brings out terpene aromas					●											

Légend

- ☼ Microgranulated
- Liquid
- Red
- White
- Rosé

✓ = Purified in order to optimise the required actions.

* 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...).

ENZYMES

Natural accelerators

USE OF ENZYMES IN OENOLOGY

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

- Their addition during vinification promotes clarification and the extraction of skin compounds of interest and optimises 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.

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.

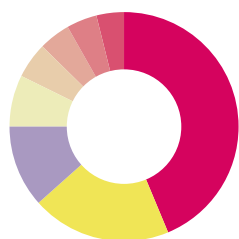
IMPORTANCE OF THE SECONDARY ACTIVITIES OF ENZYME PREPARATIONS

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 very enzyme spectra for each strain. A high level of secondary activity allows for adaptation to the conditions of matrices that are difficult to clarify.

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

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

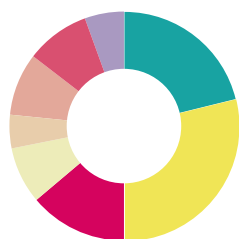
Strain n° 1 - *Aspergillus aculeatus*



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

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

Strain n° 2 - *Aspergillus aculeatus*



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

- Rhamnogalacturonase (Rgases)
- Endo- β -1,4-Mannanase
- Endo-polygalacturonase (Endo-PG)
- Exo-polygalacturonase (Exo-PG)

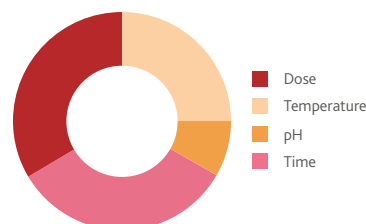
Each enzyme preparation is selected for its robustness, its performance but also for its very specific technical applications.

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, colour, grape variety.
- **The time of action possible:** related to the winery's procedures.



PRESSING AND SKIN CONTACT FOR WHITE AND ROSÉ WINES

Enzymes - Natural accelerators

INTEREST OF USING ENZYME PREPARATIONS ON GRAPES:

- **Optimise 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.**

PRESSURAGE

LAFAZYM® PRESS

MICROGRANULATED

PURIFIED (CE)

Pulp extraction

Secondary activities

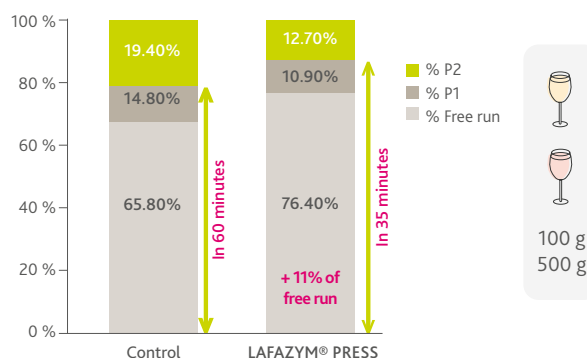


Optimise the volume of quality juice when pressing red and white grapes for the production of rosé and sparkling wines.

- Preparation of pectolytic enzymes.
- Preserve aromatic finesse.
- Improves free run juice and first pressing yields (white and rosé).

Dose: 2 - 5 g/100 kg of grapes.

Juice yield



Effect of LAFAZYM® PRESS, on the yield of free-run juice compared with a control must without enzyme addition. In addition to a significant saving in processing time, the quality of the free-run juice is higher and the volume of press juice (of lower quality) is reduced. - 3 g/100 kg.

PROCESS

LAFASE® XL PRESS

LIQUID

PURIFIED (CE)

Pulp extraction

Secondary activities



Optimise the volume of quality juice when pressing red and white grapes for the production of rosé wines.

- Preparation of pectolytic enzymes.
- Increases high-quality juice yields.
- Protects musts from oxidation.

Dose: 1 - 4 mL/100 kg of grapes.



PRE-FERMENTATION SKIN CONTACT

LAFAZYM® EXTRACT

MICROGRANULATED

PURIFIED (CE)

Pulp extraction

Secondary activities

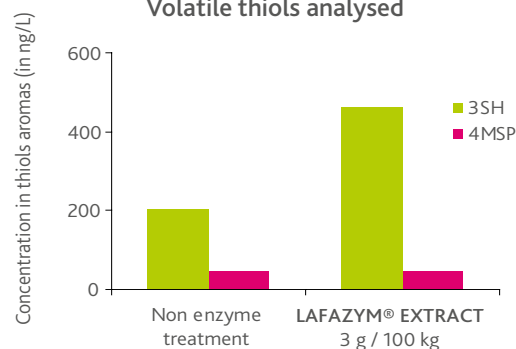


Pre-ferment skin contact at low temperatures.

- Preparation of pectolytic enzymes.
- 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.

Dose: 2 - 3 g/100 kg of grapes.

Volatile thiols analysed



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



AROMATIC EXTRACTION

Enzymes - Natural accelerators

LAFAZYM® AROM MICROGRANULATED

Aromatic wines made from grape varieties with terpene precursors.

- Micro-granulated preparation of pectolytic and β -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).



100 g

LAFAZYM® THIOLS^[+] MICROGRANULATED LOW CE

Bringing out aromas in grape varieties with volatile thiol characters.

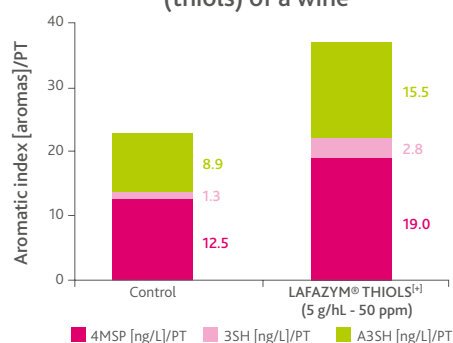
- Micro-granulated preparation of pectolytic enzymes with secondary activities.
- Acts in synergy with yeasts to bring out volatile thiols.
- Can be used on juice and added up to the first third of the alcoholic fermentation, to increase the aromatic potential of wines.

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



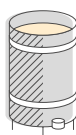
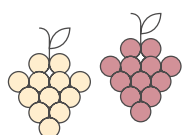
250 g

Increase in the aromatic potential (thiols) of a wine



Experimental cellar trial - Sauvignon Blanc.
PT: perception threshold.

MECHANISMS FOR BIOTRANSFORMATION OF THIOL PRECURSORS BY YEAST



Red and white grape varieties*

Family of glutathionylated thiol precursors.

Must

Enzymatic hydrolysis of intermediate precursors.

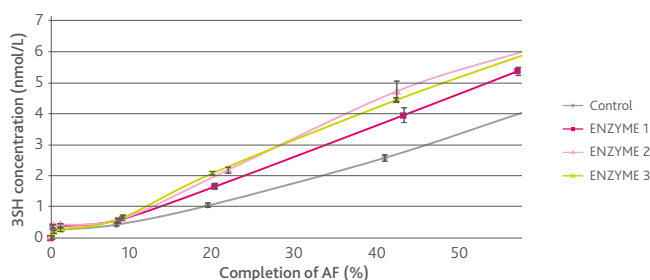
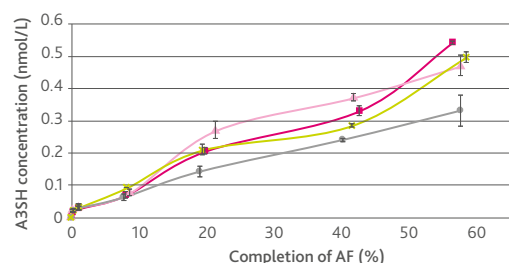
Alcoholic fermentation (*Saccharomyces cerevisiae*)

Transformation of intermediate precursors into volatile thiols.

* 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 Blanc 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 - A. Minot 2016 - BIOLAFFORT®.

HOW TO OPTIMISE 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^[+].

WHITE & ROSÉ WINE CLARIFICATION

Natural accelerators

INTEREST OF USING ENZYME PREPARATIONS TO CLARIFY MUSTS:

Qualitative and quantitative optimisation of clarification:

- Rapid depectinisation for optimised 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

MICROGRANULATED

PURIFIED (CE)

Lees compaction



Depectinisation



Secondary activities



Clarification of musts for the production of high-quality wines.

- Preparation of pectolytic enzymes.
- Improves lees settling and compaction.
- Increases the volume of clear juice.
- Purified from CE to help preserve aromatic finesse of wines.

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



100 g
500 g

LAFASE® XL CLARIFICATION

LIQUID

LOW CE

Lees compaction



Depectinisation



Secondary activities



Clarification of must and wines.

- Preparation of pectolytic enzymes.
- Rapid depectinisation.
- Allows the clarification of must and juice from heat treatment or flash detente.
- Perfectly suited to static and dynamic clarification.

Dose: 1 - 3 mL/hL.



1 L
10 L

PROCESS

EXTREME CONDITIONS

LAFAZYM® 600 XL^{ICE}

LIQUID

PURIFIED (CE)

Lees compaction



Depectinisation



Secondary activities

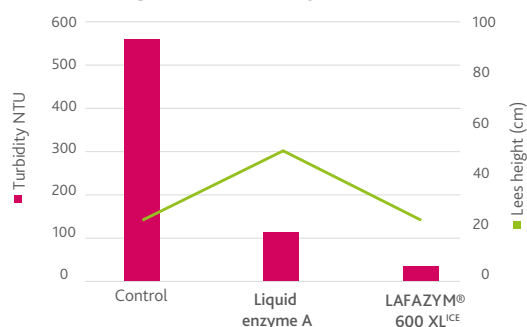


Rapid and effective clarification of musts over a wide range of pH (2.9 - 4.0) and temperature for the production of high-quality wines.

- Preparation of pectolytic enzymes.
- Allows rapid depectinisation even at low temperature (effective from 5°C (41°F)).
- Reduces settling time and improves compaction of solids.

Dose: 0.5 - 2 mL/hL.

Lees height and turbidity after static settling



250 mL
10 L

Comparative trial with the formulation of LAFAZYM® 600 XL^{ICE}.
In static settling, improvement of lees compaction and juice clarification after one night at 5°C (41°F) (1 mL/hL).

FLOTTATION



TIME OPTIMISATION

LAFASE® XL FLOT

LIQUID

LOW CE

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

- Low cinnamoyl esterase activity to preserve juice quality.
- Dose: 1 - 4 mL/hL.



10 L

Monitoring the depectinisation of a Chardonnay juice (Australia) with high turbidity (> 1.000 NTU).

Depectinisation kinetics at 20°C (68°F)



Pectin test scale (3 = positive; 0 = negative).
A negative pectin test indicates total depectinisation.
Enzyme doses: 2 mL/hL.

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

CLARIFICATION BY FLOTATION

Alcoholic fermentation

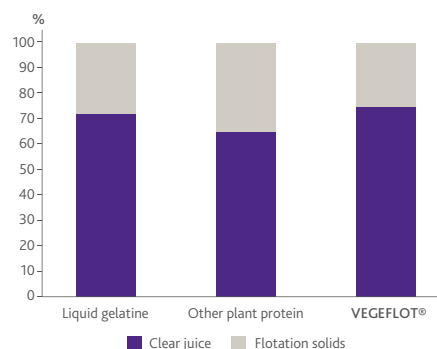
FLOCCULATION OPTIMISATION

VEGEFLOT®

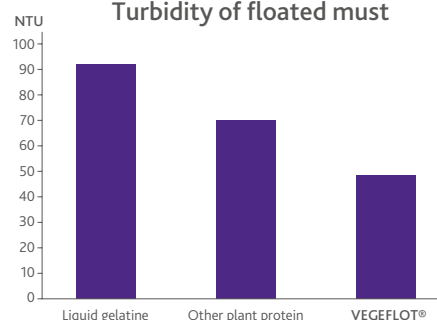
Improvement of flocculation and action on phenolic compounds.

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

Distribution of juice volume after flotation



Turbidity of floated must



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



See P. 50

RED EXTRACTION

Enzymes - Natural accelerators

INTEREST OF USING ENZYME PREPARATIONS IN RED VINIFICATION:

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

LAFASE® HE GRAND CRU

MICROGRANULATED

PURIFIED (CE)

Cell compound extraction



Secondary activities

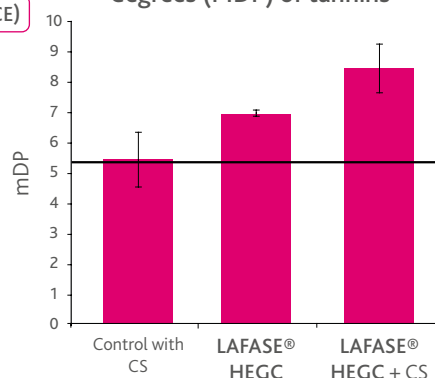


Traditional macerations. Produces structured wines rich in colour and elegant tannins.

- Preparation of pectolytic enzyme.
- **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 (RGII) and less larger size polysaccharides (PRAG).

Dose: 3 - 5 g/100 kg of grapes.

Comparison of mean polymerisation degrees (MDP) of tannins



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



100 g
500 g



LAFASE® FRUIT

MICROGRANULATED

PURIFIED (CE)

Cell compound extraction



Secondary activities



Short macerations with or without pre-fermentation cold soaking.

- Preparation of pectolytic enzyme.
- Optimises the **fruit potential of wines** and their suppleness by promoting gentle extraction of phenolic compounds and aromas from the grape skin while minimizing the need for mechanical actions.

Dose: 3 - 5 g/100 kg of grapes.



250 g

LAFASE® XL EXTRACTION ROUGE

LIQUID

LOW CE

Cell compound extraction



Secondary activities



Maceration of red and white grapes to optimise quality juice volumes.

- Preparation of pectolytic enzyme.
- Increases free run juice or wine yields.
- Improves grape skin compound release.
- Limits mechanical actions.

Dose: 2 - 4 mL/100 kg of grapes.



1 L
10 L

OPTIMISATION OF WINE AGEING

Enzymes - Natural accelerators

ENZYMES

CLARIFICATION AND FILTERABILITY OF WINES

NEW IN 2023

EXTRACLEAR®

LIQUID

LOW CE

Enzyme formulation (100% *Aspergillus Niger*) specifically suited to the clarification of finished wines and the optimisation of all stages of ageing and preparation of wines for bottling.

- Preparation of pectolytic enzyme.
- Treatment of all types of wine, even the most difficult (press wine, thermovinified wine).
- Accelerates the natural clarification of wines: limits the risks of microbiological contamination and optimises fining doses.
- Significantly improves the filterability of wines.
- Use from the last third of the AF and throughout ageing.

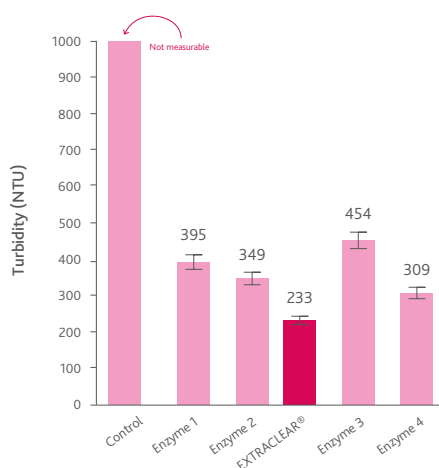
Dose: 3 - 6 mL/hL.



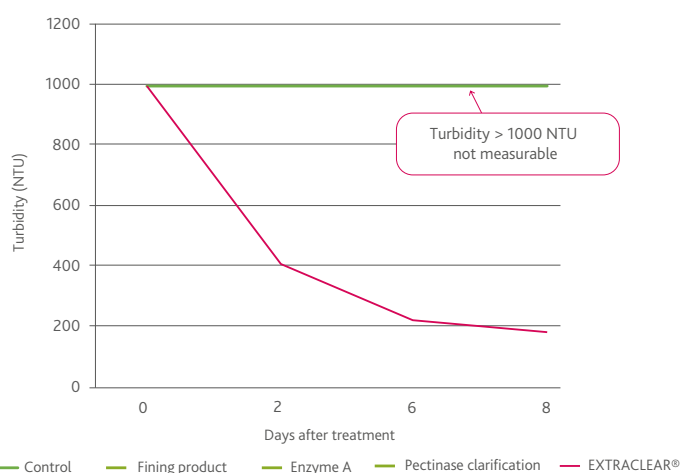
1 L

PROCESS

Clarification of finished wines under difficult conditions



Thermovinified wine - Enzyme treatment at the end of MLF dose: 6 g/hL (60 ppm) or 6 mL/hL - Temperature: 12°C (54°F). Sedimentation: 48 h - Measure of the turbidity after racking.



Blends of press wine: Merlot - Cabernet Sauvignon
Dose: Fining product: 10 g/hL (100 ppm) -
Enzyme: 4 g/hL (40 ppm) or 4 mL/hL. Temperature: 12°C (54°F)

Focus : On the treatment of red press wines

Red press wines have an especially heavy "load" of macromolecules in particular, which slow down clarification before the blending and bottling stages. These macromolecules come mainly from grape polysaccharides, fermentation yeasts or contaminating fungi such as *Botrytis cinerea*.

EXTRACLEAR® allows for effective clarification and facilitates the filtration of press wine. Its benefits have now been demonstrated: reduction of clogging indices, improvement of sedimentation, reduction of turbidity and lees volumes.

AGEING ON LEES AND PRESENCE DE GLUCANS (BOTRYTIS CINEREA)

EXTRALYSE®

MICROGRANULATED

PURIFIED (CE)

Enzymes with strong β -(1-3; 1-6) glucanase activity intended for ageing on lees. Improves the filterability of wines.

- Preparation of pectolytic enzyme with secondary β -(1-3 ; 1-6) glucanase activities.
- Accelerates all biological mechanisms linked to ageing on lees and especially yeast autolysis.
- Improves clarification and filterability, particularly in wines from *Botrytis*-affected grapes.

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



250 g

SPECIFIC APPLICATIONS

Enzymes - Natural accelerators

NEW IN 2023

PROCESS

LAFASE® DISTILLATION

LIQUID

LOW CE

LOW PME

Cell compound extraction

●●●●○

Secondary activities

●●●●●

Pressing grapes intended for distillation base wine (very low pectin methyl esterase activity).

- Preparation of pectolytic enzymes.
- Low release of methanol.
- Increases press yield with the release of quality juice:
 - Drainage of juice to limit the quantity of solids.
 - Limits the extraction of herbaceous compounds (C6).
- Reduces must viscosity to facilitate decanting and flotation.

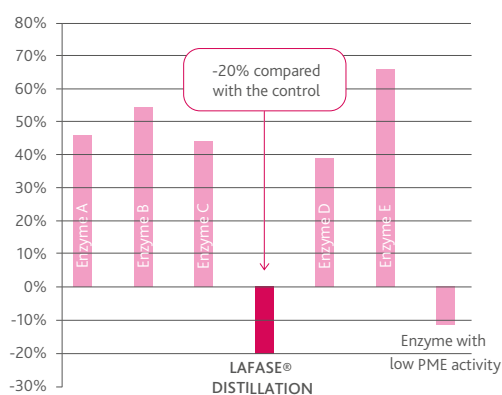
Dose: 1 - 4 mL/100 kg of grapes.



1 L

BENEFITS OF AN ENZYME FORMULATION WITH LOW RELEASE OF METHANOL

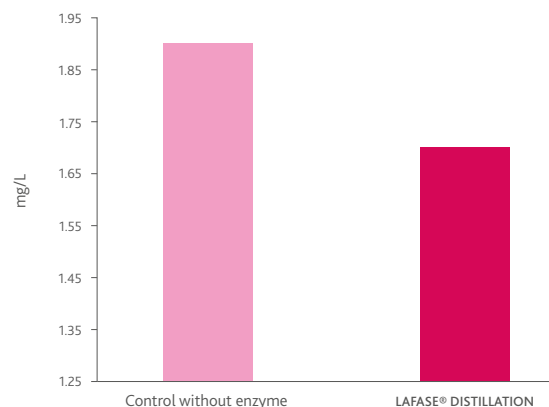
Change in methanol concentration at the end of AF after enzyme treatment



Cognac must - Ugni Blanc - Dose: 3 mL/hL.

LAFASE® DISTILLATION reduces the methanol concentration in the wine.

Marker for crushing - Cis-3-hexanol



Micro-distillation of the wine (70% vol.) from a Cognac must - Ugni Blanc - Dose: 3 mL/100 kg.

LAFASE® DISTILLATION allows for pressing that is more respectful of the grapes.

THERMAL TREATMENT OF RED GRAPES

PROCESS

LAFASE® THERMO LIQUIDE

LIQUID

LOW CE

Lees compaction

●●●●○

Depectinisation

●●●●●

Secondary activities

●●●●●

Thermo-treated juices to promote better clarification and pressing.

- Preparation of pectolytic enzymes.
- Quick and efficient depectinisation juice over a large spectrum of temperatures (< 65°C (< 149°F)).
- Decreases viscosity of musts and facilitates pressing.

Dose: 3 - 5 mL/100 kg of grapes.



1 L

FOCUS

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:

- Optimisation of pulp extraction while pressing.
- Optimised depectinisation 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.
- Depectinisation 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:

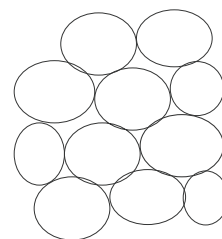
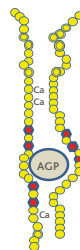
- Extraction of compounds responsible for improved mouthfeel or softening tannins, e.g., Rhamnogalacturonan II.
- Increase in juice extraction yield.
- Depectinisation and clarification of wines.

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**.

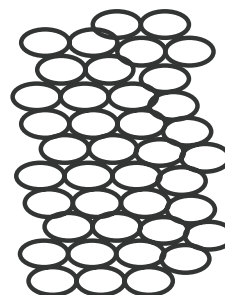
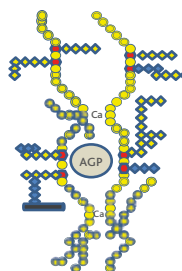


Research programme (2013-2016) - BIOLAFFORT® in collaboration with John P. Moore's team (University of Stellenbosch).

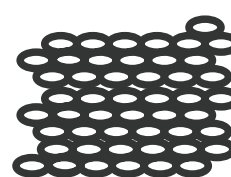
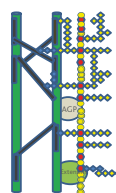
SCHEMATIC DIAGRAMS INSPIRED BY "HYPOTHETICAL MODEL OF THE GRAPE WALL", YU GAO, 2016.



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.

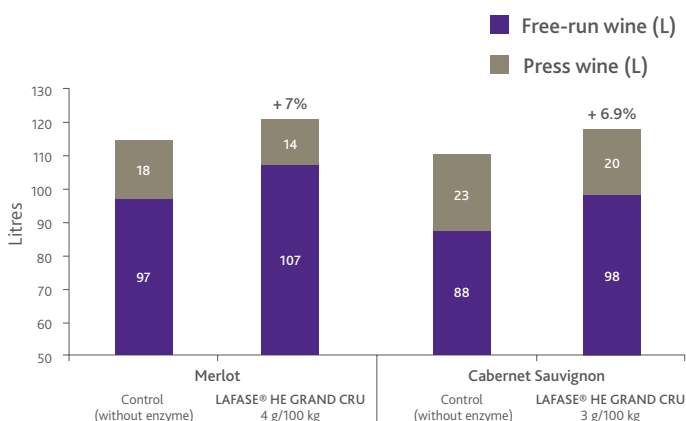
For more details, see our article "Structure de la paroi cellulaire du raisin rouge" RDO no. 172 - July 2019.

IMPACT OF RED EXTRACTION ENZYMES ON FINISHED WINES

Actions common to all LAFFORT® red extraction enzymes.

→ QUANTITATIVE OPTIMISATION:

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.



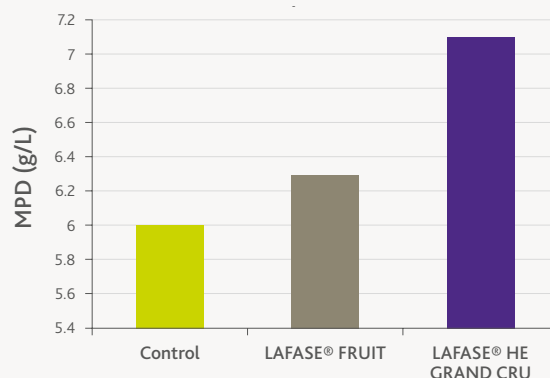
→ QUALITATIVE OPTIMISATION:

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 colour 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.
- Depectinisation of wines: facilitating the filtration and clarification of wines for bottling.

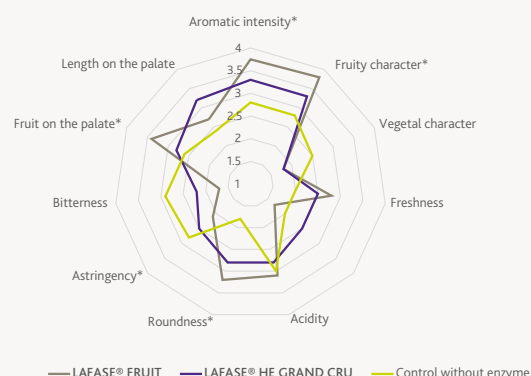
The study below illustrates the capacity of LAFASE® FRUIT and LAFASE® HE GRAND CRU to extract cellular compounds of interest by the selectivity of their enzymatic spectrum of action.

Average degrees of polymerisation - 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



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

OENOFINE® RANGE

Fining based on inactivated yeasts and vegetable proteins



FINING

NEW IN 2023

Many winemakers today want to **avoid the use of PVPP**.

Through its expertise in the selection of raw materials and their formulation, **LAFFORT®** has developed two distinct preparations, **OENOFINE® PiNK** and **OENOFINE® NATURE**.

The synergy between their ingredients means that these formulations can replace PVPP in its various applications.

OENOFINE® PiNK is a powerful tool for managing the hue of musts and wines. **OENOFINE® NATURE** plays a specific role in the elimination of oxidised and oxidisable phenolic compounds.

Their high level of inactivated yeast contributes to colour management and helps to refine wines by reducing the sensation of bitterness.

OenoFine

OENOFINE® PiNK

Inactivated yeast, vegetable protein (patatin), activated carbon, sodium bentonite.

- Alternative to the use of PVPP for fining musts.
- Stabilisation of the hue of fermenting musts.
- Colour correction of white musts.
- Very good sedimentation capacity.

Dose: Fining must and fermenting must: 20 - 70 g/hL (200 - 700 ppm).

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



OENOFINE® NATURE

Inactivated yeast, vegetable proteins (patatin and pea), calcium bentonite.

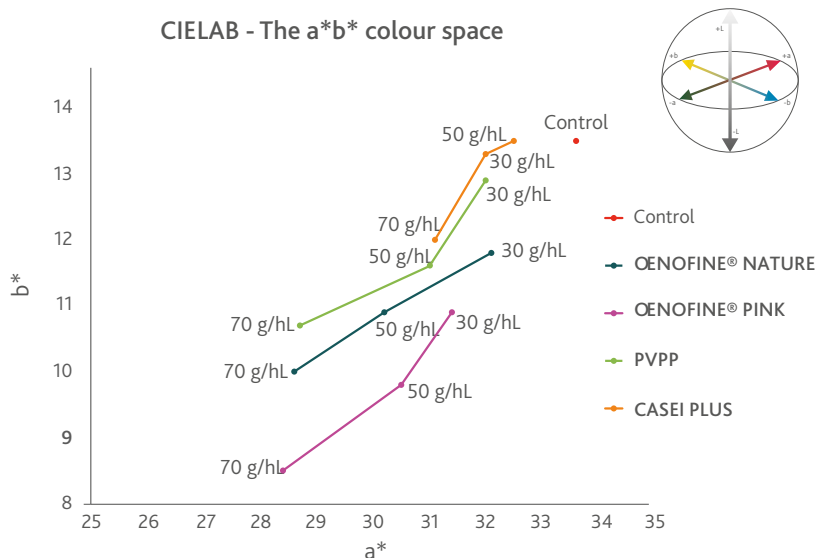
- Alternative to the use of PVPP for fining musts.
- Elimination of oxidised phenolic compounds.
- Preserves the aromatic potential of wines.
- Prevents oxidation.
- Effective for curative and preventive fining.

Dose: Fining must and fermenting must: 15 - 50 g/hL (150 - 500 ppm).

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



CIELAB - The a*b* colour space



*Fining of Syrah rosé must, 2022.
The various fining agents differ in their effectiveness in reducing the orange-yellow hue.*

OENOFINE® NATURE has a similar impact to PVPP – by reducing colour factors a* and b*.

OENOFINE® PiNK is 40% more effective than PVPP for de-colouration.

*The synergy between the raw materials that make up **OENOFINE® PiNK** and **OENOFINE® NATURE** optimises must colour before fermentation.*

OENOFINE® RANGE

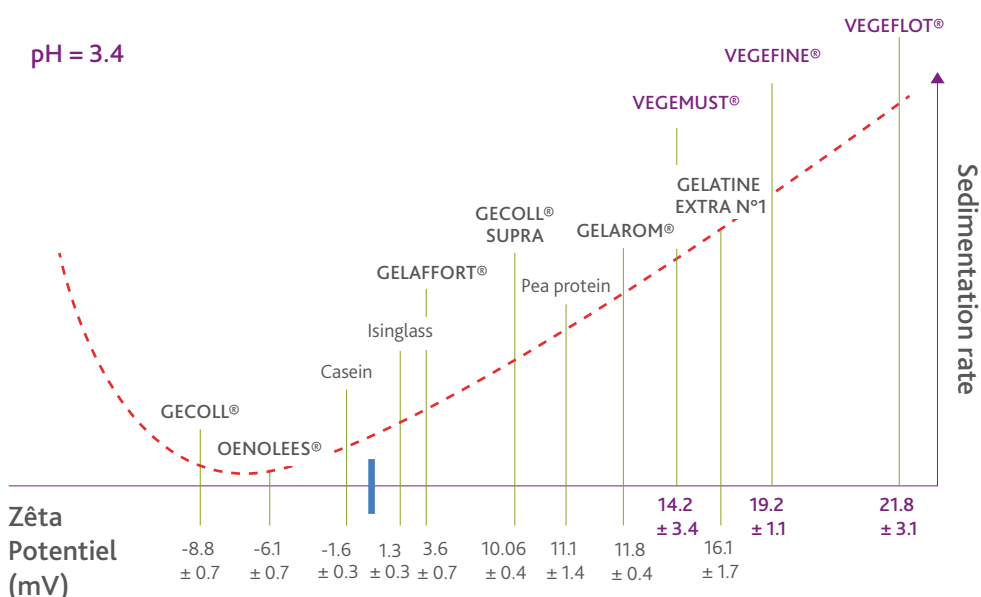
Pea & Patatin

FINING AND ZÊTA 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 Zêta potential values should be high (positive and negative).



ZÊTA POTENTIAL OF PROTEIN FINING AGENTS AS A FUNCTION OF pH.

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

		ZÊTA 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 patatin fractions, VEGEFINE®, VEGEMUST® and VEGEFLOT® retain strong activity over a broad spectrum of pH.

VEGETABLE PROTEIN

Juice Fining



FINING

VEGEFINE®

Vegetable proteins (patatins), for the clarification of musts and wines.

- Non-animal, non-GMO protein.
- High Zêta potential, synergistic effect of the proteins.
- Multi-purpose and usable on a wide range of musts and wines with high content of oxidised and oxidisable polyphenols.
- Low quantity of lees after sedimentation.
- No risk of over-fining.
- Preservation of aromas.

Dose:

*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 oxidised phenolic compounds: 10 - 50 g/hL (100 - 500 ppm).



VEGEMUST®

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

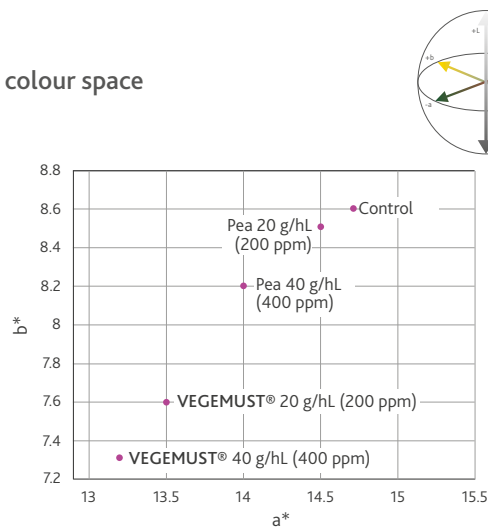
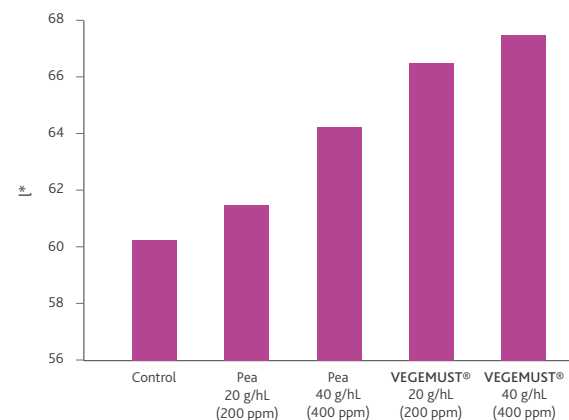
- High Zêta potential, synergistic effect of the proteins.
- High sedimentation rate.
- The presence of patatins helps to reduce the risks of wine oxidation at an early stage.
- Better juice yield (low percentage of solids).
- Flocculation capacity retained, even at high pH.
- Non-animal, non-GMO protein.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

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

VEGEMUST® is available in liquid form (production to order during the harvest - 20 L jerrycan).



CIELAB - The L*a*b* colour space



Addition of fining products a third of the way through fermentation, Grenache rosé.

Greater effectiveness of VEGEMUST® compared with a pea protein, for the decrease in colour and the increase in clarity.

CIELAB colour space: colour space used to characterise the colours 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 colours).



VEGETABLE PROTEIN

Juice fining

VEGEFLOT®

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

- Rapid flotation, highest Zêta potential.
- The presence of patatin 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.

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

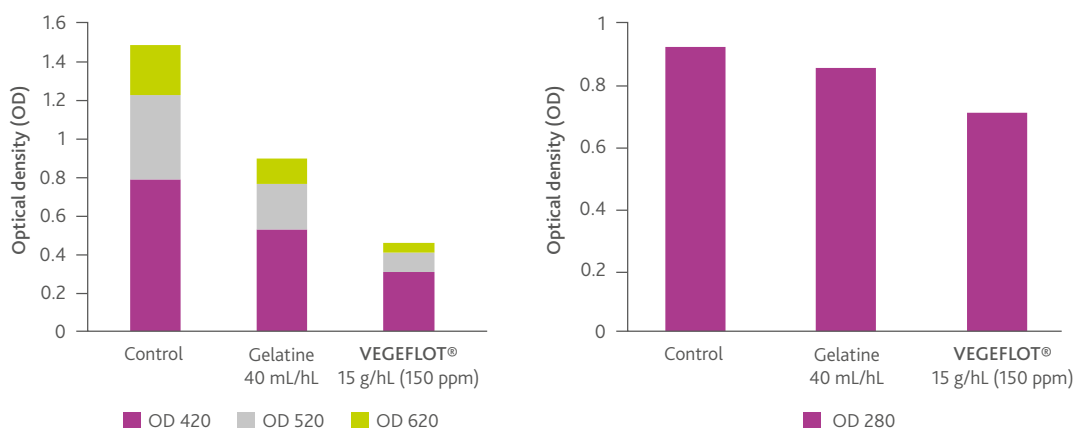
VEGEFLOT® is available in liquid form (produced to order during the harvest - 20 L jerrycan).

Use in association with **LAFASE® XL FLOT** - See **FOCUS FLOTATION P. 41**.



1 kg
10 kg

Flotation of a Pinot Gris must, South Africa



*VEGEFLOT® more effective than a gelatine for reduction of colour and total polyphenols
Gelatine: 40 mL/hL - VEGEFLOT®: 15 g/hL (150 ppm).*

Find out more:

Watch our **FLOTATION** video on our website, **LAFFORT & YOU** section.

POLYMUST® RANGE

Juice Fining



FINING



POLYMUST® ROSÉ

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

- Elimination of phenolic acids.
- Stabilisation of the colour of rosé musts and wines in fermentation.

Dose: 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 oxidisable phenolic compounds liable to trap aromas and distort the colour.
- Compatible with flotation and for treatment of wines.

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



POLYMUST® PRESS

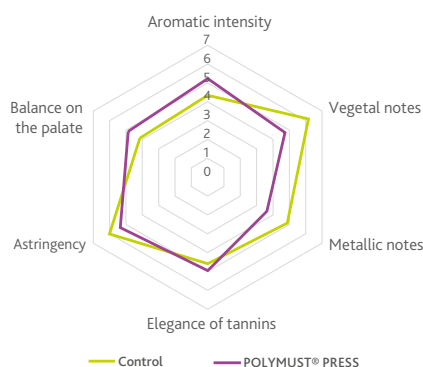
Association of PVPP, calcium bentonite and vegetable protein (patatin, potato protein isolate) for the preventive fining of press wines and the reduction of oxidised character.

- Preventive treatment of oxidation in white and rosé juices: elimination of oxidisable and oxidised phenolic compounds, preservation of glutathione content and limitation of browning and pinkening phenomena.
- Refining red press wines: clarification, stabilisation of the colouring matter, reduction of astringency and green and metallic notes, microbiological stabilisation.
- Colour correction and organoleptic refinement of white and rosé wines.

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

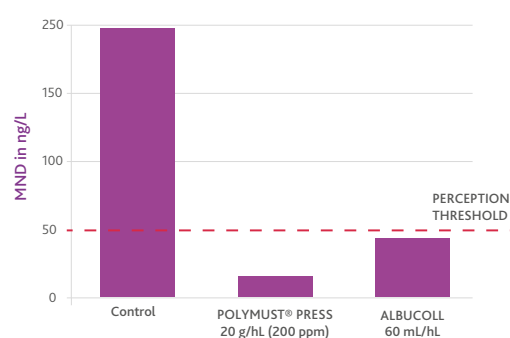


Tasting profile after fining with
POLYMUST® PRESS



POLYMUST® PRESS (30 g/hL (300 ppm)) reduces perception of vegetal and metallic notes. The fined wines are perceived as better balanced and less astringent. Press wine (Merlot) before blending.

POLYMUST® PRESS reduces the concentration
of 3-methyl-2,4-nonanedione (MND)



Fining of press wine (Merlot) before blending. MND is the source of prune character in red 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 stabilisation as from the fermentation phase.

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

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



*on request

JUICE FINING

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
CASEI PLUS	Potassium caseinate. Treatment of oxidation phenomena and maderisation in juice (white and rosé).	5 - 20 g/hL (50 - 200 ppm) for clarification. 20 - 60 g/hL (200 - 600 ppm) for maderisation treatment and colour correction.	1 kg 5 kg 20 kg
POLYLACT®	Combination of PVPP and casein. Preventing and treating oxidation in juice (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	High quality natural sodium microgranular bentonite with a high adsorption capacity. Protein stabilisation in juice over a large range of pH.	10 - 80 g/hL (100 - 800 ppm).	1 kg 5 kg 25 kg
GECOLL® SUPRA	Liquid gelatine 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
GECOLL® FLOTTATION	Liquid gelatine highly reactive. Flotation.	30 - 70 mL/hL (depending on the type of must, pH and condition).	10.5 kg
VINICLAR®	Microgranulated preparation of PVPP for preventive and curative treatment of the oxidation of juice . <i>(VINICLAR® contains a small fraction of cellulose favouring the clarification and filterability of lees).</i>	Preventive treatment: 15 - 30 g/hL (150 - 300 ppm). Curative treatment of oxidised wine or must: 30 - 80 g/hL (300 - 800 ppm).	1 kg 25 kg
VINICLAR® P	Microgranulated preparation of PVPP. Preventive and curative treatment of the oxidation of juice.	20 - 50 g/hL (200 - 500 ppm).	1 kg 22.7 kg

Find out more:

Discover our **MICROCOL® ALPHA** video on our website at **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 oenological implications of tannin usage.
- ✓ Develop the methods of tannin application in accordance with implemented oenological practices.

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

THE PURPOSE OF TANNINS IN WINEMAKING

Hydrolysable 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 stabilisation of colour.
- ✓ Protection against oxidation.
- ✓ Reductive character minimisation.
- ✓ Structure enhancement.
- ✓ Improves clarification.
- ✓ Regulates redox phenomena.



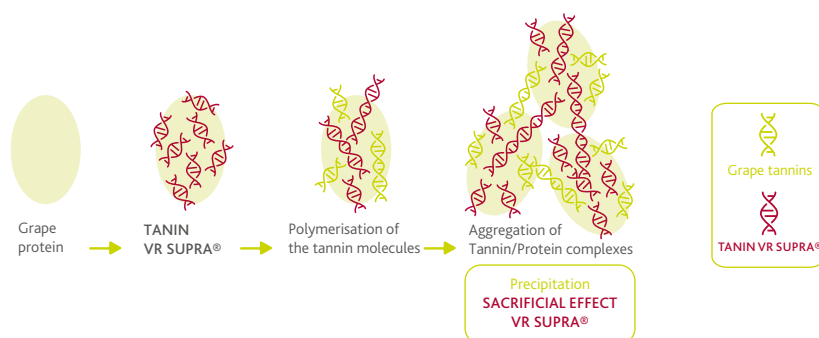
THE IDP PROCESS

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 homogenising 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



VINIFICATION

The essential element

OBJECTIVE	GRAPE OR MUST TYPE	TANNIN	DOSAGE	NOTE
Botrytised grapes, anti-oxidant action, laccase inhibition.		TANIN VR SUPRA® TANIN VR SUPRA® ÉLÉGANCE	10 - 80 g/hL (100 - 800 ppm)*	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)*	
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)	
Colour stabilisation.		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)	

*According to the health of the grapes.

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 colour.
- 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 SO₂).
- Sacrificial effect: preserves the grape tannins from precipitation with the grape proteins, to favour indigenous tannin/anthocyanin reactions.

Dose: 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®.

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



1 kg
5 kg

VINIFICATION

The essential element

TANIN VR COLOR®

Instantly dissolving (IDP) catechin tannin preparation. Specially formulated to stabilise wine colour.

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

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.
- Varietals that have **colour management** problems (extraction/stabilisation).

Dose: 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 vinification, including:

- **Inhibition of natural oxidation enzymes** (laccase, polyphenol oxidase), more efficiently than SO₂.
- Precipitation of some of the **unstable proteins**, as efficiently as bentonite but without aroma loss.
- Facilitates clarification.

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

OPTION TANIN GALALCOOL® SP - See P. 66.



1 kg

TANIN VR GRAPE®

Instantly dissolving (IDP) grape proanthocyanidic tannin preparation.

During the fermentation phase, TANIN VR GRAPE® allows:

- Compensation for **natural grape tannin deficiency**.
- Stabilisation of colour 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).

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

OPTION TANIN VR SKIN® - See P. 65.



500 g

TANIN OENOLOGIQUE

Ellagic tannins, intended for the vinification 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 SO₂.
- Protecting against oxygen.
- Precipitating some of the **unstable proteins**, in association with bentonite.
- Facilitating clarification.

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



5 kg

Find out more:

Discover our **IDP** video on our website, at **LAFFORT & YOU** section.



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

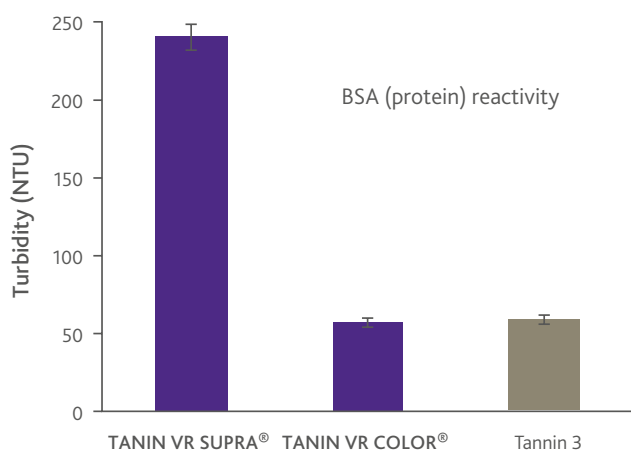
TANNINS IN WINEMAKING HAVE 4 POINTS OF INTEREST:

- ✓ The "sacrificial" effect.
- ✓ The anti-oxidant effect.
- ✓ The co-pigmentation effect in the presence of colour components.
- ✓ The effect of stabilisation 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 vinification tannins.



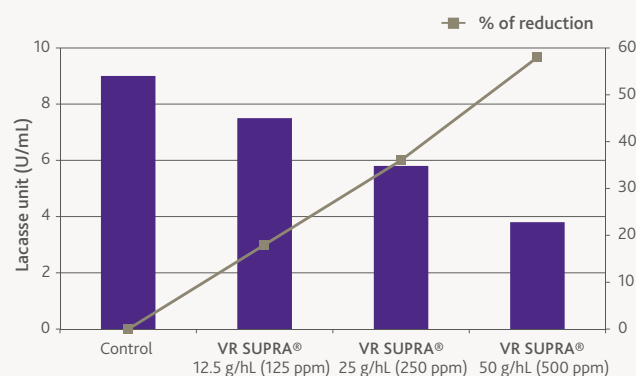
THE ANTIOXIDANT EFFECT

The use of tannins has always been linked to their ability to moderate the effects of oxygen. They have antioxidant properties and protect the oxidisable 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 oxidisable 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

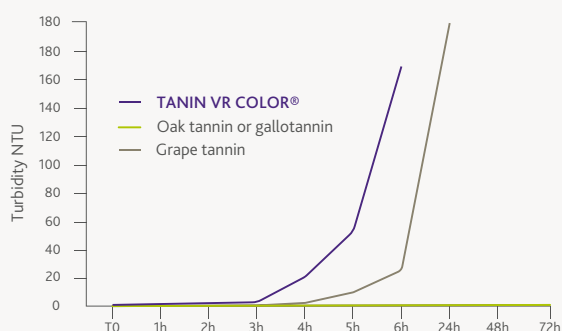
THE CO-PIGMENTATION EFFECT

The phenomenon of co-pigmentation results from the molecular association of coloured pigments such as anthocyanins with other more or less coloured pigments (tannins, phenolic acids...) leading to complexes (co-pigments) having a colour intensity greater than that of the coloured pigment alone. Co-pigmentation seems to play an important role in the colour of young wines. Red wines that are the richest in co-pigments present a more intense colour 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 (STABILISATION OF COLOUR)

Acetaldehyde molecules are involved in stabilising simple coloured 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 tannins of different origins. **TANIN VR COLOR®** is the most reactive with acetaldehyde (ethanal), a key step in the colour stabilisation 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 coloured 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 vinifications.

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

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 colour extraction phase at 10 to 30 g/hL (100 - 300 ppm).



SPECIFIC TREATMENTS

ACTIVE CARBONS

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
CHARBON ACTIF LIQUIDE HP	Liquid activated carbon in stabilised aqueous solution. High stain removal and decolorisation capacity.	100 - 400 mL/hL	10 L
CHARBON ACTIF SUPRA 4	Activated carbon in powder. Stain removal and decolorisation.	20 - 100 g/hL (200 - 1000 ppm)	5 kg 15 kg
CHARBON ACTIF PLUS GR	Granulated activated carbon. Stain removal and decolorisation.	20 - 100 g/hL (200 - 1000 ppm)	5 kg
GEOSORB® GR	Granulated activated carbon. Decontaminant for fermenting musts and new wines. Reduction in geosmin and octenone content.	Action on geosmin: 15 - 25 g/hL (150 - 250 ppm) Action on octenone: 35 - 45 g/hL (350 - 450 ppm)	5 kg 15 kg

? Practical advice

OPTIMISED DECOLORISATION

In AF, consider the combined use of POLYMUST® NATURE and CHARBON ACTIF LIQUIDE HP.

- Combination compatible with European Regulation (EU) 848/2018 for organic winemaking.
- Colour stabilisation and removal of oxidised compounds.
- Selective adsorption of unstable proteins from wine, to initiate protein stabilisation.

ANTIOXIDANT

PRODUIT	DESCRIPTION / APPLICATION	DOSE	PACKAGING
SUPRAROM®	Preparation containing condensed tannins, potassium metabisulfite and ascorbic acid. Preventive and curative treatment for must oxidation.	10 - 25 g/100 kg grapes	1 kg



60	Yeast products	
	POWERLEES® LIFE	60
	POWERLEES®	60
	MANNOSWEET®	61
	MANNOFEEL®	61
	OENOLEES® MP	62
	OENOLEES®	62
63	Enzymes	
	Wine clarification	63
	EXTRACLEAR® - New in 2023	63
65	Tannins	
	Ageing tannins	65
	QUERTANIN® range	67
68	Fining	
	OENOFINE® range - New in 2023	68
	Sensory refinement	69
	Oxidation treatment	70
71	Specific treatments	
	Activated carbon	71
72	Stabilisation	
	Microbial stabilisation	72
	Colloidal stabilisation	74
	Protein stabilisation	75
	Tartaric stabilisation	76
78	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 ageing.

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

- Protect wines from premature oxidation during ageing, with or without added sulphites.
- Significantly slow down oxygen consumption by oxidisable compounds in the wine.
- Preserve wine colour.
- Refresh the aromatic profile of already oxidised wines.

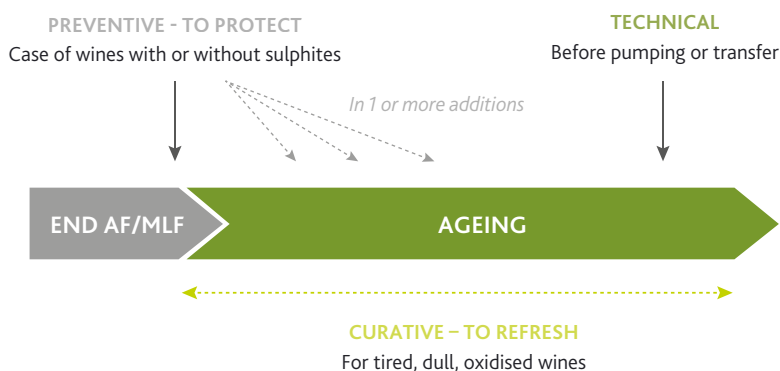
POWERLEES® LIFE can be added once or several times as from the end of fermentation and throughout the ageing period. It is a complementary solution to SO₂ in a strategy of reducing the doses of sulphur used.

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



1 kg
5 kg

POWERLEES® LIFE - Possible uses



Preventive and curative use cases for all types of wine.



POWERLEES® (Formerly POWERLEES *Rouge*)

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

Developed by LAFFORT®, POWERLEES® provides yeast constituent that help soften wines during fermentation and ageing.

- 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 on the cell envelopes of the inactivated yeast and from yeast autolysis fragments.
- Contributes to wine stabilisation through fining and the diffusion of mannoprotein fragments from yeast.
- Allows the winemaker to incorporate 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

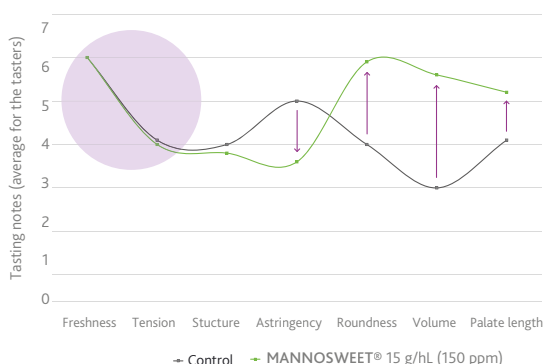
Innovation born from nature

MannOsweet®
PURE FINESSE

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

- Contributes to stabilisation of colouring matter from a dose of 5 g/hL (50 ppm).
- Respects the aromatic profile of the wine.
- Excellent filterability: **MANNOSWEET®** does not affect the initial 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' ageing. In addition to contributing to stabilisation of colouring 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.



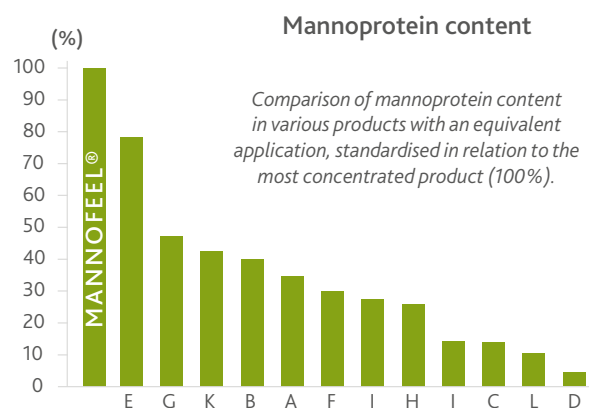
1 kg
10 kg

Mann(feel)®
PURE MANNOPROTEINS

MANNOFEEL® is the result of global research by LAFFORT® on mannoproteins to identify and understand the mechanism of action and production. The selected mannoproteins in **MANNOFEEL®** 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 stabilisation of wine**.

Dosage: 25 - 150 mL/hL.



MANNOFEEL® does not alter wine filterability

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



1 L
10 L

YEAST PRODUCTS

Innovation born from nature



OENOLEES® and **OENOLEES® MP** are oenological 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 oenology: more natural, more specific while enhancing and preserving the integrity of wine.

OENOLEES® MP

Specific preparation of an extract or 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).

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 organoleptic quality of 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:** specific peptide fraction possessing an excessively low perception threshold (only 16 mg/L (16 ppm) compared to 3 g/L for sucrose).

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



1 kg

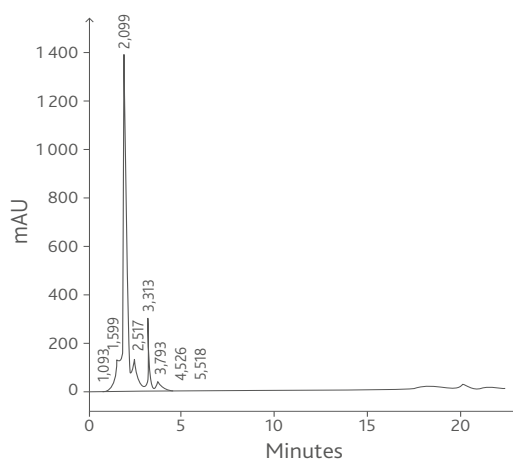


1 kg
5 kg

? Hsp12 - Brevet 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 **OENOLEES® MP**.

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 STABILISATION AND PREPARATION:

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

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

NEW IN 2023

EXTRACLEAR®

LIQUID

LOW CE

Optimises all stages of ageing, notably clarification and preparation of wines for early bottling.

- Concentrated enzyme with strong secondary activity and a wide spectrum of action for the hydrolysis of macromolecules present at the end of fermentation.
- Speeds up the natural clarification of all types of wine, even the most difficult (press wine, thermovinified wine).
- Speeds up the natural clarification of wine for improved microbiological stabilisation.
- Significantly improves wine filterability due to the hydrolysis of a large number of highly clogging macromolecules such as polysaccharides that are present at the end of fermentation.

Dose: 3 - 6 mL/hL



EARLY USE OF EXTRACLEAR®, IMPACT ON WINE FILTERABILITY:

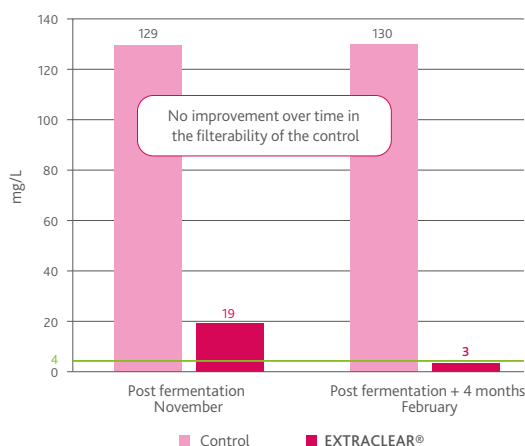
Did you know?

A UNIVERSAL TOOL FOR ASSESSMENT OF FILTERABILITY!

For the development and selection of this new enzyme, the **BIOLAFFORT®** R&D team used a new filterability index⁽¹⁾. It allows for assessment of the filterability of wines or colloidal solutions, even those with a heavy load (musts or matrices at the end of fermentation).

1: Vallet-Courbin, A., Lacampagne, S., Canal-Llauberes, R. M., Malzieu, S. M., Kanev, T., Mietton-Peuchot, M., & Ghidossi, R. (2021). A New Test of Filterability for Unprocessed Wines Evaluation of the Enzyme Efficiency. *Journal of Food Engineering and Technology*, 10(2), 55–66

FILTERABILITY INDEX (TF) DURING AGEING (thermovinified Merlot wine)



FILTERABILITY INDEX (TF) INTERPRETATION GRID

TF < 4	Wine that can be filtered for bottling (sterilising pads, membranes)
4 < TF < 8	Clogging wine to be filtered (clarifying pads, fine pre-coat)
8 < TF < 30	Highly clogging wine to be treated (coarse pre-coat or rough filtration pads for the lowest TFs)
TF > 30	Wine that will be very difficult to filter. Enzyme treatment and/or Fining

For some complex matrices, the addition of specific enzymes is essential to improve wine filterability at the end of fermentation.

Wine: ABV 15.2% vol., TA 3.01 g/L H₂SO₄, pH 4.04.
Addition of **EXTRACLEAR®** (6 mL/hL) in the last third of the AF.
MLF by early co-inoculation.

OTHER APPLICATIONS

Enzymes - Natural accelerators

AGEING

EXTRALYSE®

MICROGRANULATED

PURIFIED

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

- Micro-granulated preparation of pectolytic enzymes and β -(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* (presence of glucans).

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

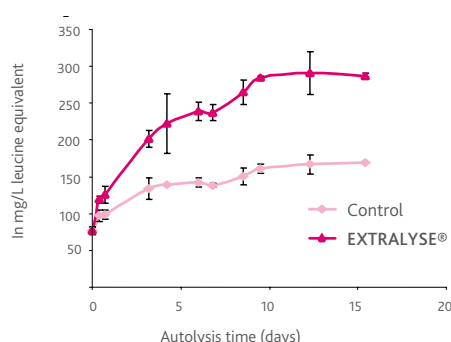


250 g

IMPACT OF EXTRALYSE® ON THE ORGANOLEPTIC TUNING OF WINES: YEAST AUTOLYSIS

Lees ageing is an enzymatic breakdown of yeast cell compartments (commonly called "yeast autolysis") until the cell walls are broken down. Research on enzymatic phenomena that occur during wine ageing. Anne Humbert (2005).

Nitrogen compounds released



Monitoring of yeast autolysis by measuring the concentration of nitrogen compounds released in a medium model, with or without EXTRALYSE® (5 g/hL). AF on synthetic must with *S. cerevisiae* 522 D.

Peptide fraction during yeast autolysis 154 days

Protocols tested	Molecular fraction 0.5 - 3 KDa	Molecular fraction 3 - 10 KDa	Molecular fraction >10 KDa
Without added enzyme	110 mg/L	10 mg/L	60 mg/L
With EXTRALYSE® 5 g/hL	200 mg/L	20 mg/L	90 mg/L

This work has made it possible to isolate three peptide fractions; those of smaller size (0.5 to 3 kDa) give a perceptible sensation of sweetness to dry wines after ageing on lees.

EXTRALYSE® speeds up yeast autolysis, thus promoting the release of a significantly larger quantity of a specific peptide fraction of molecules of interest, while improving the filterability and clarification of the wine.

MICROBIOLOGICAL STABILITY

LYSOZYM

MICROGRANULATED

Specifically for the microbial management of wines:

- Micro-granulated muramidase enzyme preparation. Degrades Gram-positive lactic acid bacteria cell wall.
- Delays the action of lactic acid bacteria, reducing the need for SO₂.
- Strengthens the action of SO₂ on sweet white wines and improves microbiological stability.






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



1 kg

AGEING 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)
Stabilisation of colour.		TANIN VR SKIN® TAN'COR GRAND CRU®	20 - 40 g/hL (200 - 400 ppm) 5 - 30 g/hL (50 - 300 ppm)

TANIN VR SKIN®

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).
- Stabilisation of colour 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).

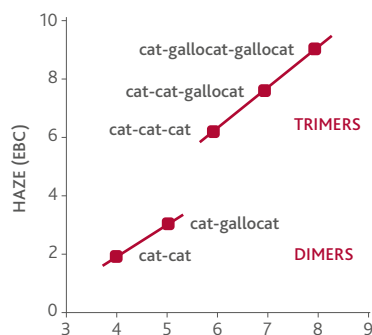


Distribution of procyanidins in seed and skin tannins



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.

Reactivity of procyanidins with proteins



The reactivity of tannins with proteins increases with the degree of polymerisation 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, LAFFORT & YOU section.

AGEING TANNINS

The essential element

TAN'COR GRAND CRU®

Preparation of proanthocyanidic tannins derived from grapes and ellagic tannins from oak. Utilises 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.
- Stabilise colour 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 ageing).
- To boost structure and mouthfeel.
- To help eliminate reductive odours.

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 oenological properties as TANIN GALALCOOL® (See P. 55).

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.

DOSAGE

It is specified in the Oenological Codex that tannins "must not change the olfactory properties and the colour of wine". The dosage rates will therefore vary in function of the wine matrix, and shall be determined after trials.



500 g



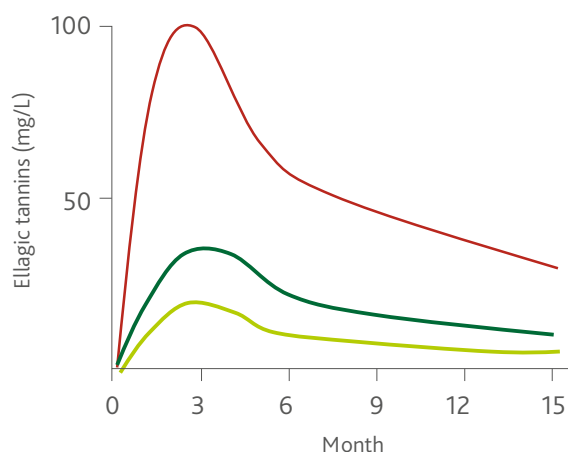
QUERTANIN® Q2

Stave-grade ellagitannins extracted from the heartwood of American oak for the ageing of white, red and rosé wines.

QUERTANIN® Q2 acts on the tannic structure and contributes to the balance of wines.



250 g



- 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.*



OENOFINE® RANGE

Fining based on inactivated yeasts and vegetable proteins

NEW IN 2023

OenoFine

OENOFINE® NATURE

Inactivated yeast, vegetable proteins (patatin, pea protein), calcium bentonite.

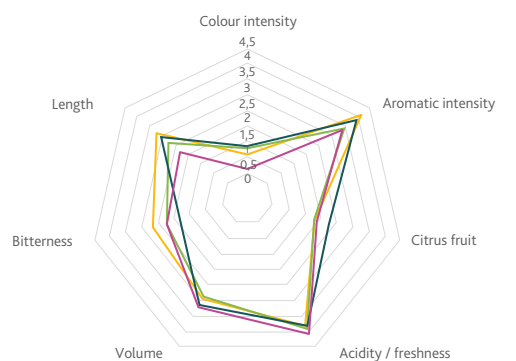
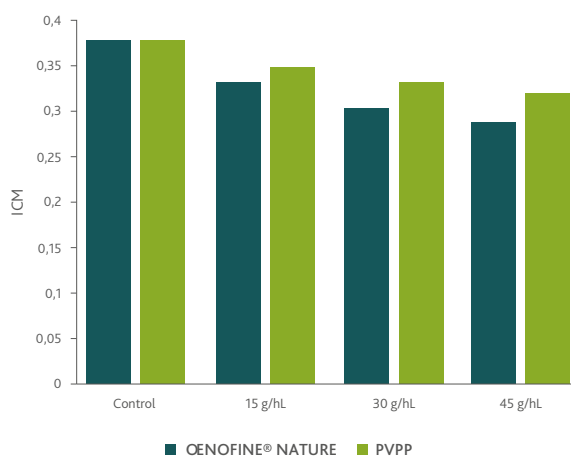
- Alternative to the use of PVPP for fining musts and wines.
- Stabilisation of hue and elimination of oxidised compounds.
- Preserves the aromatic potential of wines.
- Prevents oxidation.
- Effective for curative and preventive fining.

Dose: Fining wine: 10-30 g/hL.

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



ICM and organoleptic profile



Fining of a white wine, Chardonnay, 2021 - OENOFINE® NATURE and PVPP have a similar impact on the reduction of the ICM in oxidised white wines.

After treatment with OENOFINE® NATURE the wine shows a more intense sensory profile with less bitterness. Tasting results from a panel of trained tasters.

OENOFINE® PINK

Inactivated yeast, vegetable protein (patatin), activated carbon, sodium bentonite.

- Alternative to the use of PVPP for fining wines.
- Stabilisation of the hue of rosé wines.
- Colour correction of white wines.
- Very good sedimentation capacity.

Dose: Fining wine: 10-30 g/hL.

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



ORGANOLEPTIC TUNING

Fining based on vegetable proteins



VEGEFINE®

Vegetable proteins (patatins) 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).

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



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 oxidisable phenolic compounds liable to trap aromas and distort the colour.

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



POLYMUST® ROSÉ

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

- Stabilisation of the colour and elimination of oxidised 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 (patatin) for the preventive fining of press wines and the reduction of oxidised character.

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

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 stabilisation of colouring matter in red wines.
- Contributes to protein stabilisation.

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).

Compatible with the European Regulation (EU) 2018/848 on organic vinification.



ORGANOLEPTIC TUNING TREATMENT OF OXIDATION

Finning

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®	Intended to bring out the organoleptic potential of the wine.	30 - 60 mL/hL	1 L / 5 L / 20 L
GELAFFORT®	Wine clarification agent.	10 - 30 mL/hL	20 L
GECOLL®	Cold-soluble powdered gelatine. Wine clarification agent.	8 - 10 g/hL (80 - 100 ppm)	1 kg 20 kg
GÉLATINE EXTRA N°1	Highly purified heat soluble gelatin. Finning of red wines for ageing.	6 - 10 g/hL (60 - 100 ppm)	1 kg

OTHER PRODUCTS FOR STABILISATION AND SENSORY FINE TUNING

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
ALBUCOLL® OVOCLARYL®	Finning and clarification of red wines. Liquid preparation of egg white. Powdered egg albumin.	30 - 80 mL/hL 6 - 10 g/hL	1 L / 5 L 1 kg
ICHTYOCOLLE	Fish-based (isinglass) finning agent suitable for finning fine white and rosé wines. Restores high sensory clarity and remarkable brilliance to treated wines.	0.5 - 1.5 g/hL.	250 g 500 g
SILIGEL®	Colloidal silica solution that may be used in combination with all organic finning agents.	20 - 100 mL/hL.	1 L / 5 L 20 L

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	1 kg 10 kg
CASEI PLUS	Potassium caseinate. Treatment of oxidation phenomena and maderisation in wines.	20 - 60 g/hL	1 kg 20 kg
POLYLACT®	Combination of PVPP and casein. Preventive and curative treatment of the oxidation of wines (white and rosé).	15 - 90 g/hL	1 kg 10 kg
VINICLAR®	Granulated preparation of PVPP. Preventive and curative treatment of the oxidation of wines.	Preventive treatment: 15 - 30 g/hL Curative treatment: 30 - 80 g/hL	25 kg
VINICLAR® P	Granulated preparation of PVPP. Preventive and curative treatment of the oxidation of wines.	20 - 50 g/hL	1 kg 22.68 kg

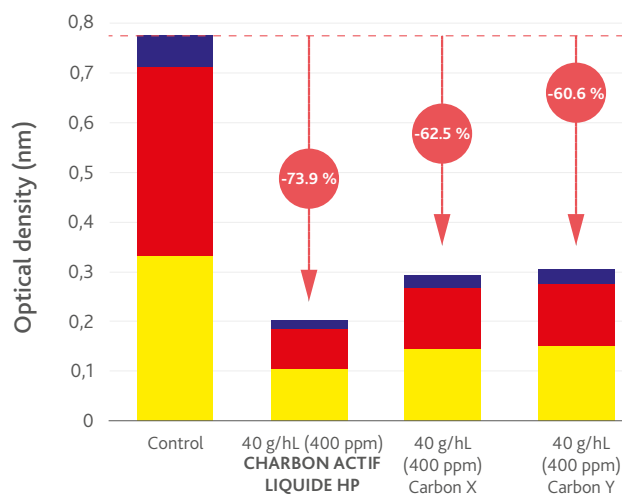
SPECIFIC TREATMENTS

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
FLOWPURE®	Selective vegetable fibres. Reduction of pesticide residues and ochratoxin A levels in the wine.	Consult the product data sheet.	5 kg
SULFIREDOX	Copper sulphate solution dissolved in water at 25 g/L. For the elimination of reduced character in wines.	2 - 10 mL/hL	1 L 5 L

ACTIVATED CARBON*

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
CHARBON ACTIF LIQUIDE HP	Activated carbon in a stabilised aqueous solution. High stain removal and decolorisation capacity.	120 - 400 mL/hL	10 L
CHARBON ACTIF SUPRA 4	Powdered activated carbon for tint removal and decolorisation.	20 - 100 g/hL (200 - 1000 ppm)	15 kg
CHARBON ACTIF PLUS GR	Granulated activated carbon for tint removal and decolorisation.	10 - 100 g/hL (100 - 1000 ppm)	5 kg

* The usage of active carbon is regulated, please check the current regulations. All treatments must be recorded in a handling register and a holding register.



Colour reduction and decolourising power (%) of CHARBON ACTIF PLUS GR

Treatment at 40 g/hL (400 ppm) for the production of a Clairet.
2 hours contact before optical density measurements.

MICROBIOLOGICAL STABILISATION

OENOBRETT®

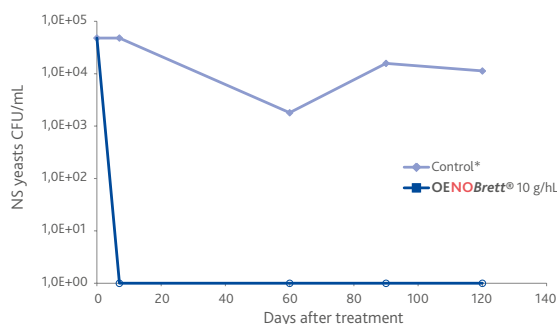
Preparation based on chitosan of fungal origin and enzymes, to combat *Brettanomyces* yeasts.

- 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 SO₂ 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 E4P+E4G 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.



OENOBRETT® ORG

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

- Disruption of the membrane and the cell space by chitosan.
- The antimicrobial action of OENOBRETT® ORG is an essential tool within a SO₂ reduction strategy.

Dosage: 4 - 10 g/hL (40 - 100 ppm).

Compatible with the European Regulation (EU) 2018/848 on organic vinification.

100 g



FLORACONTROL®

Formulation of chitosan and inactivated yeasts for the protection of wines against certain spoilage microorganisms. A Biocontrol product.

- Reduction of the overall microbial load (yeasts & bacteria).
- Tool for winemaking and ageing with reduced SO₂ or without sulphites.
- The inactivated yeast fraction provides a natural reducing component that helps protect wines against oxidation during ageing.
- Contributes to wine clarification.

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

Compatible with the European Regulation (EU) 2018/848 on organic vinification.

1 kg

MICROBIOLOGICAL STABILISATION

FUMARIC^{trl}

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

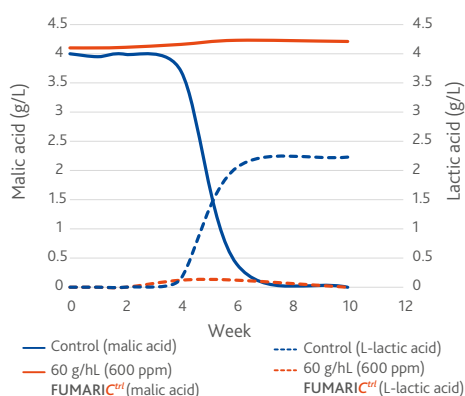
- Avoids the onset of MLF.
- Can stop MLF while in progress.
- Preservation of malic acid in wines.
- Tool for making wines with reduced SO₂ or with no sulphite added.

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



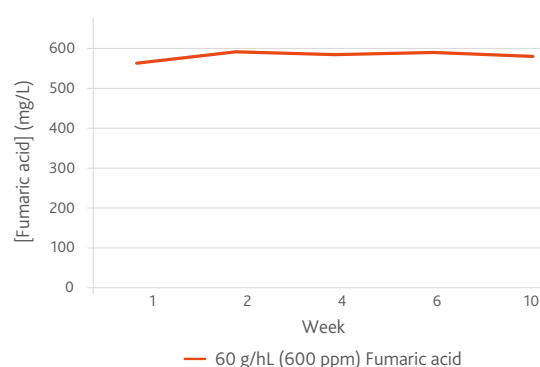
2,5 kg
25 kg

Evolution of malolactic fermentation



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 (unfavourable microorganisms).

BIOcontrol product.

- Reduction of the overall microbial load (non-*Saccharomyces* yeasts, yeast, bacteria*).
- Tool for winemaking with reduced SO₂ or without sulphites.
- Clarification of wines through sedimentation.

Dosage: 5 g/hL (50 ppm).

[Compatible with the European Regulation \(EU\) 2018/848 on organic vinification.](#)

*Reduction in microbial populations by binding.

250 g

BACTICONTROL[®]

Formula made from chitosan, LYSOZYM and enzymes for protecting wines against certain microorganisms and particularly lactic bacteria. BIOcontrol product.

- Microbiological protection of white, red and rosé wines after fermentation.
- A wine vinification tool for use in a SO₂ reduction sequence.
- Makes it possible to slow down or even stop a MLF in progress or avoid its onset (treatment is possible before or after AF).
- Synergistic action by β -glucanases and LYSOZYM on lactic acid bacteria, particularly *ropy pediococcus* (as enzymatic action on polysaccharides can create a widespread barrier around the bacteria and interfere with the action of LYSOZYM).

Dosage: 15 - 20 g/hL (150 - 200 ppm).

500 g

COLLOIDAL STABILISATION

NEW IN 2023

STABIMAX®

Solution of 100% VEREK gum arabic, specifically selected (R&D BIOLAFFORT®), resulting from an innovative purification process.

- High stabilisation power with respect to unstable colouring matter.
- Good filterability, can be added before microfiltration.

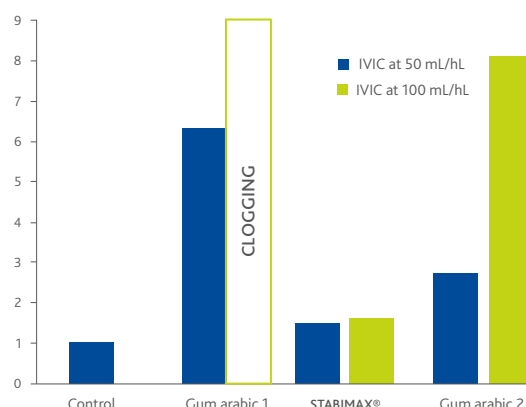
Dose: 50 - 150 mL/hL

IVIC = Clogging index of the wine treated with gum arabic / Clogging index of the control wine

STABIMAX® has a low impact on wine filterability.



Importance of the selection and purification of the gum arabic



22 kg

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 stabilisation and structure of the wines (softness and mouthfeel).
- Very low clogging index.
- Softening of wines by "coating" tannins.

Dosage: 100 - 300 mL/hL.

1 L
5 L
20 L


OENOGOM® INSTANT WITHOUT SO₂

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

- Stabilisation of the colouring matter of red wines.
- Softening of wines by "coating" the tannins.

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

2,5 kg
25 kg

STABIVIN®	STABIFIX®	OENOGOM® BIO 
Pure Verek arabic gum solution with high grade protection index for stabilising colouring matter in red wines.	Solution of selected and purified gum arabic.	Pure gum arabic in rapid dissolving microgranular form (100% verek). LOW SO₂
Hydrophilic colloid which aims to counter hazes and colloidal deposits, allowing the wine to retain maximum clarity: <ul style="list-style-type: none"> • Stabilises colouring matter. • Increases protection with regard to metallic or protein casks. 	<ul style="list-style-type: none"> • Stabilises otherwise unstable colouring matter. • Increases protection against metallic casse. 	<ul style="list-style-type: none"> • Stabilisation of the colouring matter of red wines. • Increase protection towards metallic hazes.
Dosage: 70 - 150 mL/hL.	Dosage: 70 - 150 mL/hL.	Dosage: 20 - 30 g/hL (200 - 300 ppm)
Conditioning: 1 L / 5 L / 20 L	Conditioning: 5 L / 20 L	Conditioning: 2,5 kg

PROTEIN STABILISATION

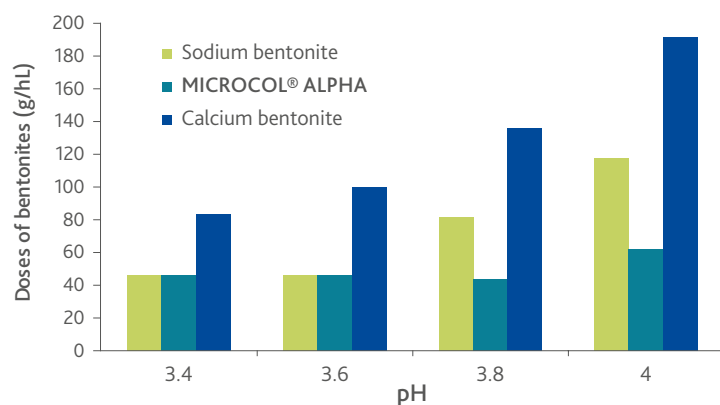
MICROCOL® ALPHA

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

1 kg
5 kg
25 kg

- Stabilising properties in regard to heat-sensitive proteins.
- Wide stabilising action spectrum.
- High clarifying capacity and compact lees.
- Aromatic preservation.
- Helps colour stabilisation.
- Improves wine brightness.

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



Deproteinisation and wine pH

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

MICROCOL® FT

Natural sodium-calcium bentonite for protein stabilisation 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).

MICROCOL® CL G

Natural calcium bentonite, possessing excellent settling capacity and high protein adsorption power and allows for faster settling with formation of very compact lees.

15 kg

- Very good compaction of solids.
- Auxiliary for wine clarification (in combination with a protein fining agent).
- Good deproteinising power.

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

Find out more:

Watch our **MICROCOL® ALPHA** video on our website, at **LAFFORT & YOU** (Video) section

TARTARIC STABILISATION

MANNOSTAB® LIQUIDE 200

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











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

- Inhibition of potassium bitartrate salts crystallisation.
- Neutral sensory impact to the wine.
- Natural compound already present in the wines.
- Stabilises 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.

Practical advice

Available in powder form on request, for the production of wines without sulphites.

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.



1 L
10 L

CELSTAB®

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

- Intended for wine stabilisation in relation to potassium bitartrate crystallisation.
- CELSTAB® is a highly purified cellulose gum. Its composition is uniform (only one peak - 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 stabilisation of highly tartaric-unstable wines.
- CELSTAB® is the liquid CMC with the lowest SO₂ concentration on the market.

Dosage: 100 - 200 mL/hL.



1 L
5 L
20 L

POLYTARTRYL®

Metatartaric acid under vacuum.

- Crystallisation inhibitor of potassium bitartrate salts.

POLYTARTRYL®: Index 40. To be incorporated 48 hours before the final filtration and bottling.

SUPER POLYTARTRYL®: Index 40/42. The strongest index of esterification. Should be added 48 hours before the final filtration.

Dosage: 10 g/hL (100 ppm).

1 kg
5 kg

CA²⁺STAB®

Preparation of racemic tartaric acid (50/50 mixture of the D and L forms).

- Stabilisation of calcium tartrate salts by selective precipitation of excess calcium.

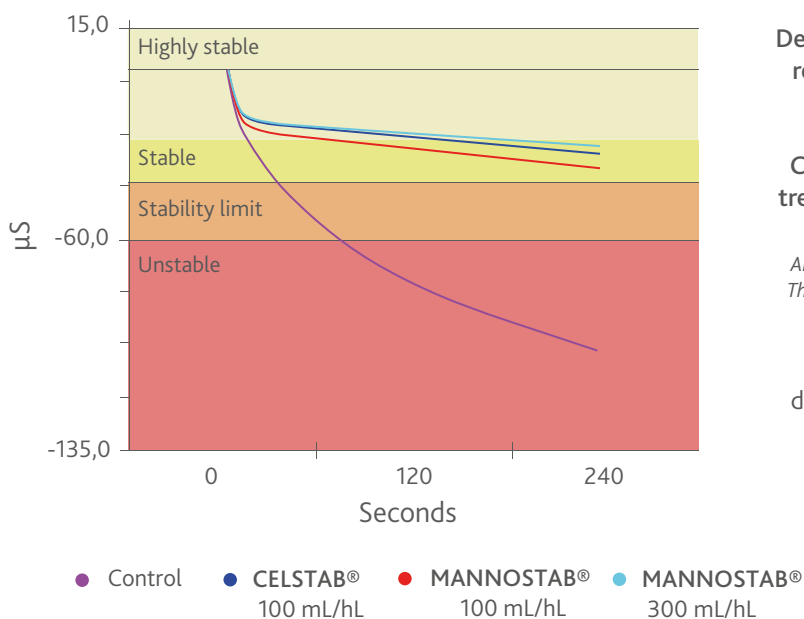
The amount of CA²⁺STAB to be added is determined after measurement of the calcium content.

It is recommended to carry out the treatment as early as possible (ideally during the alcoholic fermentation). Use on must is recommended. For use on wines during ageing, a 6-week interval before preparation for bottling must be scrupulously observed.

2,5 kg

TARTARIC STABILISATION

PRACTICAL APPROACH TO TARTARIC STABILISATION



Determination of tartrate instability and the required dose using the Mini contact test.

Check on stabilisation of a white wine after treatment with CELSTAB® or MANNOSTAB®.

Analysis by MINI CONTACT test (CHECK STAB method).
The drop in conductivity indicates that the treated wine is considered "stable".

A quick and efficient test can be used to determine the treatment dose and to check its effectiveness.

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

DIT VALUE (%)	> 20	> 20	< 20
Category of wine	Quick to Market.	Quick to Market.	Premium - ageing wines. (6 months minimum)
Calcium (mg/L)	< 60	< 60	< 60
Recommended treatment	POLYTARTRYL®	CELSTAB®	MANNOSTAB® LIQUIDE 200
Treatment dose	10 g/hL (100 ppm)	100 - 200 mL/hL	50 - 150 mL/hL
White and rosé wines	Direct treatment	Direct treatment	Natural stabilisation
Red and rosé wines	Direct treatment	-	Natural stabilisation

DEGREE OF TARTARIC INSTABILITY: DIT (%) - Stability threshold (white, red, rosé wines): < 5% (under measurement conditions in our laboratory).

PRESERVATIVES

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

PRODUCT	DESCRIPTION	DOSAGE	PACKAGING
BISULFITE 15	Aqueous solution of potassium bisulphite.	10 mL releases 1.5 g of SO ₂ .	1 L 5 L 20 L
BISULFITE 18	Potassium bisulphite and sulphur dioxide in aqueous solution.	10 mL releases 1.8 g of SO ₂ .	5 L 20 L
BISULFITE NH ₄ 150*	Aqueous solution of ammonium bisulphite.	10 mL releases 1.5 g of SO ₂ and 0.4 g of diammonium.	20 L
BISULFITE NH ₄ 200*	Aqueous solution of ammonium bisulphite.	10 mL releases 2 g of SO ₂ and 0.5 g of diammonium.	10 L
BISULFITE NH ₄ 400*	Aqueous solution of ammonium bisulphite.	10 mL releases 4 g of SO ₂ and 1.07 g of diammonium.	20 L
SOLUTION 6	Pure sulphur dioxide dissolved in water.	10 mL releases 0.6 g of SO ₂ .	10 L 20 L
SOLUTION 10	Neutralised aqueous solution of sulphur dioxide	10 mL releases 1 g of SO ₂ .	5 L 10 L 20 L
POTASSIUM METABISULFITE	Pure potassium bisulphite in powder.	1 g of potassium metabisulphite releases 0.5 g of SO ₂ .	1 kg - 25 kg
OENOSTERYL® 2	Effervescent tablets of potassium bisulphite.	Each tablet releases 2 g of SO ₂ .	Box of 48 tablets
OENOSTERYL® 5	Effervescent tablets of potassium bisulphite.	Each tablet releases 5 g of SO ₂ .	Box of 42 tablets
SOUFRE PASTILLES** 2,5 g - 5 g - 10 g	Burnable sulphur tablets.	Conservation of empty barrels: burn between 2 - 4 g/hL (20 - 40 ppm) of sulphur (repeat the operation regularly according to the storage conditions). Sulphuring after barrel cleaning: burn between 1 - 3 g/hL (10 - 30 ppm) once the barrels are drained.	Box of 1 kg

*Authorised on musts and wines still in fermentation at a maximum dose of 20 g/hL (200 ppm).

**The production of SO₂ can vary depending on how damp the barrels are.

Find out more:

Watch our **OENOSTERYL®** video on our website, at **LAFFORT & YOU** section.



NOBILE®

L'œnologie du bois



CHIPS & GRANULARS 82

SPIRIT RANGE 83

STAVES, BLOCKS & BARREL REFRESH 85

NOBISPARK 86

NOBILE®

The oenology of wood

LAFFORT's oenological 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 oenology, 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 experience and control of 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 ageing. For more usage tips, consult the NOBILE® team, specialising in the oenology of wood.

REGULATIONS

The use of oak wood chips is subject to regulation. Refer to the legislation.





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 ageing.

DOUBLE
TOASTING

SOFT OAK

Exclusive to the NOBILE® range, the "Soft Oak" method is used to optimise the softness of the tannins during toasting. This program contributes to the creation of unique organoleptic expressions.

SOFT
OAK
PROCESS



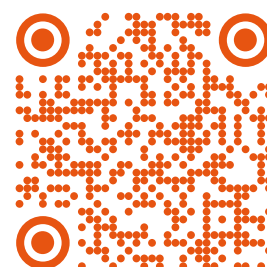
DISCOVER OUR WEBSITE ENTIRELY DEDICATED TO OAK FOR WINEMAKING

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.

JOIN US ON INSTAGRAM

@nobile_oenologie



CHIPS & GRANULARS

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

GOURMET RANGE



**NOBILE®
BASE**
Chips



Volume & roundness.
Without toasted notes.



**NOBILE®
SWEET VANILLA**
Chips



Lush vanilla
& marshmallow flavours.



**NOBILE®
CHERRY SPICE**
Chips



Sweet entry,
black fruits & spicy.



**NOBILE®
DARK ALMOND**
Chips



Roasted complexity
& dark chocolate.

CLASSIC TOAST



**NOBILE®
FRESH THERMO TRAITÉ**
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



Antioxydant & structure.



**NOBILE® AMERICAN
FRESH GRANULAR**
Granulars



Fruit & lactones.





SPIRIT RANGE

A full range of high quality chips developed specifically for spirits

HOMOGENEOUS TOASTING

NOBILE® FRUIT SHINE

FRENCH OAK

- ▶ Sensation of freshness on the palate.
- ▶ Slightly enhanced structure.

Aromatic expression:

- ▶ **Enhanced fruit.**
- ▶ Delicate oaky complexity.



NOBILE® BOURBON CASK

AMERICAN OAK

- ▶ **Volume & roundness.**
- ▶ Warm balance on the palate.

Aromatic expression:

- ▶ Lush: crème brûlée, brown sugar.
- ▶ Complex: Madagascar vanilla, bourbon, orange peel, caramel.



SOFT OAK PROCESS

NOBILE® OLD RESERVE

AMERICAN OAK




- ▶ Delicate texture.
- ▶ **Supple and silky tannins.**

Aromatic expression:

- ▶ Lush: biscuit, vanilla.
- ▶ Complex: dried fruit, spices, floral.
- ▶ Length and sophisticated oaky complexity.



AGEING OBJECTIVES


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


STAVES, BLOCKS & BARREL REFRESH OENOLOGICAL +

- Slow and gradual extraction.
- Aromatic expression with respect for the fruit.
- Character and complexity comparable to barrel ageing.


BARREL REFRESH

Give a second life to your barrels.





Patented attachment system (FR 1752945) for ultra-easy implementation.



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.



STAVES, BLOCKS & BARREL REFRESH

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 ageing.

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.

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 oenological 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 flavours.

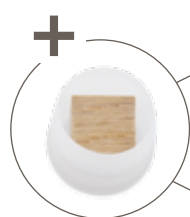


**NOBISPARK
SENSATION**



Brings complexity and toast flavours, perfectly integrated by the 2nd fermentation and keeping the fruit intact.

OENOLOGICAL +



Organoleptic differentiation of sparkling wines from the same initial blend.

Improved aromatic clarity: eliminates any notes of reduction in young wines.

Antioxidant protection: considerably improves the ageing potential of sparkling wines.



Seriously rosé

LAFFORT® is keenly aware of the highly technical nature of producing rosé wines with numerous complex hues and aromas. Via our experimental centre 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 colour 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 colour. 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 optimise 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 colour to develop and wine structure to be modified. Appropriate fining will help produce high quality rosé wines.

Stabilisation

At the end of the process, certain choices can alter the aromatic profile or colour of wines; stabilisation 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

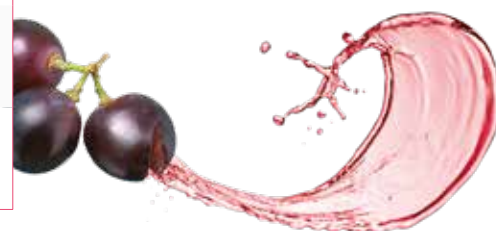
l'œnologie par nature



Our seriously rosé selection...

PROCESS OPTIMISATION	Pressing	LAFAZYM® PRESS * LAFASE® XL PRESS *
	Clarification	LAFAZYM® CL * LAFAZYM® 600 XL ^{ICE} * LAFASE® XL CLARIFICATION
AROMATIC OPTIMISATION	Aromatic thiols revelation	LAFAZYM® THIOLS ^[+] * (must and wines in fermentation)
	Terpene aroma revelation	LAFAZYM® AROM (end of AF and finished wines)

* Purified enzymes



BIOPROTECTION	ZYMAFLORE® KHIO^{MP} BIOProtection at low temperatures, suitable for stabulation. Strong capacity to consume oxygen in musts.
	ZYMAFLORE® EGIDE^{TDMP} BIOProtection on grapes and harvest reception equipment.



YEAST	ZYMAFLORE® XAROM
	ZYMAFLORE® X16
	ACTIFLORE® ROSÉ
	ZYMAFLORE® X5
	ZYMAFLORE® DELTA
	ZYMAFLORE® XORIGIN
	ZYMAFLORE® VL1

AROMATIC
STRENGTH

AROMATIC
ELEGANCE



ZYMAFLORE®
XAROM



ZYMAFLORE®
X16



ZYMAFLORE®
X5



ZYMAFLORE®
DELTA



ZYMAFLORE®
XORIGIN



ZYMAFLORE®
VL1

YEAST PREPARATION ADDITIVE	SUPERSTART® <i>Blanc & Rosé</i>	To be used when rehydrating the yeast. Yeast rehydration product with a high sterol, vitamin and mineral content for optimising yeast metabolism throughout fermentation.
NUTRIENT	NUTRISTART® AROM, NUTRISTART® ORG & THIAZOTE®	Total nutrition – mixed, 100% organic or mineral – to correct nitrogen deficiencies in musts.
AROMATIC PROTECTION	FRESHAROM®	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...

The colour chart below represents the hue and intensity of the rosé must or wine to be treated. Opposite, you will find the recommended product(s) to be used to achieve your goal.

Refine wines and control colour intensity

100% vegetal



VEGEMUST®

Vegetable proteins (patatins, pea).
Effective clarification. Reduction of the phenolic content.



VEGEMUST® + CHARBON ACTIF LIQUIDE HP

Vegetable proteins (patatins, pea) + activated carbon.
Reduction in hue, colour stabilisation.



VEGEFINE®

Vegetable proteins (patatins).
Significant action on oxidisable polyphenol.

Synergistic formulations

POLYMUST® BLANC

Vegetable protein (pea), PVPP.
Eliminates oxidisable phenolic compounds.

OENOFINE® PiNK

Inactivated yeast, vegetable protein (patatin), activated charcoal, sodium bentonite.
Reduction in hue, elimination of phenolic compounds.



POLYMUST® ROSÉ

PVPP, plant protein (patatin, potato protein isolate).
Stabilises hue, reduces phenol acids.

OENOFINE® NATURE

Inactivated yeast, vegetable proteins (patatin, pea), calcium bentonite
Elimination of oxidisable phenolic compounds.



POLYLACT®

(PVPP, potassium caseinate).
Inhibits browning.

Controlling oxidation

PROTEIN STABILISATION	MICROCOL® ALPHA	Natural sodium bentonite respecting colour and aromas while also having good protein removal capacity.
	MICROCOL® FT	Natural calcium-sodium bentonite, intended for protein stabilisation of wines during tangential filtration.
TARTARIC STABILISATION	CELSTAB®	CMC for tartaric stabilisation to be used after a laboratory trial.
	POLYTARTRYL®	Metatartaric acid - Inhibits crystallisation of potassium bitartrate.
	MANNOSTAB® LIQUIDE 200	Natural mannoprotein for tartaric stabilisation of potassium bitartrate salts.



LAFFORT spark®

...BUBBLES BY NATURE

The production of quality sparkling wine follows a sequence of stages that must be optimised 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, SO₂ reduction and O₂ consumption.
ZYMAFLORE® EGIDE^{TDMP} AND **ZYMAFLORE® KHIO^{MP}**

Non-Saccharomyces yeasts for BIOProtection of the harvest.

- Allows the medium to be colonised without fermentation activity, to limit predominance of the indigenous flora.
- Particularly suited to the strategy of reduced sulphite additions to musts, as well as the strategy of delayed sulphite additions to red musts.
- Protection of musts during transport in tanker.
- **ZYMAFLORE® KHIO^{MP}**: Strong ability to consume oxygen in musts.

Juice clarification

LAFAZYM® CL & LAFAZYM® 600 XL^{ICE}

Purified pectolytic enzymes for quick must settling.

- Quick and complete depectinisation.

Fining & colour of musts

● Cuvée / Free run juice



VEGEFINE®

100% patatins - Elimination of phenolic compounds.

POLYMUST® PRESS

Removes the oxidisable and oxidized phenolics.

● Taille / Press juice

CHARBON ACTIF PLUS GR

Selected activated carbon to decolourise 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-acclimatisation is achieved in the cellar (Step by step protocol. See technical tools).

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 stabilisation

MANNOSTAB® LIQUIDE 200

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

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

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

CELSTAB®

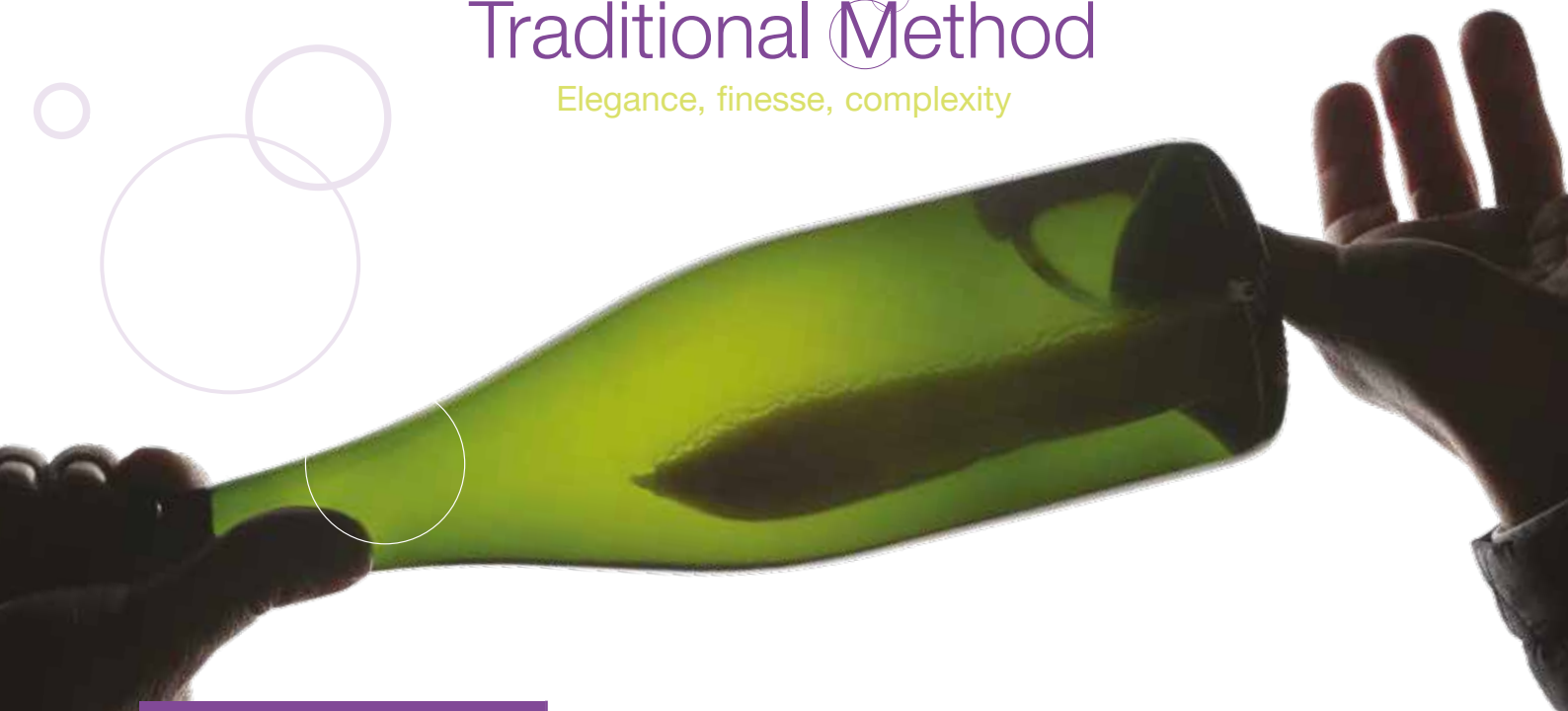
Solution of cellulose gum. CELSTAB® is a highly purified cellulose polymer of vegetal origin, with a low degree of polymerisation and viscosity.

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

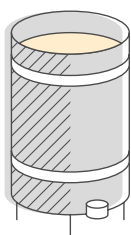
Under traditional method, the addition is made entirely before tirage.

Traditional Method

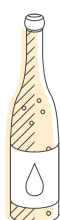
Elegance, finesse, complexity



Secondary fermentation



CLEANS^{spark} effect



SUPERSTART^{spark}

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

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



ZYMAFLORE^{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^{spark}

Riddling adjuvant (bentonite/alginate).

- Quick and complete removal of particles and sediments in bottles after ageing "sur lattes" (on lees).



TAN^{spark}

Combination of gallic and ellagic tannins in liquid form.

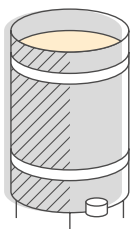
- Rebalances redox potential of the base wine, reinforces its structure and confers shininess to the finished sparkling wine.



Charmat Method

Freshness, simplicity, sophistication

Secondary fermentation



SUPERSTART® spark

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

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



ZYMAFLORE® X5

Yeast selected for fresh and aromatic wines

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



OR

ZYMAFLORE® X16

Yeast for aromatic and modern sparkling wines.

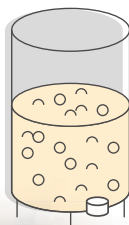
- High production of secondary aromas (white peach, white flowers, yellow fruits).



FRESHAROM®

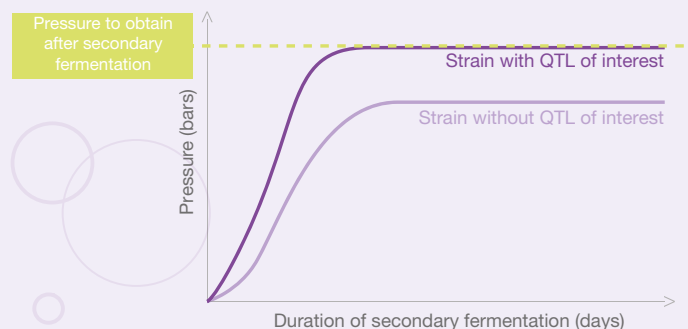
Specific preparation of inactivated yeast with high protective power (5.3%).

- Allows for increased aromatics, as well a better ageing 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® takes these genetic criteria into consideration when recommending yeasts suitable for the secondary fermentation.

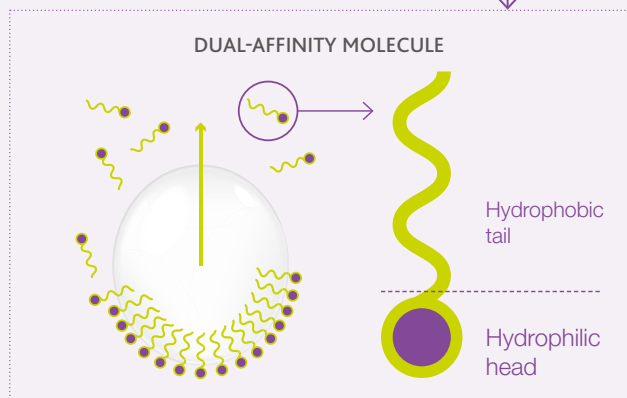
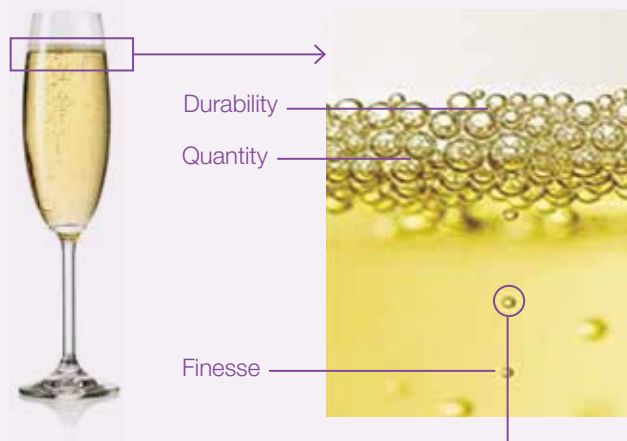




FOCUS

MANNOSPARK[®], 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 CO₂, its growth is directly linked to the concentration of dissolved CO₂ 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[®] 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[®] 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 standardised 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[®] shows a more generous collar of bubbles, which is more stable over time.

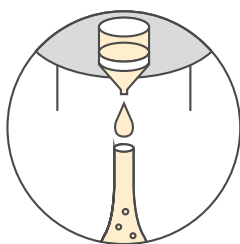


Molecular and Atmospheric Spectrometry Group (GSMA), a joint research unit between CNRS and the University of Reims Champagne Ardenne (URCA). Bubble Physics Laboratory, Pr. Gérard Liger-Belair.

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).

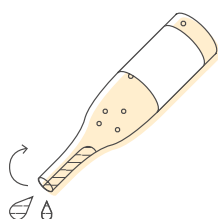
- Accelerates the development of "on lees" ageing characters.
- Optimises foam finesse and persistence.



MANNOSPARK®

Specific yeast cell wall mannoproteins (Patent 2726284).

- Reinforces tartaric and colloidal stabilisation.
- 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

OENOLEES® MP

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 oenological bidule enables the second fermentation under oak, for more complex and more elegant Traditional Method wines.



98 Filtration

100 Cleaning products

101 Équipement de cave

FILTRATION

Pre-coats and diatomaceous earths

PRE-COATS

DIATOMYL® R & DIATOMYL® B

Pre-coat filtration products specially formulated to improve the filtration yields of food liquids, composed of:

DIATOMYL® B and DIATOMYL® R are totally chemically inert with respect to musts and wines.

DIATOMYL® B and DIATOMYL® R provide better stability of the pre-coat throughout the filtration cycle. They maintain the integrity of the pre-coat, avoiding any deterioration due to pressure variations.

REFERENCE	COLOUR	PERMEABILITY	PACKAGING
DIATOMYL® R	Pink	0.25	15 kg
DIATOMYL® B	White	0.85	15 kg

NOTE:

DIATOMYL® R is an effective option to optimise the clarification of wines in preparation for bottling.

OPTION 1	PRE-COAT	FILTER COAT
DIATOMYL® P2	500 – 600 g/m ²	✓
DIATOMYL® R	800 g/m ²	
DIATOMYL® P2	500 – 600 g/m ²	

OPTION 2*	PRE-COAT	FILTER COAT
DIATOMYL® P2	500 – 600 g/m ²	
DIATOMYL® R	1 000 g/m ²	✓

** Specifically intended for white, rosé and dessert wines to meet strict microbiological requirements.*

DIATOMACEOUS EARTHS (KIESELGUHR)

Diatomaceous earths are sedimentary rocks composed of skeletal remains of single-celled aquatic plants rich in silica. DIATOMYL® products are widely used in the food industry (beer, edible oils, ciders, fruit juices).

REFERENCE	COLOUR	WET DENSITY (g/L)	APPLICATIONS
DIATOMYL® P00	White	478	New wines, press wines. Filtration of musts, solids or lees on rotary drum vacuum or press filter. Can be used as a pre-coat.
DIATOMYL® P0	White	440	
DIATOMYL® P2	White	440	Clarifying filtration of wines. Can be used as a pre-coat as a mechanical protection of the media.

FILTRATION

Perlites and filter sheets

PERLITES

Volcanic rocks of the rhyolite group. PERL products are used in the food industry (wines, ciders, fruit juices, brines...).

REFERENCE	PERMEABILITY (DARCY)	APPLICATIONS
PERL 10	2.5 - 3	Musts, solids and lees on rotary drum vacuum or press filter.
PERL 8	1.2 - 1.8	Enzyme-treated musts, new wines on earth or press filters. For optimal results, use of a cellulose-based pre-coat (DIATOMYL® B) is recommended.
PERL 6	0.5 - 0.8	Fine clarifying filtration of wines on earth or press filters. For optimal results, use of a cellulose-based pre-coat (DIATOMYL® B) is recommended.

L SERIES FILTER SHEETS

Sheet filters made of pure cellulose, diatomaceous earth or perlite, intended for wine filtration. L series filter sheets are suited to various technical objectives:

REFERENCE	RETENTION THRESHOLD (µm)	USES
L 60	0.35	Filtration for "sterile" bottling of at-risk wines (high pH, residual sugar). To limit bacterial risks. Filtration before membrane (0.45 - 0.65 µm).
L 40	0.45	Sterile filtration. Filtration before membrane (0.45 - 0.65 µm).
L 15	0.60	Yeast sterile filtration. Filtration before membrane (0.65 µm).
L 12	1	Fine filtration with significant reduction of microbes (yeasts).
L 7	1.5	Clarifying filtration.
L 5	2	Refining filtration.
L 3	2 - 3	Filtration with strong haze retention power.

CLEANING PRODUCTS

The proper meaning of hygiene

HYGIENE AND OENOLOGY

Wine is a food product that must comply with specific hygiene rules. It is a medium conducive to the growth of many microorganisms which, without being dangerous to health, can harm wine quality.

The surfaces of containers in contact with must and wine must be completely free of spoilage microorganisms and deposits that can harbour them (tartrate...).

LAFFORT® offers a full range of hygiene products for cleaning and disinfecting all equipment (stainless-steel tanks, concrete tanks, pumps, hoses, filters, bottling lines...) and winery surfaces (floors, walls...).

A FULL RANGE OF HYGIENE PRODUCTS FOR THE WINE SECTOR

PRODUCT	ACTIVE INGREDIENT	ACTIONS	PACKAGING
DECATARTRE LIQUIDE	Liquid alkali	Detergent and tartrate removal	20 L
DECAPOL® CHLORÉ	Chlorinated alkali	Detergent and decontaminant	20 L
DECAPOL® ACTIF	Hydrogen peroxide	Decontaminant, detergent activator	20 L
DECAPOXY® 5	Peracetic acid	Disinfectant	20 L
P3-ALCODES	Ethanol and glutaraldehyde	No-rinse disinfectant	1 L (spray) / 19 L
P3 VINO MFC	Liquid alkali	Detergent for membrane systems	20 L

Instructions for use / dose: consult the product data sheet.

REGENERATION AND UNCLOGGING OF FILTER MEMBRANE UNITS

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



DECAPOL® EXTRA Life

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

5 kg

- Free of phosphate and surfactants (can be directly applied to filter cartridges).
- Strong oxydiser.
- 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 (tangential filters).

5 kg

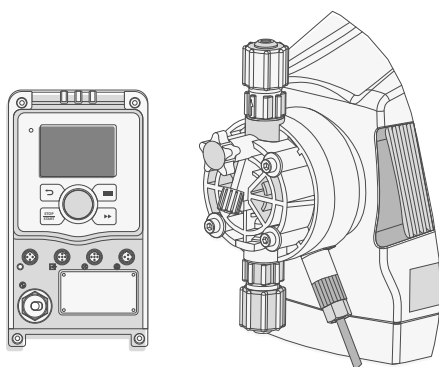
- Moderate oxydiser.
- Suitable for everyday use or for unclogging programs.
- Specific for cleaning tangential filters.
- Used in a closed circuit or CIP.

Instructions for use / dose: consult product packaging.

CELLAR EQUIPMENT

For easy implementation

STABILISATION



DOSING PUMP

Equipment connected to an electromagnetic flow meter for accurate in-line addition of liquid stabilisation products.

- Doses up to 8,000 bottles/hour for the addition of up to 200 mL/hL.
- Option to connect 2 pumps to add different or immiscible products.
- Quote on request.

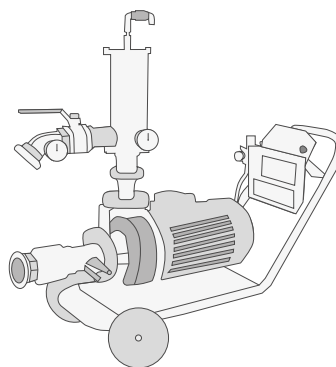
SPARK



DISGORGING TOOL

- Stainless-steel tool with an ergonomic wooden handle for disgorging bottles of sparkling wine.

FLOTATION

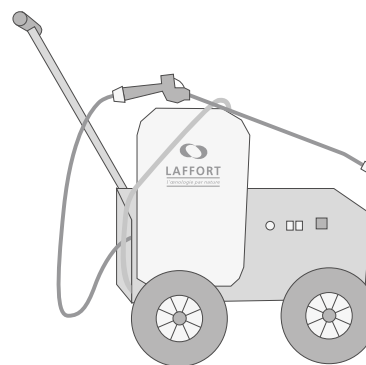


FLOTATION UNIT

Mobile unit for the optimal flotation of musts. Batch treatment in a closed circuit on a single tank.

- Equipped with a saturation unit, a gas injection system, a pressure gauge and an electrical box.
- Several models available depending on the required flow rate (150 to 500 hL/h).
- Contact us for further technical details.

BIOPROTECTION



BIOSPRAYER

Self-contained electric sprayer for **BIO**Protection of equipment.

- Allows the spraying of **BIO**Protection yeasts (ZYAMFLORE® EGIDE^{TDMP}) from a long distance (5-8m) on all equipment and tanks receiving grapes or in contact with grapes and juice.
- 20L tank.
- Mobile unit.
- Operates on a rechargeable battery (charger supplied).

LAFFORT®

THE ORGANIC COMMITMENT

Organic certifications and wine

The products and product ranges that are usable in Organic winemaking are framed by the EU regulation 889/2018 and NOP (National Organic Program) of USDA (United States Department of Agriculture).

Certifications

The list of the LAFFORT® products authorized within the framework of the European Organic legislation and/or NOP is available on our website (direct access if you scan the QR code below).

We have chosen to entrust certification to the external inspection body Ecocert: 3 of our products are certified in accordance with Regulation (EU) 2018/848.



Our certificates & listed products:



ZYMAFLORE® 011 **BIO**
OENOCCELL® **BIO**
OENOGOM® **BIO**

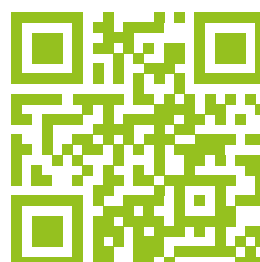
BiO

More than 137 products or range are listed on the website www.intrants.bio as authorised within the framework of the European Organic legislation.

Where to find our certificate?

Go to www.laffort.com, «Downloads» section, «Certificates» category.

www.laffort.com/downloads/certificates



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restart protocol**
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Fermentation restart protocol

Alcoholic fermentation

For 100 hL of wine in stuck AF

1 PRELIMINARY OPERATION ON STUCK WINE

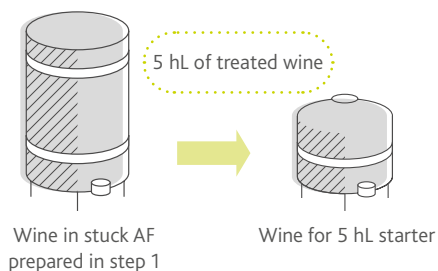
- Rack/centrifuge avoiding air.
- Adjust wine temperature to 20°C (68°F).
- Adjust SO₂ at 1 - 2 g/hL (10 - 20 ppm).
- Add:
 - For white wines: **BI-ACTIV®**: 40 g/hL (400 ppm).
 - For red wines: **OENOCELL®**: 40 g/hL (400 ppm).
- Mix wine anaerobically every 12 hours for 24 hours.
- Move on to step 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 homogenise.
- Add **ACTIFLORE® B0213**: 30 g/hL (300 ppm) of the volume of wine to be treated, then homogenise.

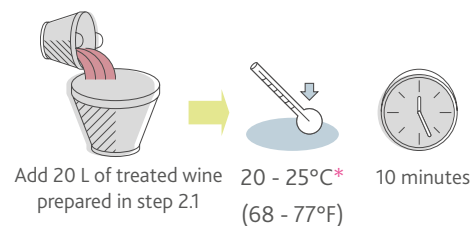


- Wait 20 minutes, then homogenise.



- 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.

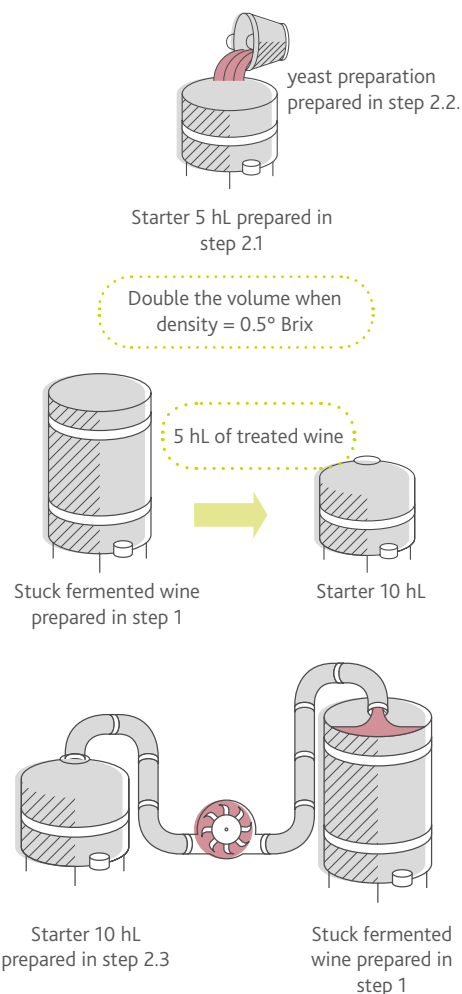


Fermentation restart protocol

Alcoholic fermentation

2.3. Acclimatation 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), maintain temperature 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.



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).

Find out more: discover our **RESTARTING FERMENTATION (AF)** DMT on our website, in the **LAFFORT & YOU** section.

Flotation protocol with VEGEFLOT®

Many factors influence the flotation process and hence its success. The parameters of the protocol have been specially adapted for an easy flotation. Do not hesitate to contact **LAFFORT®**'s team before your flotation trials in order to explore the potentially inhibiting parameters and find the appropriate solutions.

1 PREPARING OF THE JUICE

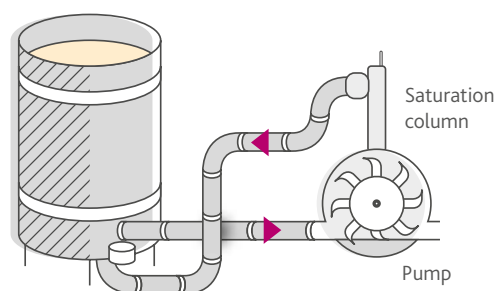
- Clarification by flotation involves migration of the particles of the must to the surface of the tank. This migration is prevented in the presence of pectins. The addition of pectolytic enzyme directly after grape pressing is necessary to accelerate the process.
 - **LAFASE® XL FLOT**: 1 - 4 mL/hL.
 - **LAFAZYM® 600XL^{ICE}** (allows complete depectinisation at low temperatures): 1 - 2 mL/hL.
- Check the completion of the depectinisation before starting the flotation. Use our **PECTIN TEST**, easy and fast.



2 CONNECTING THE FLOTATION PUMP

- For an easy flotation, the filling of the tank should not exceed 85 to 90% of the total volume.
- The temperature of the must should be between 15 - 18°C (59 - 64°F). **The colder the must, the higher the viscosity, the more difficult the flotation process.**
- Connect the pump inflow to racking valve, and the pump outflow to lees valve.
- For the best results, pipes should not exceed 3 m (inflow and outflow).
- Make sure all the air is out of the saturation column before closing the tap.

MUST FOR CLARIFICATION

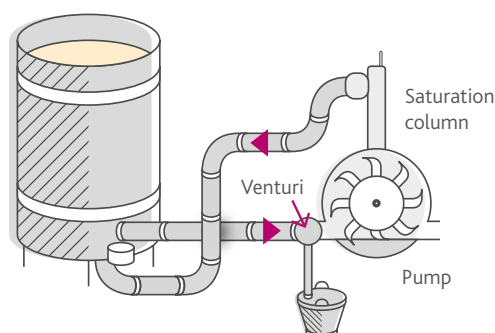


3 ADDING THE VEGEFLOT®

- Start the pump without gas injection.
- Check that the saturation pressure is between 2 and 3 bar (the size of the tank does not matter).
- Prepare **VEGEFLOT®** in a clean, inert container **following LAFFORT® recommendations**.
- The recommended dose of **VEGEFLOT®** is usually 15 g/hL (150 ppm) (the dose can be adjusted according to the characteristics of the must).
- Place into the **VEGEFLOT®** preparation, the pipe dedicated to the venturi section provided on the flotation system.
- Inject VEGEFLOT® as slowly as possible.**
- Mix the tank for 20 to 25 minutes at a saturation pressure of 2 to 3 bar, without addition of gas.



MUST FOR CLARIFICATION

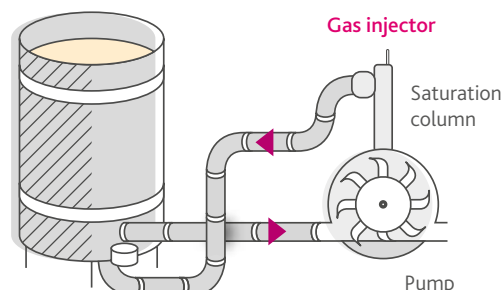


Flotation protocol with VEGEFLOT®

4 STARTING THE FLOTATION PROCESS

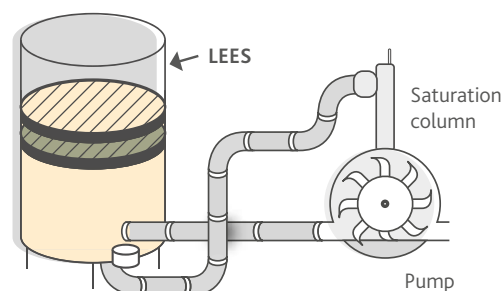
- Once the tank is homogenised, open the gas injection valve.
- The nitrogen inlet pressure should be between 5 and 7 bar.
- The gas flow rate must be between 25 - 60 L/min (depending on flotation setup). The saturation pressure must be adjusted to 5 bar.
- Check the quality of the flotation. To do this, take a sample at the tap of the saturation column.
- Remember to readjust the saturation pressure between 5 and 7 bar after sampling.
- The circulation time for flotation is between 60 - 150 min. Depending on the volume of the tank.
- Pump the equivalent of 1 to 2 volumes of the tank - 1.5 times is usually enough.

MUST FOR
CLARIFICATION



5 COMPLETION OF FLOTATION PROCESS AND WAITING TIME

- Once the flotation process is complete, stop the pump.
- Close the gas.
- Close all the valves in the tank.
- Leave the tank for 60 to 120 minutes so that lees can rise to the surface.
- **Do not leave the tank longer than 240 minutes. Gravitational force can cause lies separation and resuspension of the lees if the waiting time is too long.**
- Check the turbidity of the clarified batch.



Find Out More: Discover our **FLOTTATION** video on our website, at **LAFFORT & YOU** section.

Tools for acidification in musts and wines

Three acids are authorised for acidifying musts and wines:

- Tartaric acid (L(+) tartaric).
- Malic acid (L-Malic – D,L-Malic).
- Lactic acid (DL-Lactic).

These acids are naturally present in grapes. They differ in structure, acidification capacity and organoleptic impact.

Operations can consist of a mix of additions of different acids (especially appropriate on wines for organoleptic purposes).

The goals pursued must be the object of prior testing. Variations in pH and total acidity for the same treatment are not the same, the ionic strength and the buffering capacities can have a significant influence from one must or wine to another.

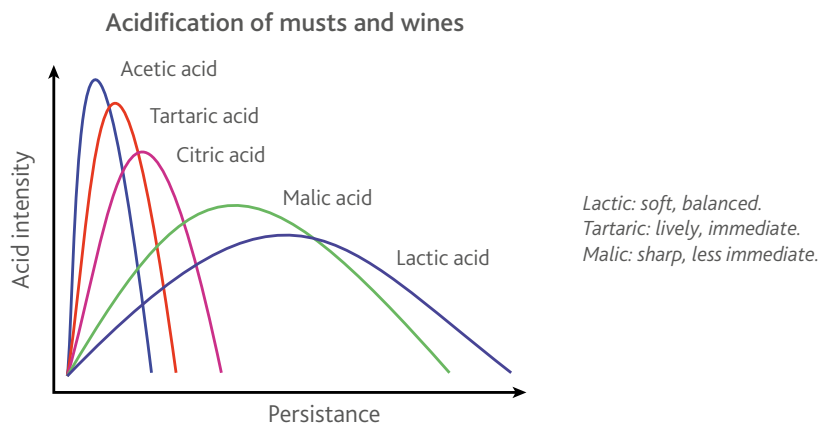
REGULATORY STANDPOINT

Acidification of fresh grapes, grape must, partially fermented grape must, new wine still in fermentation, and wine.

- Maximum dose of 4 g/L expressed as tartaric acid, i.e. 53.3 meq/L.

All treatments will be entered into a handling register and a custody register.

Acidification and enrichment (or chaptalisation) of one and the same product are mutually exclusive processes (for example a must or new wine still in fermentation can be enriched or chaptalised and the wine from the fermentation can be acidified), except by way of derogation ((CE) 1308/2013, appendix 8, part1, section C and D).



SUMMARY OF THE COMMERCIAL PRODUCTS AVAILABLE AND THEIR PRINCIPAL OENOLOGICAL CHARACTERISTICS.

	TARTARIC ACID	MALIC ACID	LACTIC ACID	COMMENTS
Chemical formula.	$C_4H_6O_6$ L	$C_4H_6O_5$ DL	$C_3H_6O_3$ DL	Malic and lactic acids are achiral molecules. They exist in the form of two enantiomers: L and D form. Only the L form of malic acid exists naturally in grapes. Lactic acid is a natural result of lactic bacteria metabolism produced by the latter only in the L form.
Note on label	Acidity regulator E334	Acidity regulator E296	Acidity regulator E270	
pKa	3.05 / 4.2 Di-acid	3.4 / 5.1 Di-acid	3.85 Mono-acid	The acids are classified according to their pKa (acidity constant). The higher the pKa, the weaker the acid.
Correspondence 1 Eq	75 g	67 g	90 g	
Recommended targets	Red - Rosé - White	Rosé - White	Red - Rosé - White	
Treatment of must (at 53.3 meq/L*)	4 g/L	3.57 g/L	4.80 g/L	
Effect on pH	+++	++	++	Tartaric acid remains the most effective on pH. To avoid an excessive precipitation of salts, it is recommended to use it during fermentation on must.
Effect on total acidity	++	+++	+++	
Chemical stability	- Precipitation of K bitartrate, neutral calcium tartrate	+++	+++	Potassium or calcium salts from malic and lactic acids are significantly more soluble than tartaric acid salts, the risk of precipitation is thus lower.
Microbiological stability	+ Only risk is acetic acid degradation (tourne disease) by certain lactic bacteria.	+++	++	
Organoleptic impact	Lively. Immediate. Dryness. Hardness.	Freshness. Greenness (green apple).	Soft and tart acidity.	
Formulation	Powder	Powder	Liquid	Lactic acid is in liquid form, powder formulations contain unauthorised lactates. Powders can be directly dissolved into the wine.

* Maximum dose – Consult the LAFFORT® technical department for more information on the dose to use.

enologie 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.
- Certificates for our Kosher passover products.
- General attestation.
- List of allergenic products.
- Statement on animal welfare.
- Packaging: suitability for contact with foodstuffs and environmental.
- Vegan certificates.



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Confirmé ★ ★

AFNOR CERTIFICATION

LAFFORT® certified as Committed to CSR according to standard ISO 26000

LAFFORT® had already paved the way in 1999, by being the first producer of oenological 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.



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L'œnologie par nature



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