CATALOG

LAFFORT® 2024

Dear winemakers,

In this year of the Olympics, **LAFFORT®** is also choosing its field of competition: red wines.

For this new vintage, we have focused our skills on red wine vinification, to give winemakers the opportunity to innovate by offering oenological solutions that will make it easier to differentiate and market their wines. **OENOFINE® RedY** is a practical expression of the "**Market Re(a)dy Wine**" concept, which means early release of red wines soon after fermentation. **ZYMAFLORE® EDEN**, a new yeast strain to bring out the fruity/spicy character of wines is also part of this approach.

Our R&D department has carried out in-depth work on enzymes, with the introduction of new formulation performance indicators. **LAFASE® XL CLARIF** has benefited from this technological advance.

NOBILE® continues the expansion of its lush range with **NOBILE® SOFT**, specially designed to develop the sweetness of oak, without notes from the toast.

Building on our knowledge and expertise in fermented beverages, we have opened a new department: "**Beverages by Laffort**", which will mainly cover new, fast-growing segments or the search for something new, such as NoLo drinks, ciders and fruit wines. A gateway to worlds where there is a strong demand for technical expertise and skills that we can provide.

We are stepping up our digital development with a blog accessible from our website. This enables us to share our knowledge and developments in winemaking products, as well as the latest scientific advances that inspire our daily work.

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 2024 vintage.

Philippe GUILLOMET
Managing Director

NEW IN 2024

A committed and responsible company, **LAFFORT®** is behind several discoveries in modern oenology, with no fewer than 22 international patent filings to its credit. Over the years, drawing on the fruits of its R&D work and advances in biotechnology, the company has moved from curative winemaking to preventive and then... precision winemaking. In other words, modern, responsible and inspired by nature. Always with the aim of providing winemakers around the world with natural, high-quality products that enable them to make and preserve the very best wines... meeting the expectations of today's consumers.

ZYMAFLORE® EDEN

***Saccharomyces cerevisiae* yeast selected for its unique fruity, spicy and refreshing sensory impact.**

The result of mass selection, **ZYMAFLORE® EDEN** charms with its lush flavours while providing robust fermentation kinetics. This strain brings a profusion of red fruit flavours, complemented by fresh, peppery notes. With its contribution to volume and suppleness on the palate, it lends itself to the production of complex, structured and well-balanced red wines.

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MARKET RE(A)DY WINE

OENOFINE® RedY

Preparation based on inactivated yeast and patatin.

OENOFINE® RedY is part of an approach to the early release of red wines soon after fermentation, embodying the innovative **Market Re(a)dy Wine** concept.

OENOFINE® RedY combines inactivated yeasts, selected to reduce bitterness and astringency, with a vegetable protein (patatin), renowned for its exceptional ability to clarify and stabilise wines. An ideal product for producing quality red wines for early release.

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NOBILE® SOFT

Made from a selection of oak of different origins, **NOBILE® SOFT** develops the **sweetness** of oak, **without notes from the toast.**

Thanks to its formulation, **NOBILE® SOFT** brings out the fruity character of wines and helps increase length on the palate.

NOBILE® SOFT is a new, natural and innovative winemaking tool for supple, delicious and complex wines that respect the fruit!

NOBILE®
L'œnologie du bois

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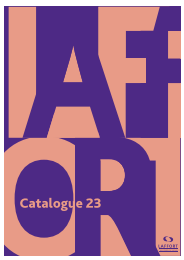
beverages BY LAFFORT®

BEVERAGES by LAFFORT® meets the growing demand for "trendy" fermented products, along with the need for biotechnology and related processing products. The development of this range represents a natural evolution in the world of fermented beverages, capitalising on the know-how built up by **LAFFORT®** in the field of winemaking for over a century.

LAFFORT®

NEW PRODUCTS OVER THE PAST 3 YEARS

2023



ZYMAFLORE® KLIMA
Saccharomyces cerevisiae yeast to **reduce the alcohol content** and **enhance the freshness of wines**.

LACTOENOS® BERRY *Direct*
Oenococcus oeni strain to enhance **the fruit intensity and freshness of wines.**

EXTRACLEAR®
Pectolytic enzyme with a high level of secondary activity for the **clarification** and **filterability** of wines.

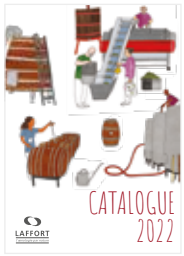
LAFASE® DISTILLATION
Liquid enzyme with low methanol production for pressing and clarifying grapes intended for the production of wines for distillation.

OENOFINE® PiNK & OENOFINE® NATURE
A range of BIOSourced fining agents as an alternative to PVPP.

NOBILE® SPIRIT
A range of chips specifically intended for spirits.

STABIMAX®
Gum arabic solution for **colloid stabilisation** of red wines.

2022



ZYMAFLORE® OMEGA*LT*
Lachancea thermotolerans yeast for BIOAcidification of wine.

ZYMAFLORE® XarOm
Saccharomyces cerevisiae yeast for wines of **great aromatic power.**

MANNOSWEET®
100% natural preparation of pure mannoproteins and vegetal polysaccharides specifically selected for **colloid stabilisation of wines and to add finesse.**

FUMARIC*TRL*
Pure fumaric acid for controlling the growth and activity of the lactic acid bacteria responsible for malolactic fermentation.

2021

ZYMAFLORE® KHIO*MP*
Metschnikowia pulcherrima for BIOProtection during pre-fermentation phases at low temperatures.

ZYMAFLORE® XORIGIN
Saccharomyces cerevisiae yeast for the production of well-balanced white wines, **respecting the typical character of grape varieties and terroirs.**

POWERLEES® LIFE
Formulation based on inactivated yeasts rich in reducing compounds **to conserve and refresh wines** during ageing.

VEGEMUST®
Specific combination of vegetable proteins (patatin & pea) for **effective fining as from the fermentation phases.**

NOBILE® DARK ALMOND
Chips resulting from a new high-precision toasting process for **intensely lush, naturally roasted notes.**

NOBISPARK®
Second fermentation under oak, for more complex and more elegant Traditional Method wines.

QUERTANIN® Q2
Stave-grade ellagitannins extracted from the heartwood of American oak intended for ageing.

LAFFORT® certified as Committed to Corporate Social Responsibility (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.

LAFFORT
l'œnologie par nature

YEASTS

ZYMAFLORE® & ACTIFLORE®

For many years, *Saccharomyces cerevisiae* yeasts were the only strains used in winemaking because of their fermentative capacity (transformation of sugars into ethanol and CO_2) and their influence on the aromatic profile of wines. This is an area that **LAFFORT®** has mastered, thanks to its collection of strains, a reserve of **BIO**Diversity, as well as its mastery of Quantitative Trait Loci (QTL) and breeding technique.

Over the years, the **ZYMAFLORE®** range has expanded to include non-*Saccharomyces* yeasts. These yeasts offer new possibilities for achieving different and specific winemaking objectives, such as **BIO**Protection to reduce the use of SO_2, **BIO**Acidification, and enhancing aromatic complexity.

Ana Hranilovic
Fermentation range manager

NON-*SACCHAROMYCES* BIOPROTECTION

ZYMAFLORE® YEASTS

- Red
- White
- Rosé
- Sparkling

ZYMAFLORE® KHIO^{MP}

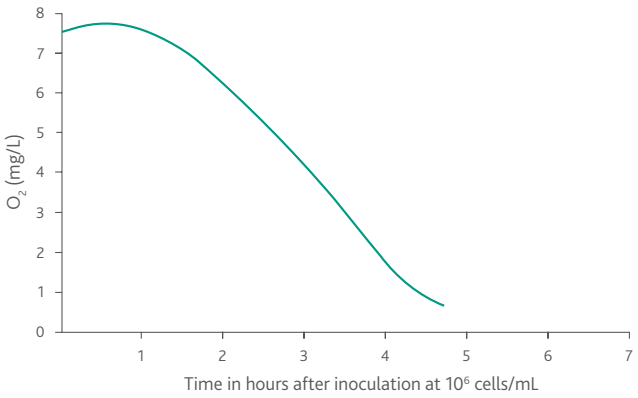
DIRECT INOCULATION

JUICE

***Metschnikowia pulcherrima* for BIOProtection of white and rosé juice 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 juice 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.

Change in dissolved oxygen in a juice 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.

500 g

3 - 5 g/hL (30 - 50 ppm)

ZYMAFLORE® ÉGIDE^{TDMP}

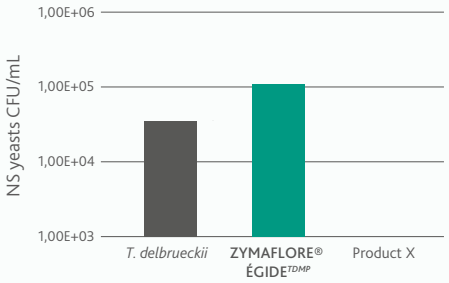
DIRECT INOCULATION

MUST GRAPE EQUIPMENT

Formulation of *Torulaspora delbrueckii* and *Metschnikowia pulcherrima* for use in harvest BIOProtection on grapes, musts and equipment, as an SO_2 reduction strategy.

- Colonisation of the medium without any detected fermentation activity under recommended conditions.
- 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).

Count of non-*Saccharomyces* yeasts at the end of the settling process



Gros Manseng, 2016. 181 g/L sugars, initial 160 mg N/L content, settling at 12°C (53.6°F) for 14h. Must inoculation after pressing at 5 g/hL (50 ppm), with no sulphite addition

*BIOProtection is highly evident after inoculation with **ZYMAFLORE® ÉGIDE^{TDMP}**. The non-Saccharomyces yeasts detected correspond only to the T. delbrueckii and M. pulcherrima species.*

500 g

2 - 5 g/hL (20 - 50 ppm)

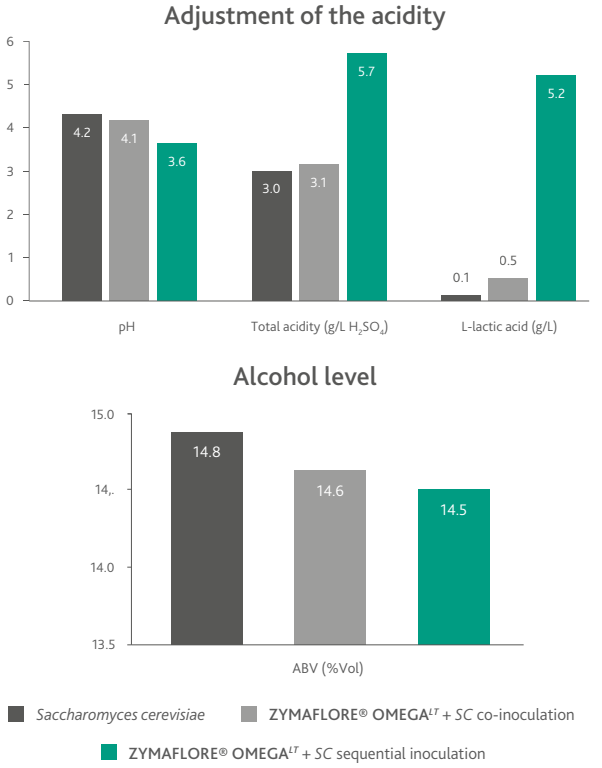
NON-*SACCHAROMYCES*

ZYMAFLORE® OMEGA^{LT}

BIOACIDIFICATION

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

- Selected for its **strong ability to produce L-lactic acid** from fermentable sugars.
- **Decrease in the pH** and increase in the total acidity of wines accompanied by a **slight reduction in alcohol content.**
- Recommended for healthy and lightly 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.



*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).

500 g

20 g/hL (200 ppm)

ZYMAFLORE® ALPHA$^{TD\ N.\ SACCH}$

AROMATIC COMPLEXITY

***Torulaspora delbrueckii* that increases aromatic complexity and mouthfeel. All grape varieties.**

- Brings out varietal and fermentation aromas.
- Adds **mouthfeel** through high production of polysaccharides.
- 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 ensure the completion of alcoholic fermentation and to benefit from the sensory impact of ZYMAFLORE® ALPHA$^{TD\ N.SACCH}$.

500 g

30 - 40 g/hL (300 - 400 ppm)

S. CEREVISIAE
RED WINE

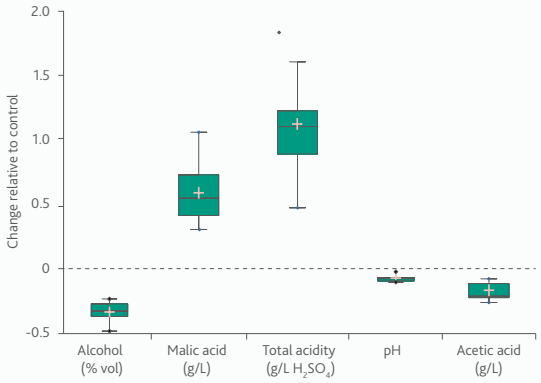
ZYMAFLORE® KLIMA

ALCOHOL FRESHNESS

The result of a selection programme assisted by molecular markers, ZYMAFLORE® KLIMA can reduce the alcohol content of wine while increasing 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 wines.
- **Elegant aromas** respecting grape varieties and terroirs.
- Very low production of volatile acidity and SO_2.

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



Cumulative results of 16 field trials (2022 and 2023): Reduction of alcohol, pH and acetic acid. Increase in malic acid concentration and total acidity.

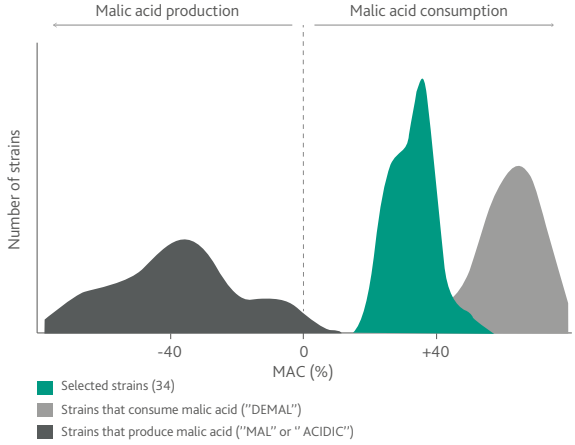
500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

MODULATION OF ALCOHOL AND ACIDITY WITH *SACCHAROMYCES CEREVISIAE*

Saccharomyces cerevisiae is an efficient yeast in terms of alcohol production, with little variability in ethanol/sugar yield between strains. As far as acidity is concerned, during AF, most selected strains consume some of the malic acid initially present in the grapes.

However, **BIOLAFFORT®** R&D work has made it possible to increase this variability by using breeding and Quantitative Trait Loci (QTL) marker-assisted techniques. Strains selected in this way have a greater capacity to reduce the alcoholic content of wines by promoting other metabolic pathways. In the case of **ZYMAFLORE® KLIMA**, the low alcohol yield is partly explained by the increased production of glycerol. The production of malic acid from the sugars also contributes to the reduction in alcohol, further enhancing wine freshness.



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).

S. CEREVISIAE
RED WINE

ZYMAFLORE® EDEN

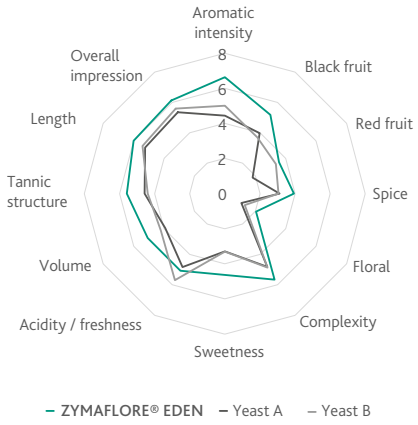
NEW

COMPLEXITY

From mass selection, for a unique and lush fruity profile. Syrah, Merlot, Pinot Noir, etc.

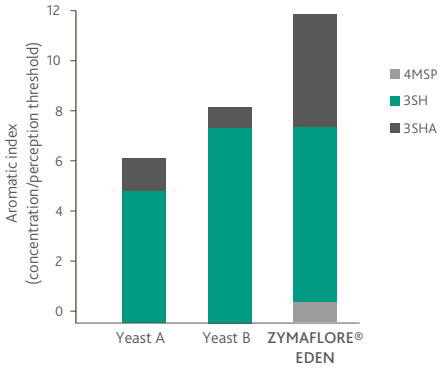
- Brings a **profusion of fruit flavours** combined with **fresh, peppery notes**.
- Contributes to **suppleness**, **volume** and **length** on the palate.
- Exceptional technological characteristics: robust fermentation, low SO_2 and VA production.

Sensory profile



*Compared with other strains on the market, **ZYMAFLORE® EDEN** favours the aromatic expression of fruit, spices and flowers and adds suppleness on the palate. Trials on Merlot, France, 2023, 13.2% ABV, pH 3.6.*

Thiols - Aromatic index



Thiols accentuate the intensity of fruit and spices, with refreshing notes. Trials on Syrah, France, 2023, 15% ABV, pH 3.8.

500 g

20 - 30 g/hL (200 - 300 ppm)

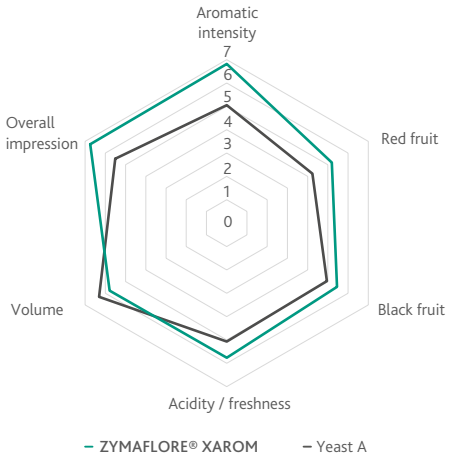
ZYMAFLORE® XarOm

AROMATIC EXPRESSION

Intense production of fermentation aromas, (boiled sweets, strawberry, pineapple, etc.) and varietal aromas.

- Perfectly suited to the production of red wines with great aromatic intensity.
- **Modern, fruity, lush red wines.**
- Genetic ability to preserve malic acid during AF (more lactic acid after MLF).
- Very low production of volatile acidity.

Sensory profile



*Wine fermented with **ZYMAFLORE® XAROM** presents a more intense and fruity sensory profile. Panel of 27 tasters using TASTEL WEB software. Trials on Syrah, France, 2023.*

500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

S.CEREVISIAE
RED WINE

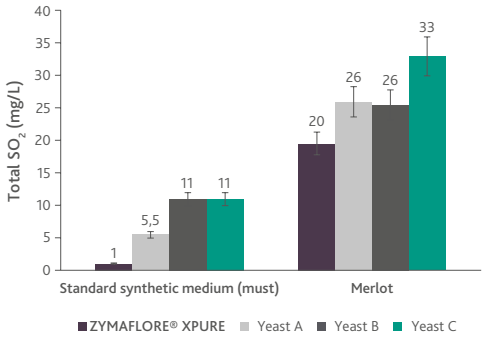
ZYMAFLORE® XPURE

LOW SO_2

Wines of great aromatic purity. All red grape varieties.

- Suitable for fermentation with reduced doses of sulphites for a low total SO_2.
- 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.

ZYMAFLORE® XPURE allows for lower concentrations of total SO_2 at the end of the alcoholic fermentation



Medium synthetic must, ABV: 13% vol., total SO_2: 20 mg/L (20 ppm).
Merlot trial: ABV: 15% vol., total SO_2: 40 mg/L (40 ppm).

500 g / 10 kg

15 - 30 g/hL (150 - 300 ppm)

ZYMAFLORE® FX10

FRUCTOPHILE YEAST

Wines showing structured and silky tannins. Cabernet Sauvignon, Petit Verdot, Malbec...

- 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 (**sweetness**).
- High polysaccharide release (contributes to **softening tannins**).

500 g / 10 kg

15 - 30 g/hL (150 - 300 ppm)

ZYMAFLORE® RX60

DIRECT INOCULATION

Fruity, spicy red wines. Syrah, Grenache, Tempranillo...

- Very high aroma production (**fresh currant and berry aromas**).
- Low production of H_2S.
- **LACTOENOS® BERRY *Direct*** recommended in early co-inoculation to preserve aromatic freshness.

500 g / 10 kg

15 - 30 g/hL (150 - 300 ppm)

Practical Advice

Consider **SUPERSTART® ROUGE** to optimise yeast viability in juice and must with high sugar concentration.
See P. 27

S. CEREVISIAE
RED WINE

ZYMAFLORE® F15

Rounded, full bodied wines. Merlot, Cabernet Sauvignon, Cabernet Franc, 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.

500 g / 10 kg — 15 - 30 g/hL (150 - 300 ppm)

ZYMAFLORE® RB2

COLOUR

Fruity and elegant red wines. Pinot noir, Merlot, Gamay...

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

500 g — 15 - 30 g/hL (150 - 300 ppm)

ZYMAFLORE® F83

Supple, fruity and floral red wines. Grenache, Carignan, Sangiovese, Mourvèdre, Syrah, Merlot...

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

500 g — 15 - 30 g/hL (150 - 300 ppm)

ZYMAFLORE® RB4

"PRIMEUR"

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**.

500 g — 15 - 30 g/hL (150 - 300 ppm)

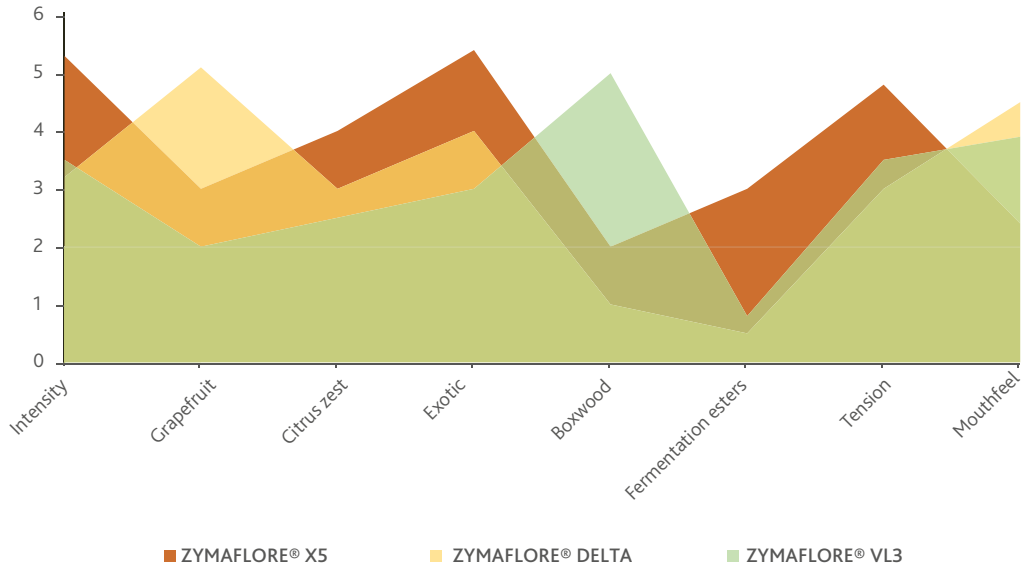
Practical Advice

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 - 4 g/L (2000 - 4000 ppm). *See P. 82*

S. CEREVISIAE
WHITE & ROSÉ WINES

GRAPE VARIETIES WITH VOLATILE THIOL CHARACTERS: HOW TO CHOOSE THE YEAST?



CHARDONNAY: HOW TO CHOOSE THE YEAST?

	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 and sweetness on the palate	●●●●	●●●●●	●●●	-
Fermentative capability	●●●●	●●●	●●●	●●●●●

Practical Advice

To increase the thiol concentration in your wines, think about **LAFAZYM® THIOLS[+]**.
See P. 39

S. CEREVISIAE
WHITE & ROSÉ WINES

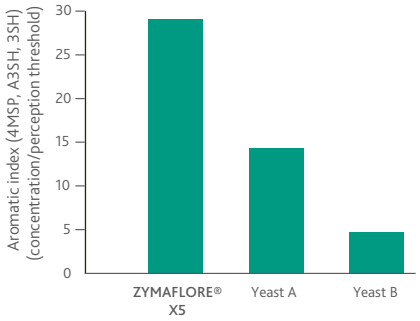
ZYMAFLORE® X5

DIRECT INOCULATION | THIOLS

Aromatic white wines with excellent thiol expression. Sauvignon blanc, Colombard, Rolle, Manseng, Riesling...

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

Release of thiols by ZYMAFLORE® X5: comparison with two thiol-releasing strains



Trial on Sauvignon Blanc, France, 2022, 12.7% potential alcohol, pH 3.3, AF at 16 - 18°C (60 - 65°F).

500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

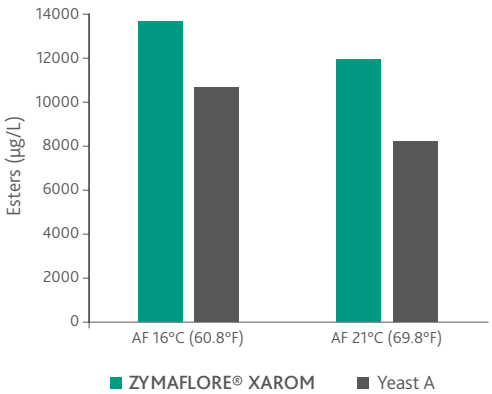
ZYMAFLORE® XarOm

AROMATIC EXPRESSION

Intense production of fermentation aromas, (boiled sweets, strawberry, pineapple, etc.) and varietal aromas.

- Production of 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.

Ester concentration of finished wines



*Higher ester concentrations in wines made with **ZYMAFLORE® XAROM** compared with a reference aromatic yeast at two different fermentation temperatures. Trial on rosé juice, France, 2022.*

500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

Practical 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*

S. CEREVISIAE
WHITE & ROSÉ WINES

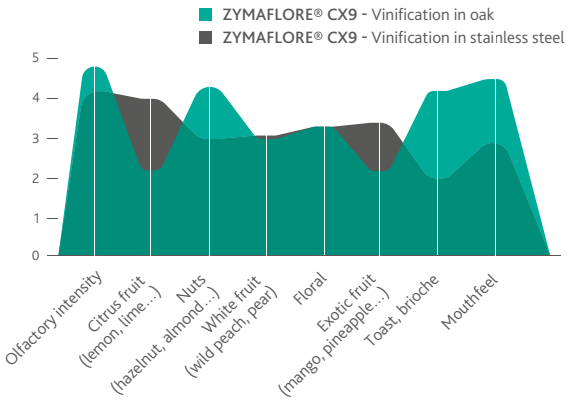
ZYMAFLORE® CX9

CHARDONNAY

Selected from a great Burgundy vineyard and breeding technology. Chardonnay, Sémillon, Godello…

- Develops notes of **lemon, fresh hazelnut, almond and toast**.
- Contributes to the balance between **smoothness, tension and mouthfeel**.
- POF(-) character [no vinyl phenol formation], **fine and clean aromatic profile**.
- Particularly suited to Chardonnay of exceptional quality.

Sensory profiles of wines vinified with ZYMAFLORE® CX9 under different conditions of vinification



500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

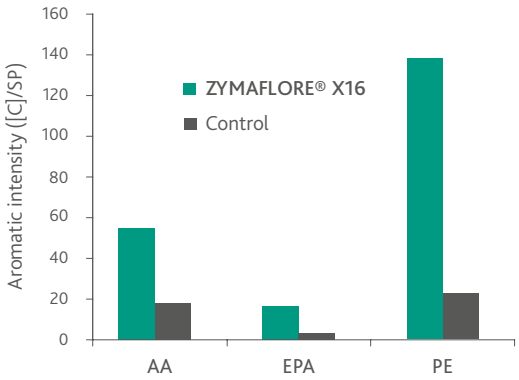
ZYMAFLORE® X16

FERMENTATION AROMAS

Modern and aromatic style white and rosé wines. Chenin, Ugni Blanc, Colombard, Chardonnay…

- High **aromatic** production (peach, white flowers, stone fruits).
- POF(-) character: **fine and clean aromatic profile**.
- Low production of H_2S.

ZYMAFLORE® X16 amplifies fruity and floral fermentation aromas



Chardonnay, 2006, Burgundy - TAP: 13% vol, FA temperature 16°C (61°F) . Fermentation in 10 days, VA 0.14 g/L H_2SO_4.

AA: isoamyl acetate - EPA: phenyl-ethyl acetate. PE: phenyl-2-ethanol.

500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

S. CEREVISIAE
WHITE & ROSÉ WINES

ZYMAFLORE® XORIGIN

TERROIR

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

- **Revelation of the aromatic potential of the grape variety**: fine and elegant aromas of white - and yellow - fleshed fruit, delicate flowers.
- Adds **volume**.
- Suitable for vinification with reduced doses of sulphites, low total SO_2.
- Low production of volatile acidity.
- POF(-) character: **fine and clean aromatic profile**.

500 g — 20 - 30 g/hL (200 - 300 ppm)

ZYMAFLORE® DELTA

THIOLS

Aromatic white and rosé wines. Sauvignon Blanc, Viognier, Chenin, Vermentino, 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 turbidity).

500 g — 20 - 30 g/hL (200 - 300 ppm)

ZYMAFLORE® VL3

THIOLS

Wines of elegance and finesse with high expression of volatile thiols. Sauvignon Blanc, Colombard…

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

500 g / 10 kg — 20 - 30 g/hL (200 - 300 ppm)

ZYMAFLORE® VL1

ELEGANCE

Elegant and refined white wines. Sémillon, Chardonnay, Riesling, Gewürztraminer, Chenin, Muscat…

- POF(-) character: fine and clean aromatic profile.
- High ß-glucosidase enzymatic activity.
- Expression of floral **terpene varietal aromas**.

500 g / 10 kg — 20 - 30 g/hL (200 - 300 ppm)

ZYMAFLORE® VL2

BARREL FERMENTATION

Delicate and clean barrel fermented wines. Sémillon, Chardonnay, Viognier…

- POF(-) character: fine and clean aromatic profile.
- High polysaccharide production.

500 g / 10 kg — 20 - 30 g/hL (200 - 300 ppm)

ZYMAFLORE® ST

SWEET WINES

Sweet wines from botrytised grapes. Late harvest.

- 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.

500 g — 20 - 30 g/hL (200 - 300 ppm)

S. CEREVISIAE SPECIFIC APPLICATIONS

ZYMAFLORE® 011 BIO

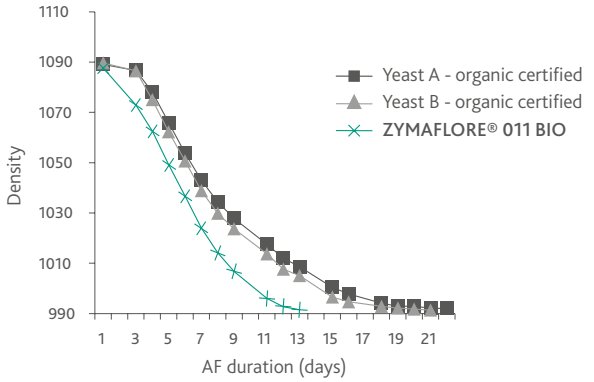
ORGANIC CERTIFIED

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.

Comparison of fermentation kinetics



Cabernet Franc, Entre deux Mers 2012.
*TAP 13.2% vol., TA (tartaric 5.66 g/hL (56.6 ppm)) 3.7 g/L H_2SO_4, pH 3.2. Initial YAN of the must 160 mg/L. Nutritional correction with 40 g/hL (400 ppm) of **NUTRISTART® ORG** at 1/3 of AF. Positive yeast implantation control.*

500 g

20 - 30 g/hL (200 - 300 ppm); 30 - 50 g/hL (300 - 500 ppm) in case of stuck fermentation

ZYMAFLORE® SPARK

FRUCTOPHILE YEAST

SPARKLING WINE

Secondary fermentation and tough conditions.

- Still wine fermentation and secondary fermentation of sparkling wines.
- Resistant to difficult fermentation conditions (potential alcohol, turbidity, temperature).
- Tolerates high SO_2 and alcohol levels.

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

500 g / 10 kg

20 - 30 g/hL (200 - 300 ppm)

ZYMAFLORE® F5

WINE FOR DISTILLATION

Yeast for wines intended for distillation.

- Yeast selected for its ability to easily establish itself in the medium.
- Excellent fermentation capacities, short lag phase.
- Low production of SO_2.
- Low production of higher alcohols, ethanal, ethyl acetate.

500 g

20 - 30 g/hL (200 - 300 ppm)

Find Out More

Discover our **yeast rehydratation** video on our website, **LAFFORT & YOU** section.
ZYMAFLORE® SPARK: go check our complete range of products for sparkling wines and **LAFFORT®** recommendations. *See P. 95*

S. CEREVISIAE CHARACTERISTICS

	Grape variety	Yeast	Alcohol tolerance (%v/v)	Nitrogen requirements	Optimal fermentation temperature	Fermentation kinetics
NEW	Syrah, Merlot, Pinot noir...	EDEN	15.5	High	20 - 30°C 68 - 86°F	Regular
RED WINES	Merlot, Cabernet Sauvignon, Cabernet Franc, Pinot Noir...	F15	16	Medium	20 - 32°C 68 - 90°F	Rapid
	Grenache, Carignan, Sangiovese, Mourvèdre, 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
ADI	Syrah, Grenache, Tempranillo...	RX60	16.5	High	20 - 30°C 68 - 86°F	Regular
	Highlight terroir	XPURE	16	Medium	15 - 30°C 59 - 86°F	Regular
WHITE & ROSÉ WINES	Balanced wines	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	Low	14 - 22°C 57 - 72°F	Regular
	Chenin, Vermentino, Gewürztraminer, Sauvignon Blanc, Riesling, Pinot Gris, Viognier...	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
	Sémillon, Chardonnay, Riesling, Gewürztraminer, Chenin, Muscat...	VL1	14.5	High	16 - 20°C 61 - 68°F	Regular
	Sémillon, Chardonnay, 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
ADI	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

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

S. CEREVISIAE

ACTIFLORE® YEASTS

- Red
- White
- Rosé
- Sparkling

ACTIFLORE® ROSÉ

Production of fermentation aromas.

- 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**.

500 g / 10 kg — 20 - 30 g/hL (200 - 300 ppm)

ACTIFLORE® BO213

DIRECT INOCULATION | FRUCTOPHILIC YEAST

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.

Fermentation restart protocol - *See P. 104.*

500 g / 10 kg — 20 - 30 g/hL (200 - 300 ppm) - 30 - 50 g/hL (300 - 500 ppm) in case of stuck fermentation

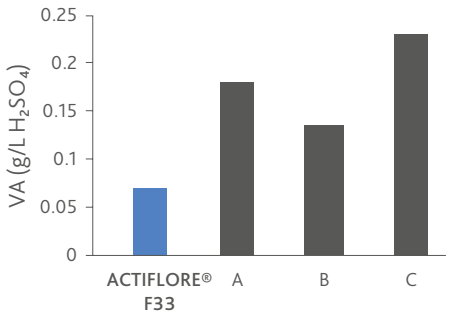
ACTIFLORE® F33

DIRECT INOCULATION

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.**

Volatile acidity at the end of AF



Cabernet Sauvignon ; 13.5% vol., pH 3.6.

500 g / 10 kg — 15 - 30 g/hL (150 - 300 ppm)

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 H_2S.
- Also recommended for secondary fermentation of sparkling wines.

500 g / 10 kg — 20 - 30 g/hL (200 - 300 ppm)

Decision Making Tool
See our **Restarting fermentation (AF) DMT** on our website at **LAFFORT & YOU.**

S. CEREVISIAE

ACTIFLORE® CEREVISIAE

***Starter* yeast.**

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

500 g / 10 kg

15 - 30 g/hL (150 - 300 ppm)

ACTIFLORE® D.ONE

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).

10 kg (2 x 5 kg)

30 - 40 g/hL (300 - 400 ppm) depending on the potential alcohol - 50 g/hL (500 ppm) if late inoculation

CHARACTERISTICS OF YEASTS IN THE ACTIFLORE® RANGE

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® 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.*

BACTERIA

LACTOENOS® RANGE

Like yeasts, lactic acid bacteria play a vital role in the sensory profile of wines. As well as transforming malic acid into lactic acid, their metabolism helps to differentiate fruit profiles, increase or decrease milky notes, enhance the freshness or suppleness of wines and influence the production of undesirable compounds (histamine, etc.).

The **LACTOENOS®** range offers a choice of lactic acid bacteria suited to different winemaking conditions and the type of inoculation (co-inoculation), enabling the expression of unique and singular wine styles.

Ana Hranilovic
Fermentation brand manager

LACTOENOS® RANGE

TECHNICAL ITINERARY & 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 program over several years.

WITHOUT REACTIVATION	PRIOR REACTIVATION		
All types of wine		*Sparkling - low pH*	*Difficult conditions* Curative MLF
		STARTER	
LACTOENOS® B7 *Direct* LACTOENOS® BERRY *Direct*	LACTOENOS® 450 PREAC	LACTOENOS® B16 STANDARD	LACTOENOS® B7 *Direct*
DIRECT SPRINKLING IN THE TANK	ACCLIMATATION: Sequential inoculation: 12 hours Early co-inoculation: 30 minutes	REACTIVATION IN MUST OR WINE *(depending on the malic acid concentration)* PREPARATION OF A STARTER: 5 to 10 days Correction of pH	REACTIVATION IN WINE Minimum 24 hours *(depending on the malic acid concentration)* PREPARATION OF A STARTER: 5 to 10 days

SPECIFIC STRAIN CHARACTERISTICS

● Red ● White ● Rosé		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	≤ 16	≤ 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*	√			
	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

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 EARLY CO-INOCULATION (24 - 48H AFTER INOCULATION WITH *S. CEREVISIAE*)

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.

3 FERMENTATION SECURITY

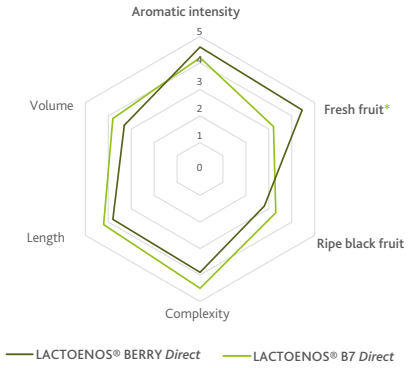
Promotes bacterial survival and establishment in milder conditions (temperature, ethanol).

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 fresh, with intense fruit expression.

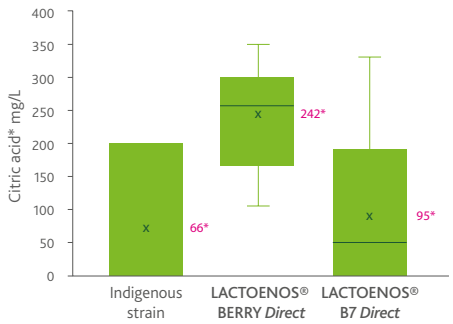
Sensory profiles of the wines



Red wine - Gamay - Sequential inoculation ABV 12.2% vol. - TA 3.8 g/L H_2SO_4 - pH 3.2 - Initial malic acid 1.3 g/L.
**Statistical validation - ANOVA test.*

The wines are perceived as significantly different (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 the end of MLF



Summary of 9 field trials (sequential inoculation). Dose of bacteria: 1 g/hL (10 ppm).
**Mean citric acid concentrations.*

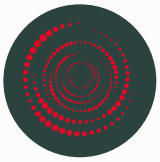
Did You Know?

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

BACTERIA

- Red
- White
- Rosé
- Sparkling



LACTOENOS® BERRY *Direct*

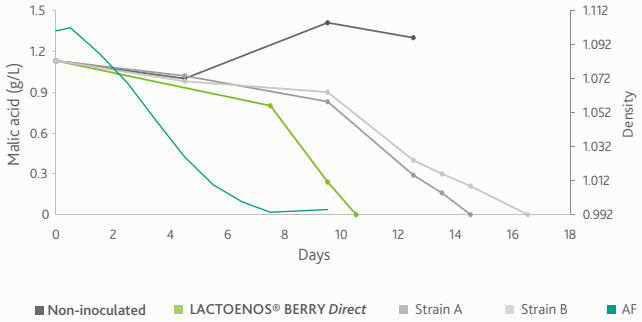
FRESHNESS AND FRUIT

IFV

***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**.
- Particularly effective in co-inoculation of red wines, allowing AF and MLF to finish almost simultaneously.
- Robust strain over a wide range of pH, alcohol, SO_2 and temperature conditions, whatever the type of wine.
- The *Direct* process allows inoculation of **LACTOENOS® BERRY *Direct*** in must or wine without acclimatisation.

Robust character of LACTOENOS® BERRY *Direct* in co-inoculation (red wine)



Merlot, France, 2022, 14% potential alcohol, pH 3.5, 4 g/hL (40 ppm) sulphite addition on filling tank.

2.5 hL / 25 hL / 250 hL

Dose: refer to packaging

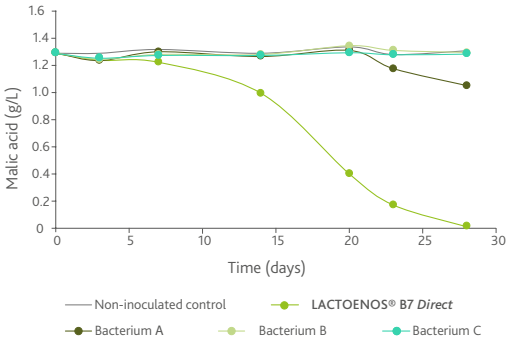
LACTOENOS® B7 *Direct*

COMPLEXITY AND ROBUSTNESS

***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, SO_2, temperature and tannic structure.
- **Particularly suitable under difficult conditions or for curative MLF.**
- Compatible with co-inoculation and sequential inoculation.

Fermentation kinetic of different strains



Chardonnay 2015. Burgundy. 14.4% ABV, pH 3.5, TSO_2 60 mg/L, MLF at 19°C (66°F).

2.5 hL / 25 hL / 250 hL

Dose: refer to packaging

LACTOENOS® RANGE

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.

50 hL / 250 hL — Dose: refer to packaging

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**.

50 hL / 250 hL — Dose: refer to packaging

BACTERIA NUTRITION

MALOBOOST®

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

Facilitating all MLFs, **MALOBOOST®** is used to:

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

1 kg — 20 - 40 g/hL (200 - 400 ppm)

Practical Advice

In instances where the wine displays limiting characteristics (low pH, high level of clarification, high TA or SO_2 levels, nutritional deficiencies, problematic AF...), the addition of an MLF nutrient is essential for the activation and progress of MLF.

Find Out More

Consult our protocols for "**Reactivation of LACTOENOS® B16 STANDARD - Sparkling wines**" and "**Restarting malolactic fermentation (MLF)**" in the **LAFFORT & YOU** section of our website.

NUTRIENTS

Successful fermentation, from both a kinetic and sensory point of view, requires good nutrition for the fermenting microorganisms. It should be comprehensive and include a good balance between nitrogen (organic and mineral), lipids, vitamins and minerals at the different stages of vinification. The complete range of nutrients developed by **LAFFORT®** provides this nutritional balance according to the specific characteristics of the must.

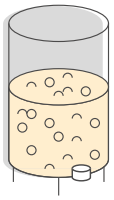
The yeast preparation additives in the **SUPERSTART®** range (Patent FR 2736651) boost yeast performance.

The **LAFFORT®** range is not limited to yeasts; it also includes bacteria, thus promoting quality MLF, a key element in the final quality of the wine.

Ana Hranilovic
Fermentation brand manager

YEAST NUTRITION

To ensure stress-free alcoholic fermentation and prevent aromatic spoilage, or the development of compounds that inhibit the yeasts and bacteria, it is essential to provide the yeasts with complete nutrition. Nutrient inputs, whether from the grapes or from specific preparations, must be balanced in terms of growth factors and survival factors in order to ensure a clean and complete finish to the alcoholic fermentation.



REGULAR FERMENTATION

Avoid rapid fermentation or heat spikes.

NEEDS

- Nutritional balance between mineral and organic nitrogen.

RECOMMANDATION

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

HEALTHY FERMENTATION COMPLETION

Avoid stuck fermentations and possible sensory defects.

NEEDS

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

RECOMMANDATION

- 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.
- Good cell membrane permeability.

RECOMMANDATION

- Rehydrate the yeast with specific rehydratation nutrients (**SUPERSTART®** range). Add nutrients at 1/3 AF.
- 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).

RECOMMANDATION

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

Yeast nutrition: nitrogen adjustment

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

Decision Making Tool

Discover our DMT **yeast nutrition** on our website, at **LAFFORT & YOU** section.

YEAST PREPARATION

NUTRIENTS

- Red
- White
- Rosé
- Sparkling

SUPERSTART® RANGE (Patent FR 2736651)

OPTIMAL PERFORMANCE

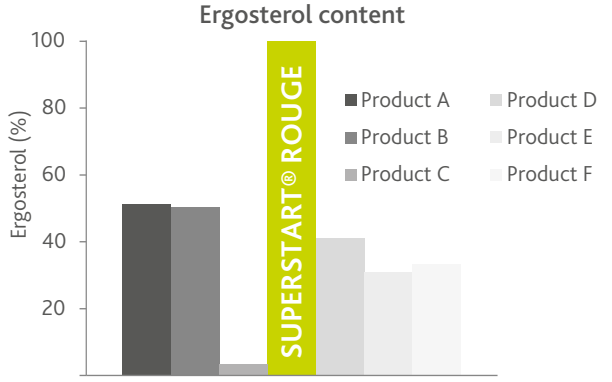
Yeast preparation additives should be used at the active dry yeast rehydration step to ensure an optimal aromatic performance and a healthy and complete fermentation. SUPERSTART® products:

- 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 H_2S.
- 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.
- Increase the dosage for potentially high alcohol juice and must.

SUPERSTART® ROUGE

High ergosterol content formulation.

- **Improves yeast cell longevity** under stressful conditions and increases yeast tolerance to high temperatures and alcohol.



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

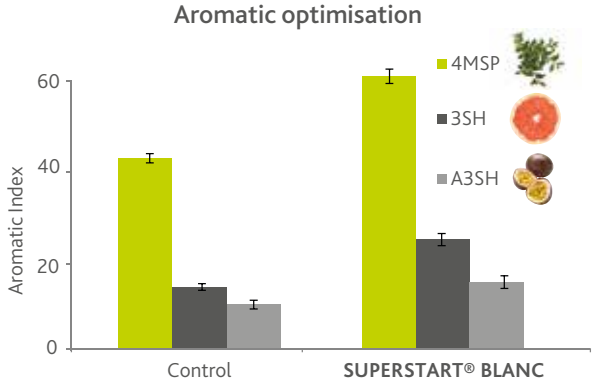
**This sterol gives yeast a higher resistance to ethanol.*

1 kg / 5 kg 20 - 30 g/hL (200 - 300 ppm)

SUPERSTART® BLANC & ROSÉ

Formulation, particularly rich in certain vitamins and mineral salts.

- **Optimises the production and aromatic revelation by yeasts** guaranteeing stronger fermentation completion.



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

*By improving the general assimilation of juice compounds, **SUPERSTART® BLANC** optimises the yeast metabolism to give more aromatic wines. 4MSP: boxwood / A3SH: passion fruit / 3SH: grapefruit.*

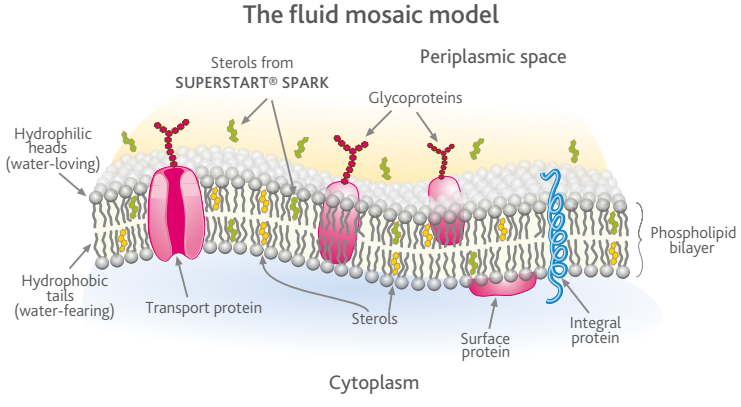
1 kg / 5 kg 20 - 30 g/hL (200 - 300 ppm)

SUPERSTART® SPARK

Yeast preparation additive suited to the difficult conditions of sparkling wines.

- Combination of survival factors (lipids) and growth factors for complete secondary fermentation.

See our **SPARK** range sheet *P.103* .



1 kg / 5 kg 20 - 30 g/hL (200 - 300 ppm)

ORGANIC NITROGEN

NUTRISTART® ORG

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

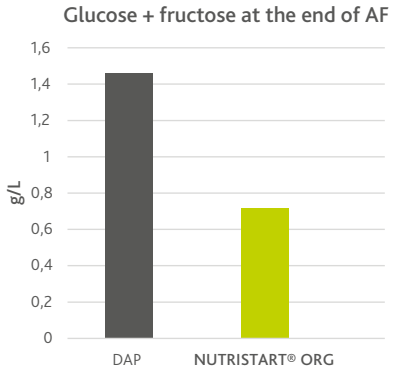
- Ensures **regular and complete alcoholic fermentation** in the case of slight to moderate nutritional deficiencies.
- **Results in more aromatic wines** and limits the formation of undesirable compounds (compounds that combine with SO_2, H_2S, etc…).
- In the case of large nitrogen deficiencies and/or 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** provides the equivalent of 10 mg/L (10 ppm) of assimilable nitrogen.

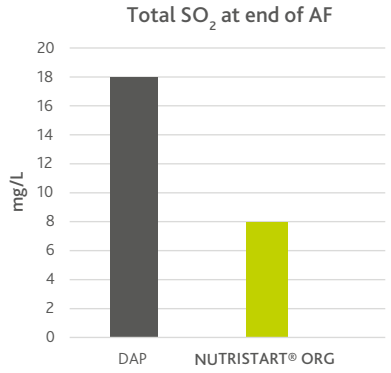
1 kg / 5 kg / 20 kg

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

WHY ORGANIC NUTRITION?

Organic nitrogen must be present in order to limit the production of SO_2 and sulphur compounds (H_2S and mercaptans), produce healthy, but not excessive, biomass and limit the risk of stuck or sluggish fermentation.





Concentrations of glucose + fructose and total SO_2 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.*

SENSORY EFFECTS OF ORGANIC NUTRITION

The addition of organic nitrogen can increase the fruitiness of wines and limit the aromatic mask linked to the production of sulphur compounds during 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**. 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

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

OTHER SOURCES OF NITROGEN

MIXED NUTRITION

NUTRISTART® AROM

Complete nutrient (inactivated yeast, yeast autolysate of which some 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 sensory complexity (nose/mouth).
- **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 dependent on nitrogen deficiency levels.

1 kg / 5 kg  20 - 60 g/hL (200 - 600 ppm)

NUTRISTART®

All-round yeast activator combining growth and survival factors and promoting yeast multiplication (inactivated yeasts, yeast autolysate, 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 dependent on nitrogen requirement.

1 kg / 5 kg / 20 kg  20 - 60 g/hL (200 - 600 ppm)

MINERAL NUTRITION

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
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

ASSIMILABLE NITROGEN CONTRIBUTION BY NUTRIENT

	EQUIVALENCE	BALANCE AND COMPOSITION			
PRODUCT	NITROGEN CONTRIBTION FROM 10 g/hL (100 ppm)	ORGANIC AVAILABLE NITROGEN	MINERAL AVAILABLE NITROGEN	VITAMINS AND MINERALS	NUTRITIONAL BALANCE
NUTRISTART® ORG	10 mg/L	••••		••••	•••
NUTRISTART® AROM	14 mg/L	•••	•	•••	••••
NUTRISTART®	15 mg/L	•	•••	••	••
THIAZOTE®	21 mg/L		••••	••	•
SUPERSTART® RANGE	Yeast rehydration products providing only a minute dose of assimilable nitrogen. They cannot be considered as nutrients.				

OTHER PRODUCTS

SUPPORT AND DETOXIFICATION

PRODUCT	DESCRIPTION / APPLICATION	DOSAGE	PACKAGING
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
OENOCELL®	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
OENOCELL® 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
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

BACTERIA NUTRITION

MALOBOOST®

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

Facilitating all MLFs, **MALOBOOST®** is used to:

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

1 kg

20 - 40 g/hL (200 - 400 ppm)

Find Out More

Discover our Focus about **nitrogen nutrition** on our website, section **LAFFORT & YOU.**

YEAST PRODUCTS

Yeast derivatives offer a wide range of winemaking products and applications, drawing on the many advantages of ageing on lees and diversity of yeasts.

LAFFORT® quickly identified the potential of these derivatives and conducted research to create innovative and unique applications in oenology. These include mannoproteins **(MANNOSTAB®** - patent FR 2726284) used for tartaric stabilisation and sapid peptides derived from the Hsp12 protein **(OENOLEES® & OENOLEES® MP** - patent EP 1850682).

Building on this research, products such as **FRESHAROM®** and **POWERLESS® LIFE** were developed for their antioxidant properties derived from their glutathione content.

Yeast products pave the way for a new, more natural approach to winemaking... to bring out and preserve the best in wine.

POWERLEES® RANGE

YEAST PRODUCTS

- Red
- White
- Rosé
- Sparkling

POWERLEES® LIFE

AGEING

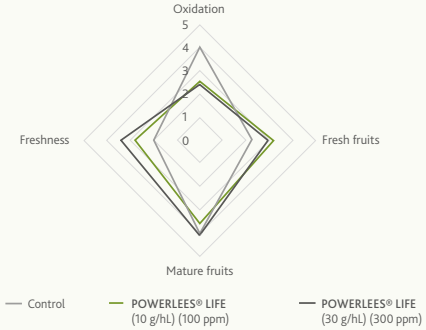
Formulation of inactivated yeasts rich in reducing compounds including reduced glutathione, to preserve and refresh wines during ageing.

POWERLEES® LIFE was selected during a research program 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 from the end of fermentation and throughout the ageing period. It is a complementary solution to SO_2 in a strategy of reducing the doses of sulphur used.

Sensory profile



Treatment of a Cabernet Sauvignon wine after 16 months of ageing. Post-racking tasting 6 days after treatment. Mean of the scores of 12 trained tasters.

1 kg / 5 kg

10 - 40 g/hL (100 - 400 ppm)

POWERLEES®

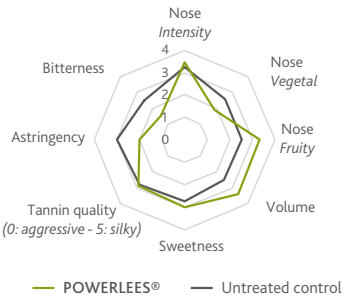
VINIFICATION / AGEING | EARLY MATURITY

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

Developed by **LAFFORT®, POWERLEES®** provides yeast constituents 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): ß-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.

Tasting profile after treatment with POWERLEES®



***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.*

Averages of 8 trials on red wines, treatment in AF or on finished wine.

1 kg

15 - 40 g/hL (150 - 400 ppm)

PROTECTION AND REFINING

FRESHAROM®

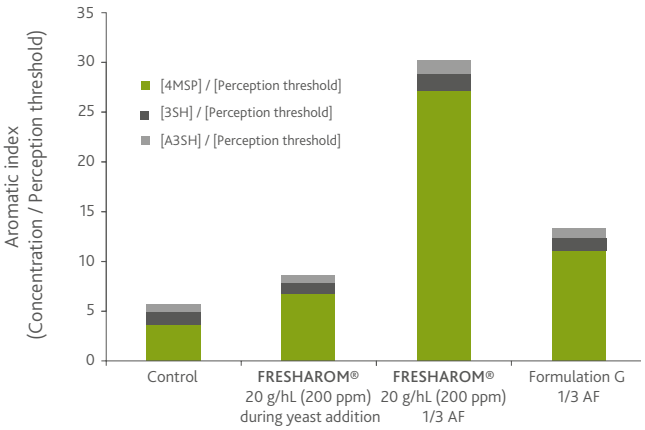
VINIFICATION | AROMATIC PRESERVATION

Specific preparation of inactivated yeasts with strong reducing power.

- **Rich in reducing metabolites**, FRESHAROM® has a much greater anti-oxidant potential than SO_2 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.

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

Preservation and aromatic revelation with FRESHAROM®



*Study of the aromatic impact of **FRESHAROM®** on a Sauvignon Blanc juice inoculated with **ZYMAFLORE® X5**.*

1 kg / 5 kg — 20 - 30 g/hL (200 - 300 ppm)

OENOLEES® and OENOLEES® MP are oenological products derived from natural constituents found in wine and obtained using innovative and patented production processes. (Patent EP 1850682).

OENOLEES®

VINIFICATION / AGEING | LEES AGEING

Specific preparation of yeast cell walls with a high sapid peptide content for premium red wine fining (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).
- Aid to reducing Ochratoxin A levels in wines.

1 kg / 5 kg — 20 - 40 g/hL (200 - 400 ppm)

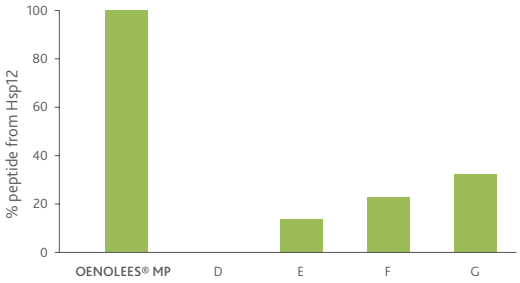
OENOLEES® MP

AGEING

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

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

Sapid peptide concentration



Concentration in Hsp12 (origin of peptides responsible for the perception of sweetness in wine) in different products of equivalent application standardized according to the most concentrated product at 100%.

1 kg — 10 - 30 g/hL (100 - 300 ppm)

MANNOPROTEINS

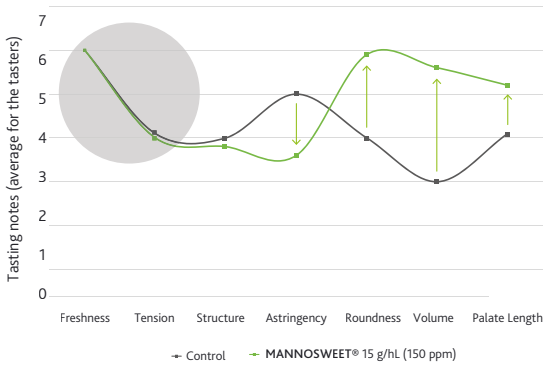
MANNOSWEET®

AGEING

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 with doses as low as 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.

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 of 12 tasters.

1 kg / 10 kg

5 - 40 g/hL (50 - 400 ppm)

MANNOFEEL®

AGEING

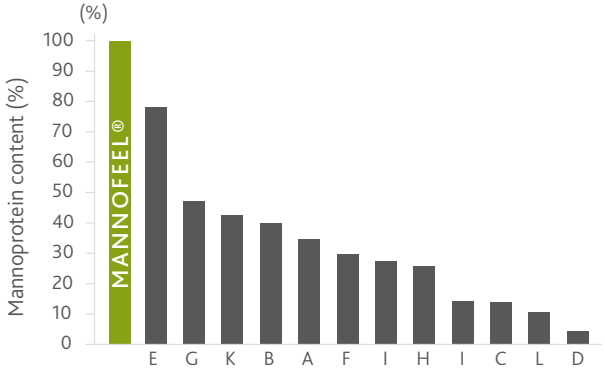
MANNOFEEL® is the result of global research by LAFFORT® on mannoproteins to identify and understand the mechanism of action and production. The selected mannoproteins in MANNOFEEL® significantly increase the perception of volume, roundness and length on the palate while aiding tartrate stability.

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

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

Mannoprotein content



Comparison of mannoprotein content in various products with an equivalent application, standardised in relation to the most concentrated product (100%).

1 L / 10 L

25 - 150 mL/hL

ENZYMES

LAFASE® & LAFAZYM®

Enzymes are highly selective catalysts for biochemical reactions, facilitating clarification, extraction, aromatic revelation, filtration, etc.

LAFFORT® offers a wide range of specific enzymes for red, white and rosé winemaking, depending on the technological targets.

For optimum security and performance, several of our enzyme preparations undergo a unique purification process to remove any potentially damaging activity (cinnamoyl esterase, anthocyanase).

Julie Barthoux
Enzymes brand manager

ENZYMES IN OENOLOGY

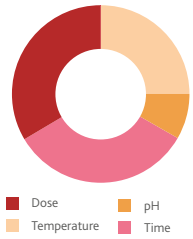
ENZYMOLOGY AND BIOCHEMISTRY

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.

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

MANAGEMENT OF ENZYME ACTIVITY FOR OPTIMAL PERFORMANCE

The three criteria - dose, must or wine temperature, and contact 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.**

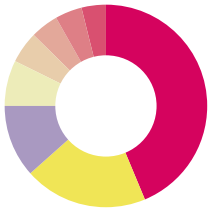


IMPORTANCE OF THE SECONDARY ACTIVITIES OF ENZYME PREPARATIONS

Each enzyme preparation is a unique cocktail of primary and secondary activities that depend on the strain of fungus used, 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 and to their environment. For matrices that are difficult to clarify, a high level of secondary activity improves the performance and robustness of the formulations.

- Cellobiohydrolase (cellulase)
- ß-mannosidase (ß D Mannanase)
- Pectin Methylesterase (PME)
- Endo-ß-1.4-glucanase (Cel)
- Pectin lyase (PL)
- Rhamnogalacturonase (RgAses)
- Endo-ß-1.4-Mannanase
- Endo-polygalacturonase (Endo-PG)

Example of the enzymatic spectra of an *Aspergillus aculeatus* strain



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

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

NEW

PERFORMANCE INDICATOR FOR ENZYME FORMULATIONS

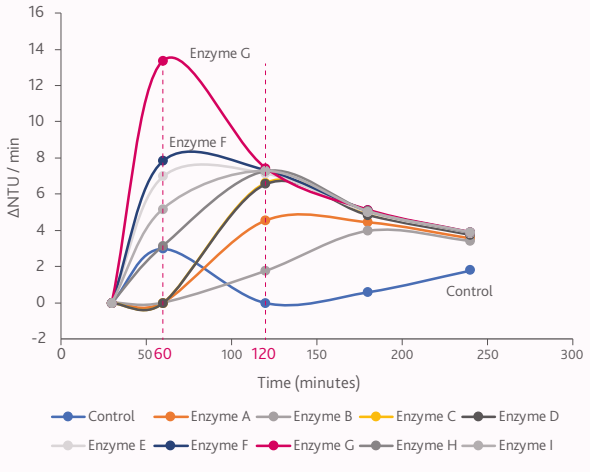
A new method for assessing the clarifying properties of our products has been developed to help formulate the best preparations.

This example (Sauvignon juice - temperature 12°C / 54°F) illustrates the ability of certain enzyme formulations to hydrolyse pectin very quickly (significant drop in turbidity within the first hour).

All wines treated with enzymes showed a significant drop in turbidity (2 hours), in contrast to the control, demonstrating the benefits of enzyme addition.

	Enzyme G	Enzyme F	Control
Turbidity (NTU) after 60 min	197	529	> 1000
Turbidity (NTU) after 120 min	106	119	> 1000

Variability in enzyme performance



Calculation of the instantaneous clarification velocity
V clarif = (Turbidity 1 - Turbidity 2)/ time 1 in min.

PRESSING AND SKIN CONTACT
WHITE & ROSÉ WINES

ENZYMES

- Red
- White
- Rosé
- Sparkling

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.**

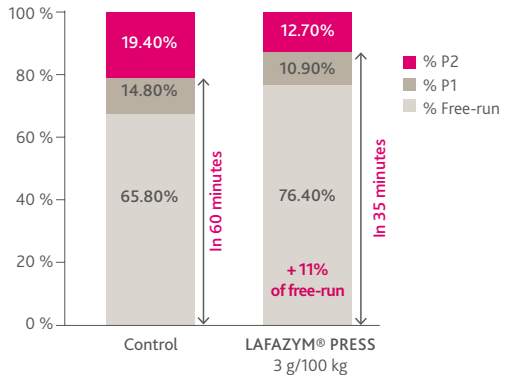
LAFAZYM® PRESS

PRESSING

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

- Preparation of pectolytic enzymes rich in secondary activities.
- Preserve aromatic finess.
- Improves free run juice and first pressing yields (white and rosé).

Increase of free-run juice with LAFAZYM® PRESS



100 g / 500 g - **MICROGRANULATED - PURIFIED (CE)**

2 - 5 g/100 of grapes

LAFASE® XL PRESS

PRESSING PROCESS

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

- Preparation of pectolytic enzymes with secondary activities.
- Increases high-quality juice yields and protects against oxidation.

1 L / 10 L - **LIQUID - PURIFIED (CE)**

1 - 4 mL/100 kg of grapes

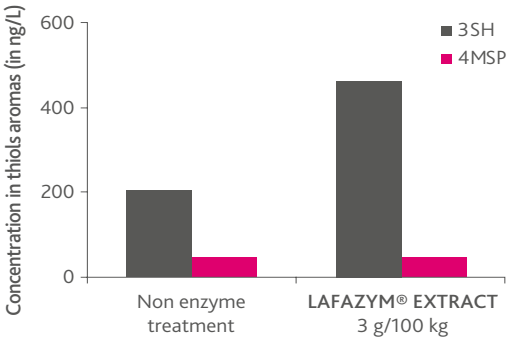
LAFAZYM® EXTRACT

PRE-FERMENTATION SKIN CONTACT

Pre-ferment skin contact at low temperatures.

- Preparation of pectolytic enzymes rich in secondary activities.
- Helps **reduce maceration duration**.
- **Allows for varietal aroma and precursor extraction, increases the aromatic potentials of juice.**
- Purified from CE to help preserve aromatic finesse of wines.
- Improves drain or free run juice yields and clarification.

Volatile thiols analysed



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

250 g / **MICROGRANULATED - PURIFIED (CE)**

2 - 3 g/100 kg of grapes

CLARIFICATION
WHITE AND ROSÉ WINES

LAFAZYM® CL

VINIFICATION

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

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

100 g / 500 g - **MICROGRANULATED PURIFIED (CE)** 0.5 - 2 g/hL (5 - 20 ppm)

LAFASE® XL CLARIF NEW FORMULATION

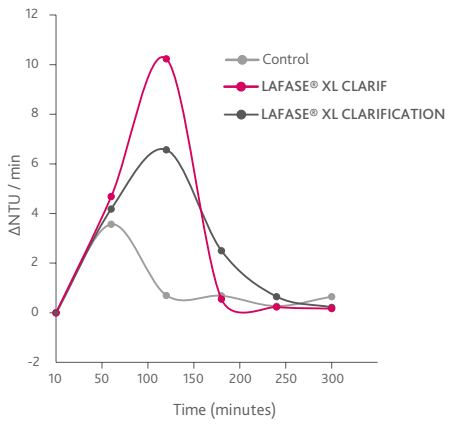
VINIFICATION PROCESS

Clarification of juice and wines.

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

*Comparative trial with the new formulation of **LAFASE® XL CLARIF** and **LAFASE® XL CLARIFICATION**. The new formulation achieves even faster depectinisation and clarification. Trial carried out at 12°C (54°F) and 2 mL/hL - Sémillon*

Kinetics of clarification velocities



1 L / 10 L - **LIQUID - LOW CE** 1 - 5 mL/hL

LAFAZYM® 600 XL^{ICE}

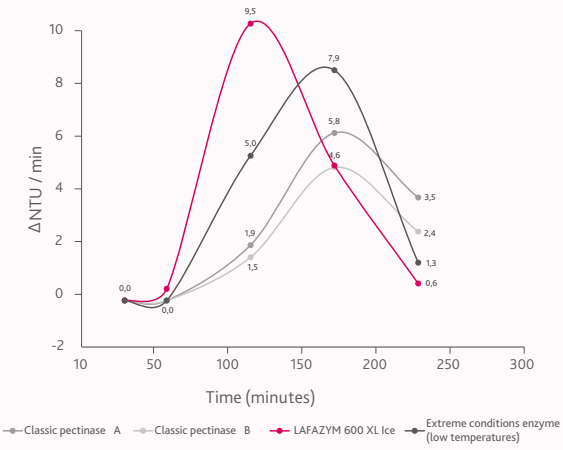
VINIFICATION EXTREME CONDITIONS

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

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

	LAFAZYM® 600 XL^{Ice}	Extreme conditions enzyme	Classic pectinase A	Classic pectinase B
Turbidity (NTU) at 120 min	113	363	543	715

Kinetics of clarification velocity at low temperature



*At low temperatures (6°C - 43°F), **LAFAZYM® 600 XL^{ICE}** (2 mL/hL) is more robust than the enzyme for the same purpose. Sauvignon Blanc.*

250 mL / 10 L - **LIQUID - PURIFIED (CE)** 0.5 - 2 mL/hL

AROMATIC EXPRESSION
WHITE & ROSÉ WINES

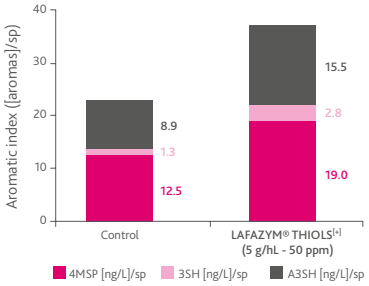
LAFAZYM® THIOLS[+]

VINIFICATION

Bringing out aromas in grape varieties with volatile thiol characters.

- 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**.

Increase in the aromatic potential (thiols) of a wine



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

250 g / MICROGRANULATED - LOW CE 3 - 6 g/hL (30 - 60 ppm)

LAFAZYM® AROM

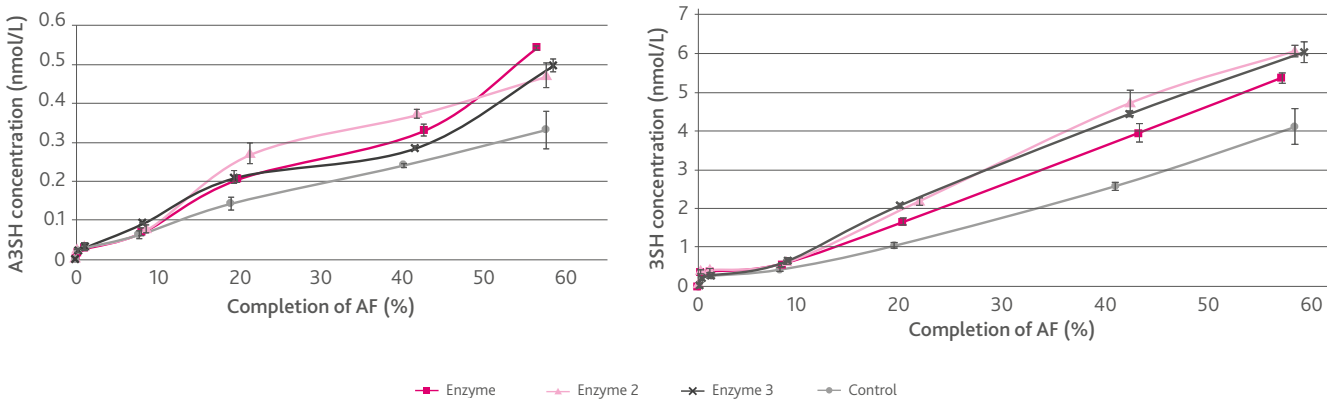
VINIFICATION

Aromatic wines made from grape varieties with terpene precursors.

- Preparation of pectolytic and ß-glucosidase enzymes.
- Increases the aromatic intensity of wines made from grape varieties with glycosylated terpene and norisoprenoid precursors.

100 g / MICROGRANULATED 2 - 4 g/hL (20 - 40 ppm)

INCREASING THE BIOTRANSFORMATION OF VOLATILE THIOLS (3SH AND A3SH)



*Enzyme preparations at 5 g/hL (50 ppm) compared with a control with no enzyme addition - Work by A. Minot 2016 - **BIOLAFFORT®** Sauvignon blanc inoculated with **ZYMAFLORE® X5** (20 g/hL (200 ppm)).*

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[+]**.

RED EXTRACTION

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.
- Contributes to microbiological stabilisation by sedimentation.

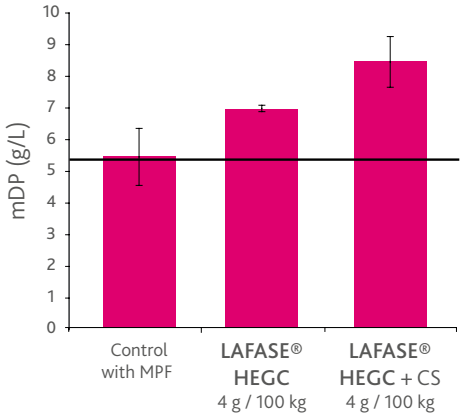
LAFASE® HE GRAND CRU

VINIFICATION

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

- Preparation of pectolytic enzyme rich in secondary activities.
- **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).

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 - **MICROGRANULATED - PURIFIED (CE)** 3 - 5 g/100 kg of grapes

LAFASE® FRUIT

VINIFICATION

Short macerations with or without pre-fermentation cold soaking for fruity, deeply coloured and rounded red wines.

- Preparation of pectolytic enzyme rich in secondary activities.
- 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.

250 g - **MICROGRANULATED - PURIFIED (CE)** 3 - 5 g/100 kg of grapes

LAFASE® XL EXTRACTION ROUGE

VINIFICATION PROCESS

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

- Preparation of pectolytic enzyme with secondary activities.
- Increases free run juice or wine yields, improves grape skin compound release and limits mechanical actions.

1 L / 10 L - **LIQUID - LOW CE** 2 - 4 mL/100 kg of grapes

CLARIFICATION & FILTERABILITY WINES

UTILITY OF ENZYME PREPARATIONS FOR OPTIMISATION OF AGEING STEPS

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

- **Clarification of finished wines**: accelerates all phenomena linked to the natural clarification of wines.
- Significant improvement in wine filterability through hydrolysis of wine polysaccharides.
- Depectinisation: optimises all stages in preparation of wines for bottling (fining, filtration).

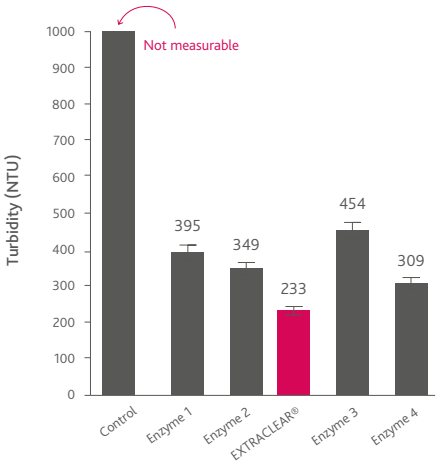
EXTRACLEAR®

VINIFICATION / AGEING | PROCESS

Very rapid clarification and significant improvement in filterability.

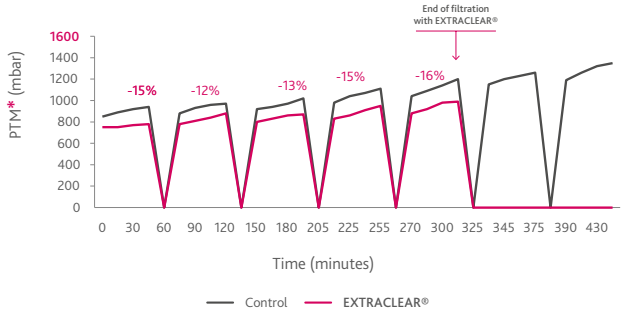
- Preparation of pectolytic enzymes particularly rich in secondary activity for the hydrolysis of complex branched chains.
- Rapid and significant improvement in wine filterability through hydrolysis of a large number of clogging macromolecules.
- Accelerates the natural clarification of wines: limits the risks of microbiological contamination and optimises fining doses.
- Speeds up the natural clarification of even the most difficult wines (grape varieties rich in polysaccharides, press wine, thermovinification).
- Use from the last third of the AF and throughout ageing.

Free-run juice yield



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.

Early use of EXTRACLEAR®: impact on wine filterability



**PTM (transmembrane pressure).*

Optimisation of the filtration cycle using enzymes

	CONTROL	EXTRACLEAR®
Mean flow rate	16.5 hL/h	**18.8 hL/h (+14%)**
Duration of filtration cycle	7h40 (145 hL)	**5h40 (145 hL)**
Number of filter flushes	7*1.8 hL	5*1.8 hL
Stability of colouring matter	50	**35**

- **20% reduction in filtration time.**
- Average 14% reduction in TMP (transmembrane pressure) over the entire filtration period for the wine treated with enzyme.
- Preservation of colloidal stability.

Practical Advice

Treatment of red press wines.

Red press wines have an especially heavy "load" of macromolecules in particular, which slow down clarification. 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.

1 L - LIQUID - LOW CE

3 - 6 mL/hL

SPECIFIC APPLICATIONS

EXTRALYSE®

AGEING

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

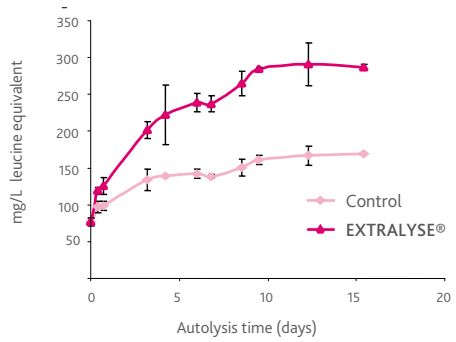
- Preparation of pectolytic enzyme with secondary ß-(1-3 ; 1-6) glucanase activities.
- Accelerates all biological mechanisms linked to ageing on lees and especially yeast autolysis.
- **Brings roundness and softness to the wine by releasing larger quantities of yeast-derived molecules.**
- Improves clarification and filterability, particularly in wines from *Botrytis*-affected grapes.

250 g - MICROGRANULATED - PURIFIED (CE) 6 - 10 g/hL (60 - 100 ppm)

IMPACT OF EXTRALYSE® ON THE SENSORY TUNING OF WINES:

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 (50 ppm)). AF on synthetic must with S. cerevisae 522 D.*

Peptide fraction during yeast autolysis

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 (50 ppm)	**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.

OPTIZYM®

VINIFICATION / AGEING

Concentrated preparation of pectolytic enzymes for extraction and clarification of musts and wines.

- Improves the yield of free-run juice and wine from red grape maceration.
- Clarification of musts and finished wines.

2.5 kg - MICROGRANULATED PURIFIED (CE) 2 - 5 g/hL (20 - 50 ppm)

LYSOZYM

AGEING MICROBIOLOGICAL STABILITY

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 of SO_2.
- Strengthens the action of SO_2 on sweet white wines and improves microbiological stability.

1 kg - MICROGRANULATED 10 - 50 g/hL (100 - 500 ppm)

SPECIFIC APPLICATIONS

LAFASE® DISTILLATION

VINIFICATION PROCESS

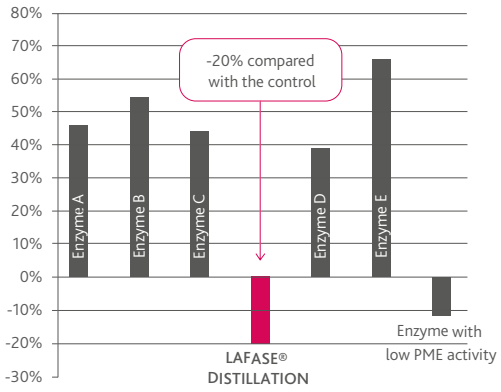
Pressing grapes intended for distillation base wine (very low pectin methyl esterase activity).

- Preparation of pectolytic enzymes rich in secondary activities and with **low release of methanol.**
- **Increases press yield** with the release of quality juice: drainage of juice to limit the quantity of solids and limits the extraction of herbaceous compounds (C6).
- Reduces juice viscosity to facilitate decanting and flotation.

1 L- LIQUID - LOW CE - LOW PME 1 - 4 mL/100 kg of grapes

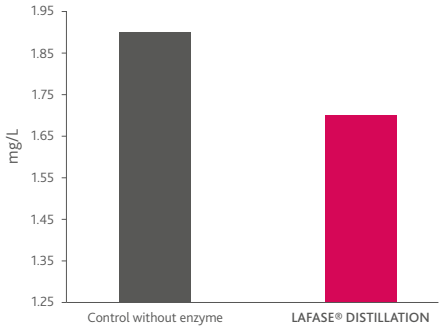
BENEFITS OF AN ENZYME FORMULATION WITH LOW RELEASE OF METHANOL

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



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

Marker for crushing - Cis-3-hexanol



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

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

LAFASE® THERMO LIQUIDE

THERMO-TREATMENT PROCESS

Thermo-treated juice to promote better clarification and pressing.

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

1 L - LIQUID - LOW CE 3 - 5 mL/100 kg of grapes

LAFASE® XL FLOT

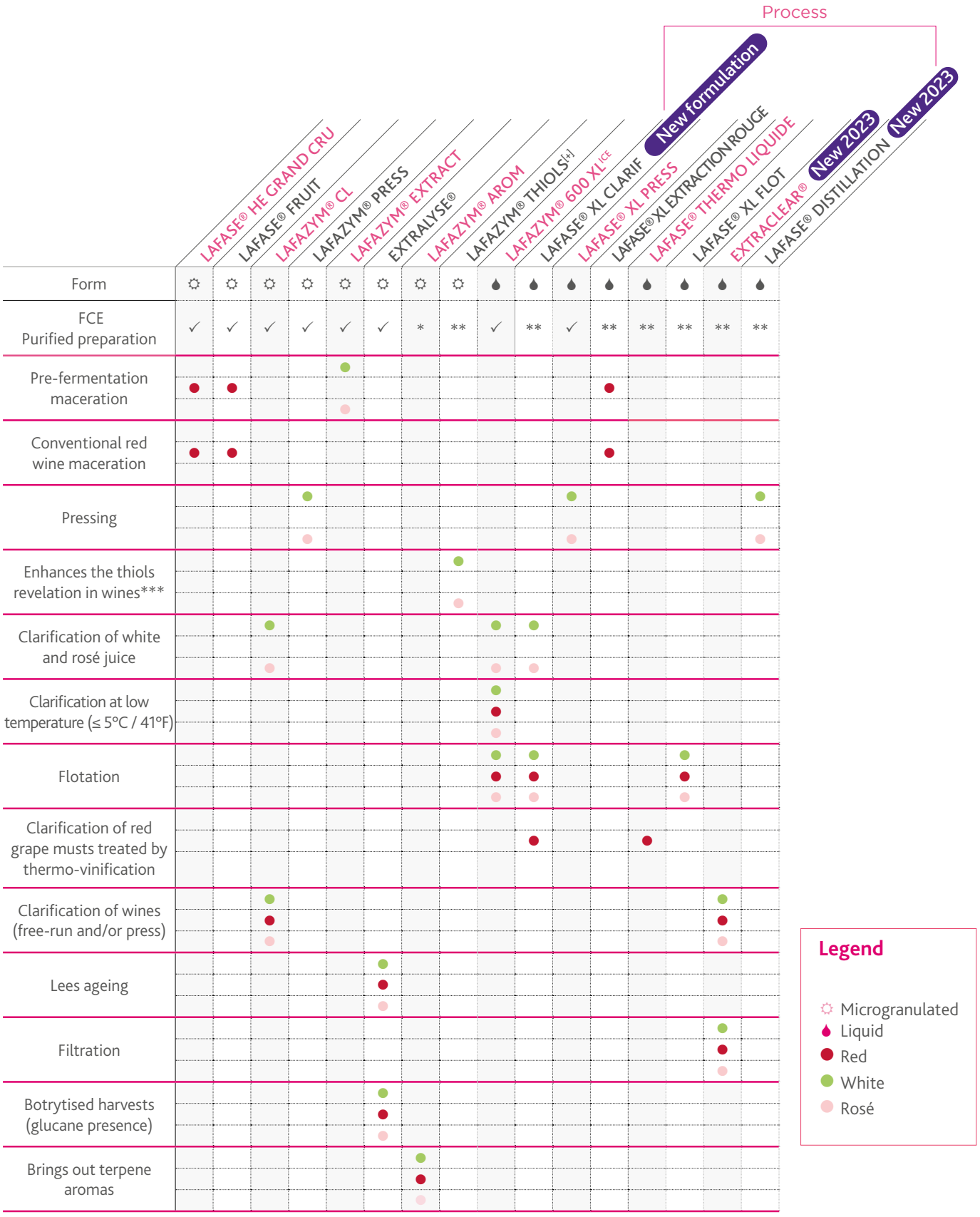
FLOTATION PROCESS

Rapid depectinisation of musts before flotation.

- Preparation of pectolytic enzymes with secondary activities.
- Low cinnamoyl esterase activity to preserve juice quality.
- Rapid depectinisation to optimise clarification.

10 L - LIQUID - LOW CE 1 - 4 mL/hL

CHARACTERISTICS OF OUR ENZYMES



✓= 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**…).

FINING

Fining is no longer just about clarification!

For more than 30 years, through in-depth research and development and the use of the Zeta potential to characterise protein reactivity, **LAFFORT®** has been continually renewing its range of innovative oenological products and applications, using a wider range of raw materials such as vegetable proteins, yeast derivatives, etc. These new materials have also made it possible to develop preparations offering targeted synergies for specific applications.

The modern approach to fining white and then rosé juice has led to major advances in wine quality. Today we are revisiting the fining of red wine by offering a unique preparation designed for the concept of "**Market Re(a)dy Wine**".

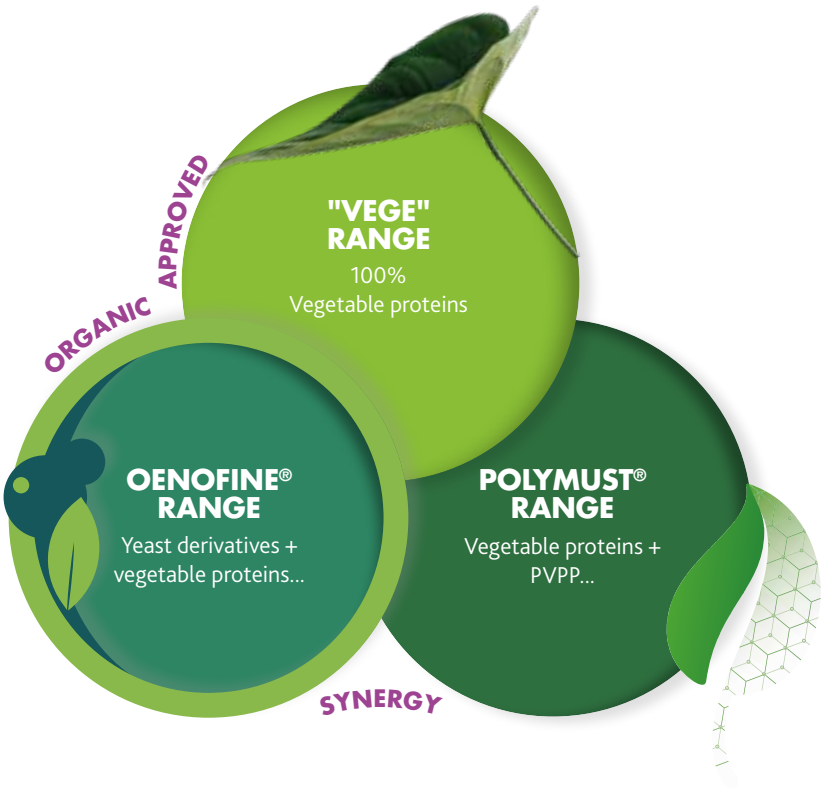
Sami Yammine
Finnig & stabilisation brand manager

FINING - NEW GENERATION

Over the past twenty years, fining has undergone major changes, fuelled by innovation and regulatory developments among other factors. The availability of new preparations has been considerably enhanced with new sources of active ingredients and their synergies, enabling targeted and more precise fining.

LAFFORT® launched the first vegetable protein derived from patatin in 2014 and since then has continued to explore new materials such as yeast derivatives and other mixtures of active ingredients. This research is part of our precision oenology® approach to meet specific winemaking objectives such as flotation, fining on must or during fermentation, or linked to consumer concerns: PVPP replacements, vegan wine, etc.

LAFFORT® has thus developed 3 distinct new ranges of fining products, adapted to various oenological applications as well as to a certain winemaking philosophy: **100% vegetable protein, POLYMUST®** and **OENOFINE®.** This development demonstrates our commitment to precision oenology® that meets the demands of the market and evolving needs in the world of winemaking.



"VEGE" RANGE	POLYMUST® RANGE	OENOFINE® RANGE
VEGEFLOT®	POLYMUST® ROSÉ	OENOFINE® PiNK
VEGEMUST®	POLYMUST® BLANC	OENOFINE® NATURE
VEGEFINE®	POLYMUST® PRESS	OENOFINE® RedY
VEGECOLL®	POLYMUST® NATURE	

BIOSOURCED MIXED

VEGAN

FINING

- Red
- White
- Rosé
- Sparkling

OENOFINE® RedY is an innovative preparation, the result of research into the specificity and diversity of inactivated yeasts. It is part of the "**Market Re(a)dy Wine**" concept, which enables the early release of red wines soon after fermentation.

The yeast derivative selected for **OENOFINE® RedY** promotes the abundant release of so-called "reactive polyphenol" polysaccharides, naturally present in the yeast cell wall. To complement its action on the polyphenolic load and promote the early release of wines, this yeast derivative is combined with a vegetable protein (patatin) recognised for its exceptional capacity to clarify and stabilise colour.

Adding **OENOFINE® RedY** to the must at the fermentation stage results in the rapid formation of less reactive polysaccharide-polyphenol complexes, which are thus more supple, producing red wines with a cleaner, more intense colour and improved clarification characteristics.

OENOFINE® RedY can be used alone or in combination with enzymes for even more advanced wine preparation: **LAFASE® THERMO LIQUIDE** for thermovinification wines or **EXTRACLEAR®** for wines with a high level of suspended solids or destined for early release.

OENOFINE® RedY

NEW

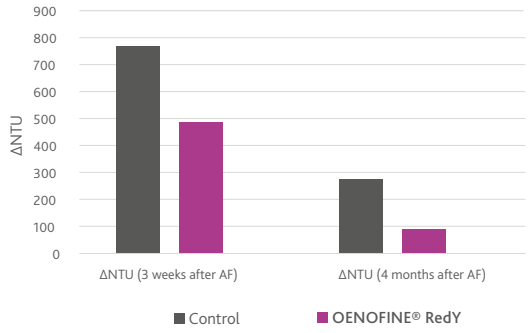
VINIFICATION

Inactivated yeasts, vegetable proteins (patatins).

- Facilitates earlier release of wines.
- Harmonious, elegant tannins.
- Suppleness and volume.
- Stabilisation of colouring matter.
- Preservation of fruity character.
- Optimisation of filterability.

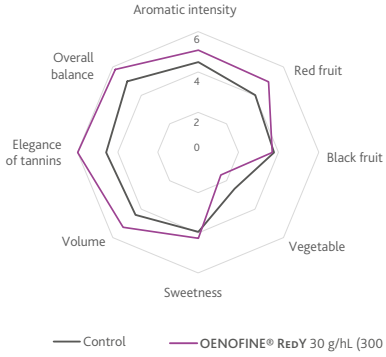
MARKET RE(A)DY WINE

Stability of colouring matter and sensory profile



Fining of a fermenting Merlot must, 2023.

Sensory profile



*After treatment with **OENOFINE® RedY** the wine has a more intense sensory profile with less bitterness. Tasting results by a panel of trained tasters.*

1 kg / 10 kg

10 - 30 g/hL (100 - 300 ppm)

AN ALTERNATIVE TO PVPP BASED ON INACTIVED YEASTS AND VEGETABLE PROTEINS

LAFFORT® has developed 2 unique preparations based on BIOSourced raw materials, specific inactivated yeasts acting in synergy with other fining agents. These preparations allow precise colour management and refinement of the wines, with the particular aim of reducing the sensation of bitterness.

OENOFINE® PiNK: powerful tool for managing the hue of juice and wines.
OENOFINE® NATURE: precise tool for the elimination of oxidised and oxidisable phenolic compounds.

OENOFINE® PiNK & OENOFINE® NATURE are natural replacements for PVPP.

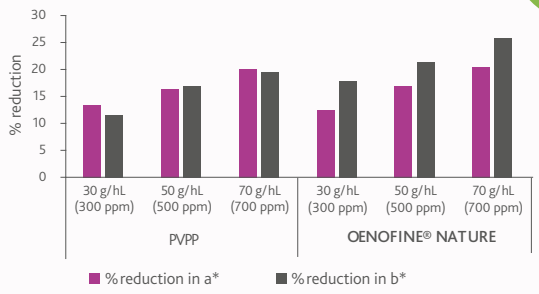
OENOFINE® NATURE

VINIFICATION / AGEING

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

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

Reduction in a* and b* parameters



Cielab - Juice fining, Tavel rosé 2023
***OENOFINE® NATURE** shows comparable performance to PVPP in reduction of a* and b* parameters.*

1 kg / 5 kg

10 - 50 g/hL (100 - 500 ppm)

OENOFINE® PiNK

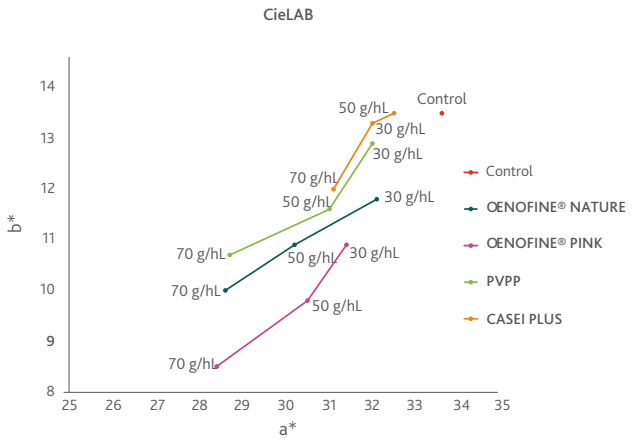
VINIFICATION / AGEING

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

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

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.

Impact of the OENOFINE® range on the colour of juice before AF



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

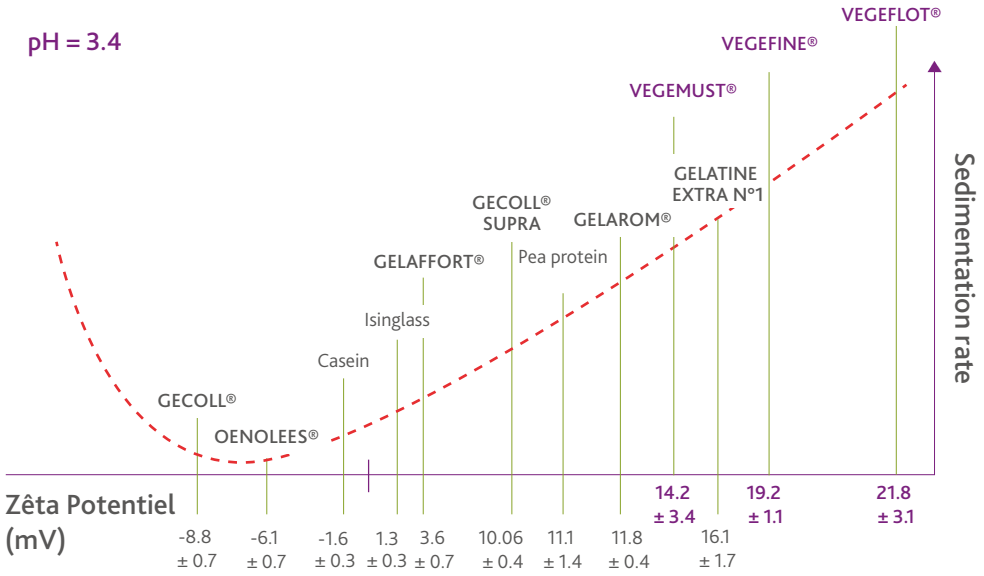
1 kg / 10 kg

10 - 70 g/hL (100 - 700 ppm)

VEGETABLE PROTEINS

FINING AND ZÊTA POTENTIAL

The addition of a protein fining agent to juice, 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 juice, must, or wine. 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
Classification of protein fining agents by sedimentation rate.

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)	
	Fining products	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
	VEGECOLL®	19.6	14.1
	VEGEFINE®	19.2	11.47
	VEGEFLOT®	21.8	11.2
	VEGEMUST®	14.2	9.5

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

VEGETABLE PROTEINS PATATIN

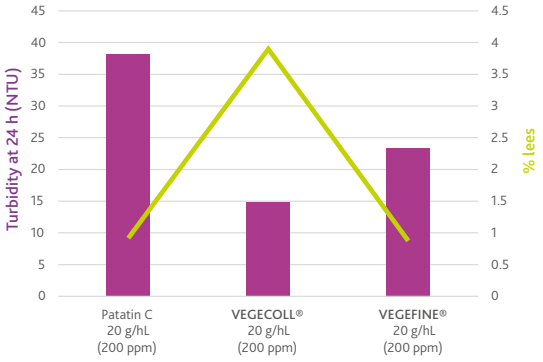
VEGEFINE®

VINIFICATION / AGEING

Vegetable proteins (100% patatin), for the clarification of musts and wines.

- 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.
- Preservation of aromas.
- Rapid clarification, no risk of over-fining.

Comparison of turbidity and % lees



Static fining trial at 7°C (45°F) on Sauvignon Blanc juice (2019).

1 kg / 10 kg

2 - 50 g/hL (20 - 500 ppm)

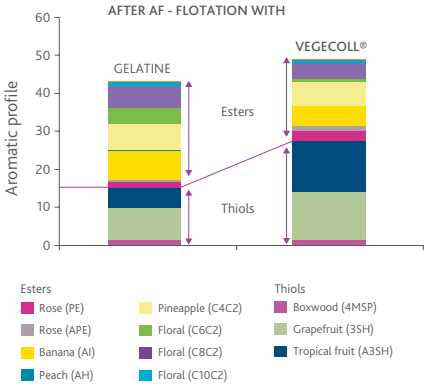
VEGECOLL®

VINIFICATION / AGEING

Vegetable proteins (patatin), for the clarification of juice and wines.

- Very rapid clarification.
- The most reactive vegetable protein in oenology to date.
- Rapid flotation at low doses.
- No risk of over-fining.
- Preservation of aromas.

Optimisation of the aromatic profile



500 g / 5 kg

2 - 30 g/hL (20 - 300 ppm)

VEGETABLE PROTEINS PATATIN & PEA

VEGEMUST®

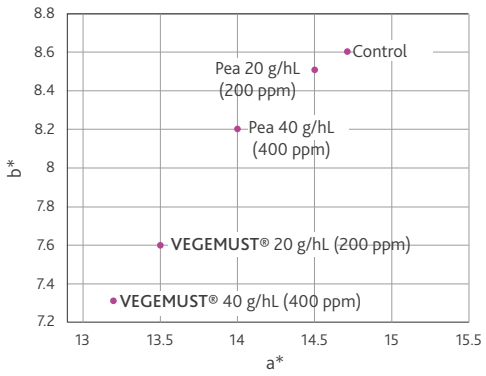
VINIFICATION

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.
- No risk of over-fining.

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 2020.

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 juice and wines. For fining white or rosé juice and wines, the aim is to increase L* (increased clarity) and decrease a* and b* (decrease in red and orange colours).

1 kg / 10 kg

10 - 40 g/hL (100 - 400 ppm)

VEGEFLOT®

VINIFICATION FLOTATION

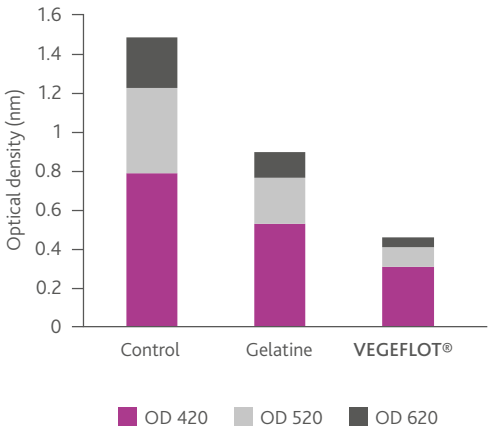
Combination of vegetable proteins (patatin & pea) with high flocculation capacity, suitable for flotation. Optimised balance between plant protein sources.

- 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.
- No risk of over-fining.

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

Complementary use with **LAFASE® XL FLOT**.

Flotation of a Pinot Gris juice, South Africa, 2020



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

1 kg / 10 kg

10 - 40 g/hL (100 - 400 ppm)

Find Out More

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

POLYMUST® RANGE

FINING

POLYMUST® ROSÉ

VINIFICATION / AGEING

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

- Elimination of phenolic acids.
- **Stabilisation of the colour of rosé juice and wines in fermentation.**
- When used on finished wine, it is best to rack within 5 days following treatment.

1 kg / 10 kg — 30 - 80 g/hL (300 - 800 ppm)

POLYMUST® BLANC

VINIFICATION / AGEING

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

- Prevention of oxidation.
- **Elimination of oxidisable phenolic compounds liable to trap aromas and distort the colour.**
- Compatible with floatation and for treatment of wines.

1 kg / 10 kg — 30 - 80 g/hL (300 - 800 ppm)

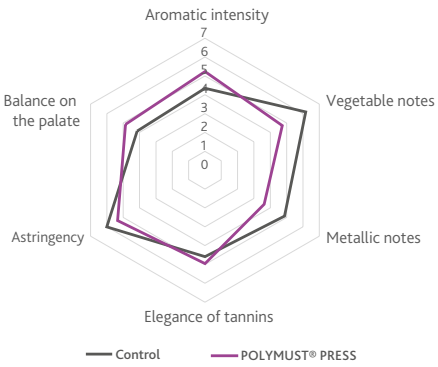
POLYMUST® PRESS

VINIFICATION / AGEING

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 juice:** elimination of oxidisable and oxidised phenolic compounds, preservation of glutathione content and limitation of browning and pinking phenomena.
- **Refining red press wines:** clarification, stabilisation of the colouring matter, reduction of astringency and green and metallic notes, microbiological stabilisation.
- Colour correction and sensory refinement of white and rosé wines.

Tasting profile after fining



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.

1 kg / 10 kg — 15 - 100 g/hL (150 - 1000 ppm)

POLYMUST® NATURE

VINIFICATION / AGEING

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

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

1 kg / 10 kg (on request) — 10 - 80 g/hL (100 - 800 ppm)

FINING PRODUCTS

GELATINES

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

PRODUCT	DESCRIPTION / APPLICATION	DOSE	PACKAGING
GECOLL® SUPRA	**Juice and wines clarification. Eliminates astringent tannins.**	40 - 100 mL/hL.	1 L / 5 L / 20 L
GECOLL® FLOTTATION	Liquid gelatine highly reactive. **Flotation.**	40 - 100 mL/hL	10 L
GELAROM®	**Bring out the sensory 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 gelatine **Wine clarification agent.**	8 - 10 g/hL (80 - 100 ppm)	1 kg 20 kg
GÉLATINE EXTRA N°1	Highly purified heat soluble gelatine. **Fining of red wines for ageing.**	6 - 10 g/hL (60 - 100 ppm)	1 kg

PVPP

PRODUCT	DESCRIPTION / APPLICATION	DOSE	PACKAGING
VINICLAR®	Microgranulated preparation of PVPP. VINICLAR® contains an amount of cellulose favouring the clarification and filterability of lees. **Preventive and curative treatment of the oxidation of juice and wines.**	Preventive treatment: 15 - 30 g/hL (150 - 300 ppm). Curative treatment: 30 - 80 g/hL (300 - 800 ppm).	25 kg
VINICLAR® P	Granulated preparation of PVPP. **Preventive and curative treatment of the oxidation of juice and wine.**	20 - 50 g/hL (200 - 500 ppm).	1 kg 22.7 kg

TRADITIONAL FINING

PRODUCT	DESCRIPTION / APPLICATION	DOSE	PACKAGING
ALBUCOLL® OVOCLARYL®	**Fining and clarification of red wines.** Liquid preparation of egg white. Powdered egg albumin.	30 - 80 mL /hL 6 - 10 g/hL (60 - 100 ppm).	1 L 1 kg
ICHTYOCOLLE	Fish-based (Isinglass) fining agent adapted to high-grade white and rosé wine fining and clarification. **Restores high sensory clarity and remarkable brilliance to treated wines.**	0.5 - 1.5 g/hL (5 - 15 ppm).	250 g
CASEI PLUS	**Potassium caseinate.** Treatment of oxidation phenomena and maderisation in juice (white and rosé) and wines.	5 - 20 g/hL (50 - 200 ppm) for clarification. 20 - 60 g/hL (200 - 600 ppm) for the treatment of musts and wines.	1 kg 20 kg
POLYLACT®	Combination of PVPP and casein. **Preventive and curative treatment of the oxidation of wines (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
SILIGEL®	Colloidal silica solution that may be used in combination with all organic fining agents.	20 - 100 mL/hL.	1 L / 5 L / 20 L

TANNINS

Tannins are essential to the balance of the red wine matrix, but they also play a part in white and rosé production due to their many oenological properties: stabilisation of colour, anti-oxidant and anti-oxidase properties, reaction with proteins, clarification, etc.

A very diverse range of tannins is available to winemakers. **LAFFORT®** precisely selects its tannins to develop formulations adapted to each type of wine and each stage of vinification.

Tannin addition is a natural technique that facilitates wine production and stabilisation.

Bruno Marquette
Tannin range manager

TANNINS IN OENOLOGY

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.

TANNINS, FOR WHAT PURPOSE?

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.
- ✓ Anti-oxidation.
- ✓ Reductive character minimisation.
- ✓ Structure enhancement.
- ✓ Improve clarification.
- ✓ Regulates redox phenomena.

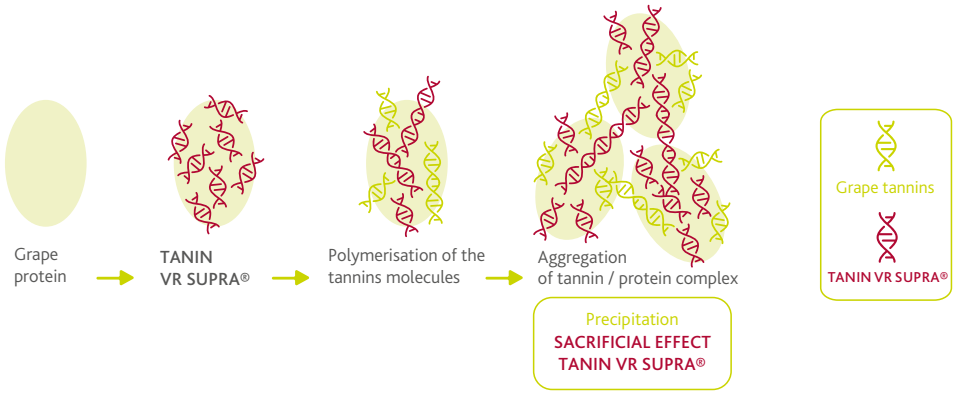
IDP PROCESS

All **LAFFORT®** tannins benefit from the unique formulation Instant Dissolving Process (**IDP**); a revolutionary process for ease of use! The IDP process enables perfect solubility in wine and thus no preliminary dissolution of the tannins in water is required. Homogenous introduction 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.

TANIN VR SUPRA® interaction - proteins



WINEMAKING TANNINS

The role of tannins in winemaking

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

Sometimes the joint use of two tannins can be complementary, as in the case when harvest is not at optimal phenolic ripeness, the qualities of **TANIN VR SUPRA®** and **TANIN VR COLOR®** are complementary.

Find Out More: Discover our focus "**TANIN VR SUPRA® & TANIN VR COLOR®, the winning team**" on our website, **LAFFORT & YOU** section.

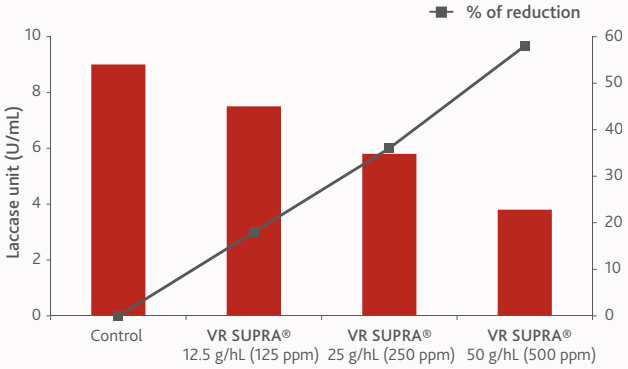
TANIN VR SUPRA®

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-oxydant** 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 SO_2).
- Sacrificial effect: preserves the grape tannins from precipitation with the grape proteins, to favour indigenous tannin/anthocyanin reactions.

The inhibition of laccase activity



*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.*

1 g / 5 kg

10 - 80 g/hL (100 - 800 ppm)

TANIN VR COLOR®

Catechin tannin preparation. Specially formulated to stabilise wine colour.

- Grapes harvested at sub-optimal phenolic ripeness.
- Grape varietals with a naturally poor tannin/anthocyanin ratio.
- Varietals that have **colour management problems** (extraction/stabilisation).
- Tannin with low astringency, suitable for all wine styles.

1 kg / 5 kg

10 - 80 g/hL (100 - 800 ppm)

WINEMAKING TANNINS

TANNINS

- Red
- White
- Rosé
- Sparkling

TANIN VR SUPRA® ÉLÉGANCE

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®.**

1 g / 5 kg 10 - 80 g/hL (100 - 800 ppm)

TANIN GALALCOOL®

Granulated gallic tannin preparation, to be used for white and rosé juice, including:

- **Inhibition of natural oxidation enzymes** (laccase, polyphenol oxidase), more efficiently than SO_2.
- Precipitation of some of the **unstable proteins**, as efficiently as bentonite but without aroma loss.
- Facilitates clarification.

OPTION TANIN GALALCOOL® SP - *See P. 59*

1 kg 5 - 20 g/hL (50 - 200 ppm)

TANIN VR GRAPE®

Grape proanthocyanidic tannin preparation.

- Compensates the for natural grape **tannin deficiency**.
- Stabilises the colour thanks 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).

OPTION TANIN VR SKIN® - *See P. 58*

500 g 10 - 40 g/hL (100 - 400 ppm)

TANIN ŒNOLOGIQUE

Extract of ellagic chestnut tannins, particularly suited to the protection of musts from oxidation by:

- Inhibiting natural oxidation enzymes (laccase, tyrosinase) in association with SO_2.
- Protecting against the undesirable effects of oxygen.
- Precipitating some of the unstable proteins, in association with bentonite.
- Facilitating clarification.

5 kg 8 - 15 g/hL (80 - 150 ppm)

OBJECTIVE	TYPE OF GRAPE OR MUST	TANNIN	DOSE	NOTE
Botrytised grapes, anti-oxidant action, laccase inhibition.	Red	VR SUPRA® RANGE	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 *Botrytis*.
	White, Rosé	TANIN GALALCOOL®	5 - 20 g/hL (50 - 200 ppm)*	
Protein precipitation and skin tannin preservation.	Red	VR SUPRA® RANGE	10 - 50 g/hL (100 - 500 ppm)	"Sacrificial effect". Add as soon as possible to grapes.
Protein precipitation.	White, Rosé	TANIN GALALCOOL®	5 - 20 g/hL (50 - 200 ppm)	
Colour stabilisation.	Red	TANIN VR COLOR® TANIN VR GRAPE®	10 - 80 g/hL (100 - 800 ppm) 10 - 40 g/hL (100 - 400 ppm)	Add during the first third of fermentation.
Structure contribution. Compensation for tannin deficiency.	Red	TANIN VR GRAPE® VR SUPRA® RANGE	10 - 40 g/hL (100 - 400 ppm) 10 - 80 g/hL (100 - 800 ppm)	

* According to the health of the grapes.

AGEING TANNINS

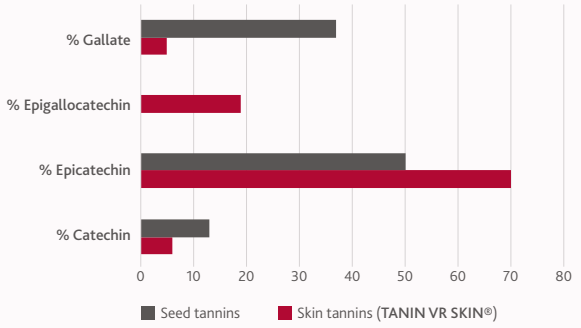
TANIN VR SKIN®

Preparation of proanthocyanidic tannins from grape skins.

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

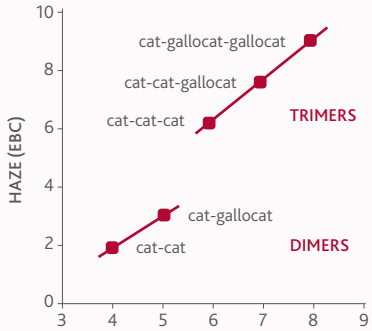
- Compensation for natural grape tannin deficiency (lack of phenolic maturity or adverse tannin-anthocyanin ratio).
- Stabilisation of colour due to the formation of tannin-anthocyanin combinations.
- Improved clarification.
- Refinement of wine structure and palate length.

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.

500 g 5 - 40 g/hL (50 - 400 ppm)

TAN'COR GRAND CRU®

Preparation of proanthocyanidic tannins derived from grapes and ellagic tannins from oak. 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.

1 kg 5 - 30 g/hL (50 - 300 ppm)

TAN'COR®

Proanthocyanidic and ellagic tannin preparation. 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 of the wine with regards to oxidation phenomena.
- Regulate oxidation-reduction phenomena.

1 kg / 5 kg 10 - 30 g/hL (100 - 30 ppm)

AGEING TANNINS

TANFRESH®

Preparation of proanthocyanidins and oak ellagitannins.

- To refresh white and rosé wine (against oxidation, atypical ageing).
- To boost structure and mouthfeel.
- To help eliminate reductive odours.

250 g — 0.5 - 6 g/hL (5 - 60 ppm)

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. 57*).

1 kg — 2 - 5 g/hL (20 - 50 ppm)

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

Find Out More

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

QUERTANIN® RANGE

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.

DOSE

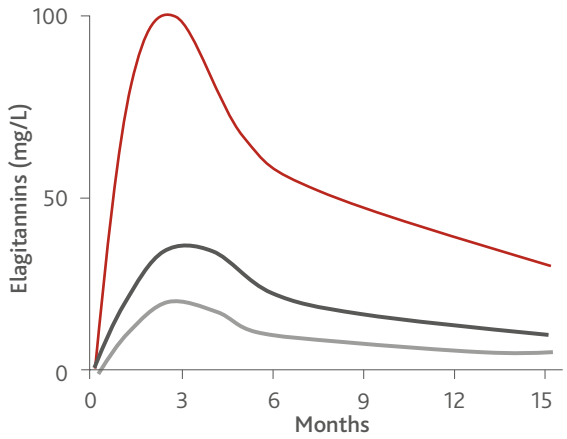
It is specified in the Oenological Codex that tannins "must not change the olfactory properties and the colour of wine". The dosage rates will therefore vary in function of the wine matrix, and shall be determined after trials.

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.*

STABILISATION

Stabilisation is essential for the presentation and appearance of wine, to avoid cloudiness and other deposits in bottle.

Several treatments are available depending on the nature of the instability: tartaric, protein, microbiological, colouring matter. **LAFFORT®** responds to each of these needs with a range of products adapted to winemaking, as well as bottling conditions.

LAFFORT® has developed recognised expertise in the field of wine stabilisation with innovative products such as **MANNOSTAB®** (Patent FR 2726284), as well as mastery of analytical techniques for measuring stability.

Sami Yammine
Fining & stabilisation range manager

COLLOIDAL STABILISATION

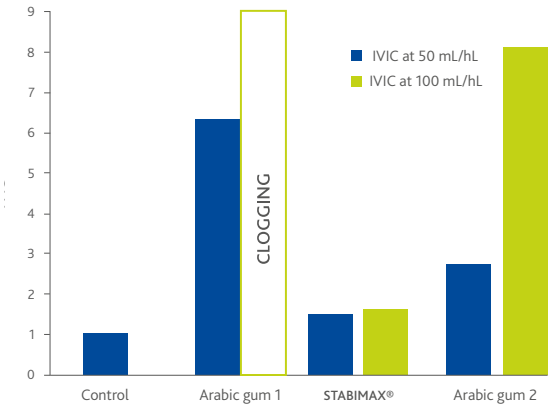
STABILISATION

- Red
- White
- Rosé
- Sparkling

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.
- Very good filterability, can be added before microfiltration.



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.

20 L	50 - 150 mL/hL

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 structure of the wines (softness and mouthfeel).
- Very low clogging index.

1 L / 5 L / 20 L	100 - 300 mL/hL

OENOGOM® INSTANT

LOW SO_2

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

- Stabilisation of the colouring matter of red wines.

2.5 kg / 25 kg	20 - 100 g/hL (200 - 1000 ppm)

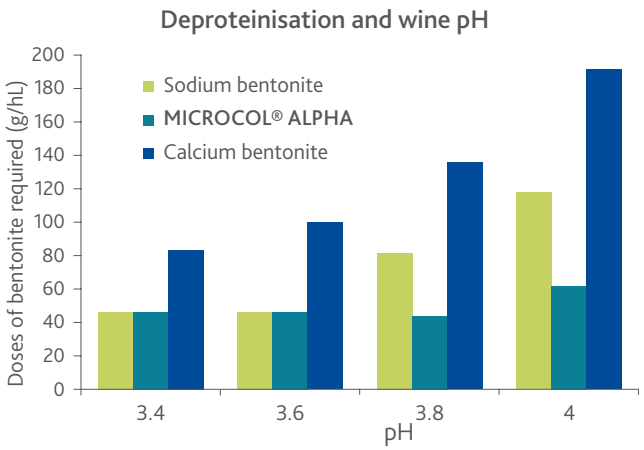
STABIVIN®	STABIFIX®	OENOGOM® BIO
Pure Verek arabic gum solution with high grade protection index (> 8) for stabilising unstable colouring matter in red wines.	**Solution of selected and purified gum arabic.**	**Pure arabic gum in rapid dissolving micro-granular form (100% Verek).** LOW SO_2
Hydrophilic colloid which aims to counter hazes and colloidal deposits, allowing the wine to retain maximum clarity: • Stabilises unstable colouring matter. • Increases protection with regard to metallic or protein hazes.	• Stabilises otherwise unstable colouring matter. • Increases protection against metallic hazes.	• Stabilisation of the colouring matter of red wines. • Increases protection against metallic hazes.
Dose: 70 - 150 mL/hL.	Dose: 70 - 150 mL/hL.	Dose: 20 - 30 g/hL (200 - 300 ppm).
Packaging: 1 L / 5 L /20 L	Packaging: 5 L /20 L	Packaging: 2.5 kg

PROTEIN STABILISATION

MICROCOL® ALPHA

High quality natural sodium microgranular bentonite.

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



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

1 kg / 5 kg / 25 kg	10 - 80 g/hL (100 - 800 ppm)

MICROCOL® FT

CROSS-FLOW FILTRATION

Natural sodium-calcium bentonite compatible with cross-flow filtration.

- 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 leaving residues of micro-particles after filtration.

15 kg	30 - 80 g/hL (300 - 800 ppm)

MICROCOL® CL G

CLARIFICATION

Natural calcium bentonite.

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

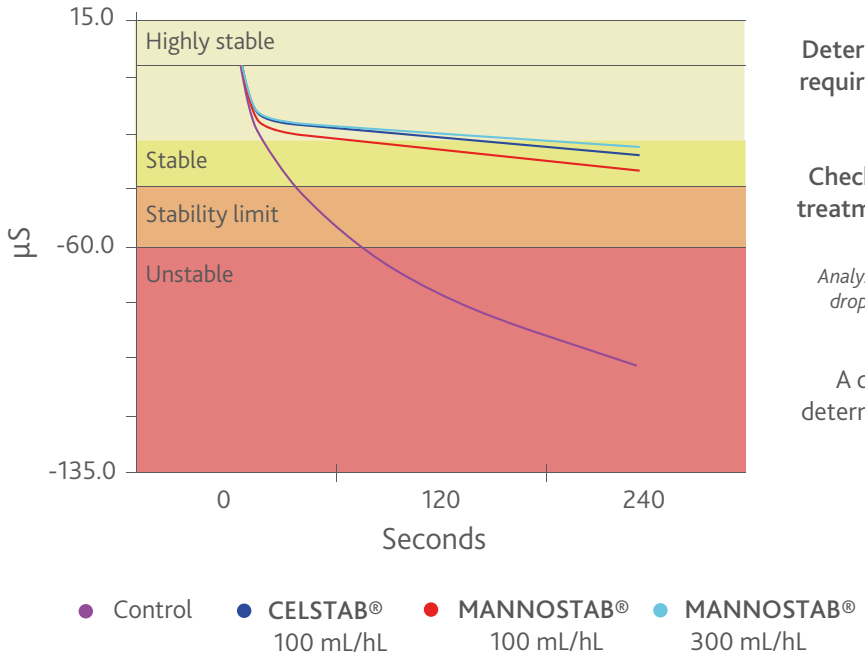
15 kg	20 - 100 g/hL (200 - 1000 ppm)

Find Out More

See our **MICROCOL® ALPHA** video in the **LAFFORT & YOU** section.

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 (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, **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 - ageworthy 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 wines	Direct treatment	-	Natural stabilisation

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

TARTARIC STABILISATION

CELSTAB®

Solution of cellulose gum (100 g/L), a highly purified polymer of vegetable origin (from wood) with a low degree of polymerisation and lower viscosity.

- 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.

1L / 5 L / 20 L

100 - 200 mL/hL

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 No 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.

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

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

1L / 10 L

50 - 150 mL/hL

POLYTARTRYL®

Metatartaric acid under vacuum.

- Crystallisation inhibitor of potassium bitartrate salts.

POLYTARTRYL®: index 40.

SUPER POLYTARTRYL®: index 40/42. The strongest index of esterification.

Incorporate **POLYTARTRYL®** / **SUPER POLYTARTRYL®** 48 hours before the final filtration and bottling.

1 kg / 5 kg

10 g/hL (100 ppm)

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. See the product data sheet for instructions for use.

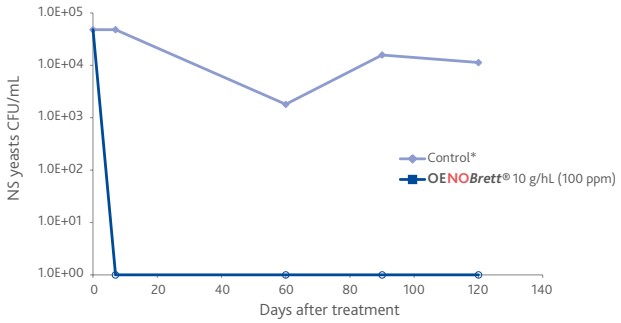
2.5 kg

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 synergystic effect of enzymes accelerate the settling of lysed cells. The decrease of the *Brettanomyces* population is significant and thus prevents spoilage.
- The antimicrobial action of **OENOBRETT®** is an essential tool within a SO_2 reduction strategy.



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.*

Available in barrel dose: addition in just 4 steps!

23 g *(barrel dose)* / 250 g / 2.5 kg	10 g/hL (100 ppm)

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 SO_2 reduction strategy.

100 g	4 - 10 g/hL (40 - 100 ppm)

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 SO_2 or without sulphites.
- The inactivated yeast fraction provides a natural reducing component that helps protect wines against oxidation during ageing.
- Contributes to wine clarification.

	20 - 30 g/hL (200 - 300 ppm)

MICROBIOLOGICAL STABILISATION

MICROCONTROL®

Formula made from chitosan, vegetable protein (patatin, which is a potato protein isolate) and enzymes for reducing the microbial load, as well as protecting wines against certain unfavourable microorganisms. BIOControl product.

- **Reduction of the overall microbial load** (non-*Saccharomyces cerevisiae* yeasts, yeasts*, bacterias*).
- Tool for winemaking with reduced SO_2 or without sulphites.
- Clarification of wines through sedimentation.

**Reduction in microbial populations by binding.*

250 g	5 g/hL (50 ppm)

BACTICONTROL®

Formulation of chitosan of fungal origin, lysozyme and enzymes for protecting wines against certain microorganisms and particularly lactic acid bacteria. BIOControl product.

- Microbiological protection of white, red and rosé wines after fermentation.
- A wine vinification tool for use in a SO_2 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 ß-glucanases and **LYSOZYME** 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 **LYSOZYME**).

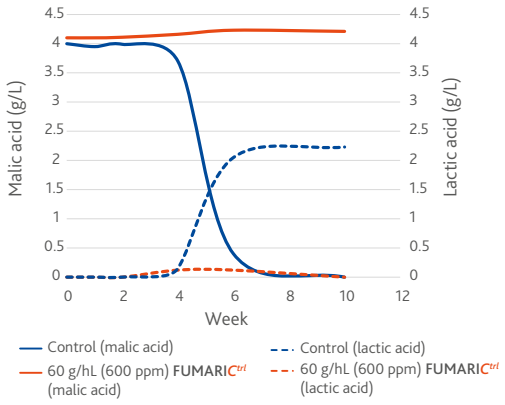
500 g	15 - 20 g/hL (150 - 200 ppm)

FUMARIC^{trl}

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

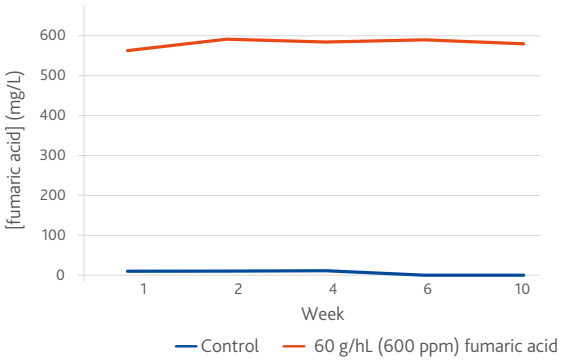
- Avoids the onset of MLF.
- Can stop MLF while in progress.
- Preservation of malic acid in wines.
- Tool for making wines with reduced SO_2 or with no sulphite added.

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.

2.5 kg / 25 kg	30 - 60 g/hL (300 - 600 ppm)

SPECIFIC TREATMENTS

Oenological carbon may be required in wine production to correct spoilage from fungi, or to correct the colour and hue of juices affected by oxidation or pinking. **LAFFORT®** offers a wide range of vegetable-based solutions, selected for their high capacity to remove these compounds from musts and wines, in powder, granule or solution form to facilitate their use by operators.

Wine quality is intimately linked to the redox balance. **SUPRAROM®** and **SULFIREDOX®** are two tools at your disposal to ensure optimal ageing and preserve the sensory characteristics of your wine.

SPECIFIC TREATMENTS

ACTIVE CARBON

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.

CHARBON ACTIF LIQUIDE HP

VINIFICATION / AGEING

Activated carbon in a stabilised aqueous solution.

- High stain removal and decolorisation capacity.

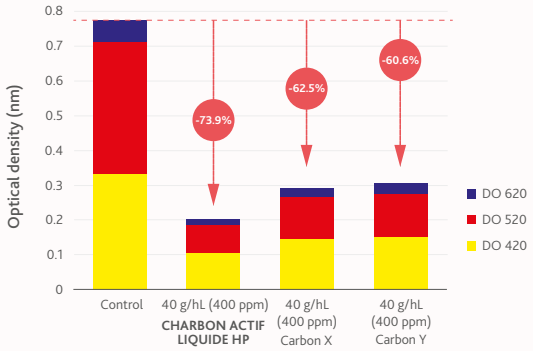
Practical Advice

OPTIMISED DECOLORISATION

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

- Combination compatible with European regulations for organic winemaking, Regulation (EC) 889/2008.
- Colour stabilisation and removal of oxidised compounds.
- Selective adsorption of unstable proteins from wine, to initiate protein stabilisation.

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.

10 L

100 - 400 mL/hL

PRODUCT	DESCRIPTION / APPLICATION	DOSE	PACKAGING
CHARBON ACTIF SUPRA 4 VINIFICATION / AGEING	Powdered activated carbon. **Stain removal and decolorisation.**	20 - 100 g/hL (200 - 1000 ppm)	5 kg 15 kg
CHARBON ACTIF PLUS GR VINIFICATION / AGEING	Granulated activated carbon. **Stain removal and decolorisation.**	20 - 100 g/hL (200 - 1000 ppm)	5 kg
GEOSORB® GR VINIFICATION	Granulated activated carbon. Decontaminant for fermenting juice 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

OTHERS

PRODUCT	DESCRIPTION	DOSE	PACKAGING
SUPRAROM® VINIFICATION	Preparation containing condensed tannins, potassium metabisulphite and ascorbic acid. Preventive and curative treatment for must oxidation.	10 - 25 g/100 kg grapes	1 kg
SULFIREDOX AGEING	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

PRESERVATIVES

In oenology, sulphur dioxide is widely used for its antioxidant, antimicrobial and stabilising properties.

LAFFORT® offers a range of sulphur formulas, available in liquid, powder or effervescent tablet form to facilitate their use.

PRESERVATIVES

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

PRODUCT	DESCRIPTION	DOSE	PACKAGING
BISULFITE 15	Aqueous solution of potassium bisulphite.	10 mL releases 1.5 g of SO_2.	1L 5 L 20L
BISULFITE 18	Potassium bisulphite and sulphur dioxide in aqueous solution.	10 mL releases 1.8 g of SO_2.	5 L 20L
BISULFITE NH_4 150*	Aqueous solution of ammonium bisulphite.	10 mL releases 1.5 g of SO_2 and 0.4 g of diammonium.	20L
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 20L
SOLUTION 10	Pure sulphur dioxide dissolved in water.	10 mL releases 1 g of SO_2.	5 L 10 L 20L
POTASSIUM METABISULFITE	Neutralised aqueous solution of sulphur dioxide.	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.	Preservation 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 SO_2 can vary depending on how damp the barrels are.*

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

FILTRATION

A crucial step in the winemaking process, filtration is intended to eliminate particles in suspension, microorganisms and other impurities, to obtain a clear wine.

LAFFORT® offers a wide range of diatomaceous earths (Kieselguhr), perlites and filter sheets to adapt filtration to the intended purpose and ensure the quality of the finished product.

PRE-COATS & 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

RECOMMENDATIONS FOR PRE-COATS:

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

OPTION 1	PRE-COATS	FILTER COAT
DIATOMYL® P2	500 - 600 g/m²	√
DIATOMYL® R	800 g/m²	
DIATOMYL® P2	500 - 600 g/m²	

OPTION 2*	PRE-COATS	FILTER COAT
DIATOMYL® P2	500 - 600 g/m²	
DIATOMYL® R	1 000 g/m²	√

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

DIATOMACEOUS EARTHS (KIESELGHUR)

Unicellular brown algae whose cellulose membrane binds the silica in water. **DIATOMYL®** products are widely used in the food industry (beer, edible oils, ciders, fruit juice).

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.

PERLITES AND FILTER SHEETS

PERLITES

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

Wine is a food product that must comply with precise hygiene rules. It is an environment conducive to the development of numerous microorganisms which, although not dangerous to health, can affect the quality of the wine.

The surfaces of containers in contact with must and wine must be completely free of spoilage microorganisms and their substrates (tartrate crystals, etc...).

LAFFORT® offers a complete range of hygiene products for cleaning and disinfecting all types of equipment (stainless steel and concrete tanks, pumps, hoses, filters, bottling lines, etc.) and the cellar (floors, walls...).

HYGIENE AND OENOLOGY

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 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 crossflow filters and filter cartridges.

DECAPOL® EXTRA*Life*

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

- 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.

5 kg

DECAPOL® DEEP*Clean*

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

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

Instructions for use / dose: consult product packaging.

5 kg

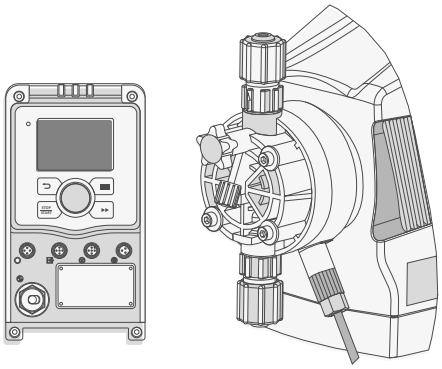
EQUIPMENT

To ensure that our formulations are implemented correctly, **LAFFORT®** offers a range of equipment adapted to cellar constraints and can provide support in configuring the equipment. Well-managed clarification by flotation is a powerful tool and provides the option of fining the must at an early stage. The use of a dosing pump ensures that the products are added precisely and in line.

The **BIOSPRAYER** facilitates the application of **BIO**Protection yeasts to harvesting and cellar equipment.

CELLAR EQUIPMENT

STABILISATION

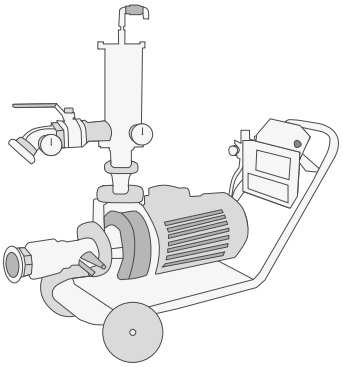


DOSING PUMP

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.

FLOTATION



FLOTATION UNIT

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

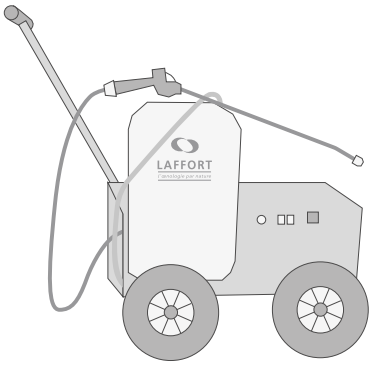
- Equipped with a saturation unit, a gas injection system, a pressure gauge and an electrical box.
- Several models available depending on the required flow rate (150 to 500 hL/h).
- Contact us for further technical details.

SPARK

DISGORGING TOOL

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

BIOPROTECTION



BIOSPRAYER

Self-contained electric sprayer for BIOProtection of equipment.

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

NOBILE®

L'œnologie du bois

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.

NOBILE®

L'œnologie du bois

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

COMPLEX PROFILE

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.

TRADITIONAL PROFILE

NOBILE® SWEET
Chips & Granulars

Vanilla & toasted.

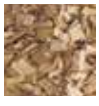
NOBILE® INTENSE
Chips

Volume & coffee.

NOBILE® AMERICAN BLEND
Chips & Granulars

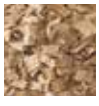
Caramel & smoky.

UNTOASTED OAK - VINIFICATION



NOBILE® FRESH GRANULAR 24M
Granulars

Antioxydant & structure.



NOBILE® AMERICAN FRESH GRANULAR
Granulars

Fruit & lactones.

NEW 2024

CHIPS VARIETAL PROFILE

Respect of the fruit without notes of oak

VARIETAL PROFILE

NOBILE® SOFT
Chips

▶ Sweetness & length.

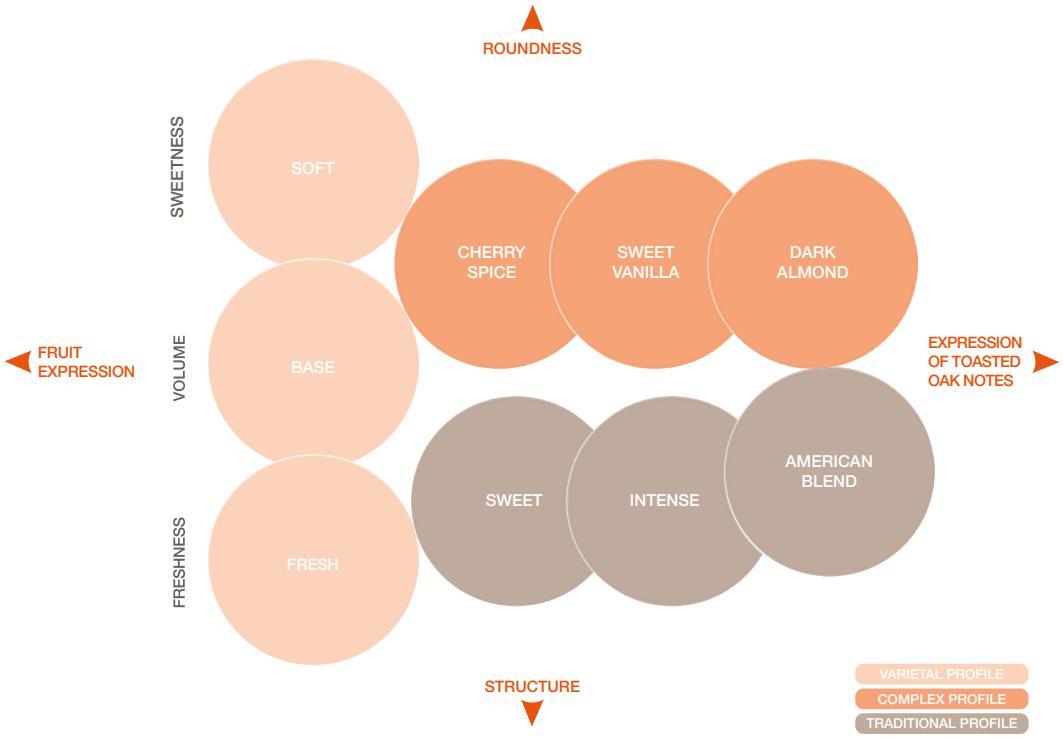
NOBILE® BASE
Chips

▶ Volume & roundness.

NOBILE® FRESH THERMO TRAITÉ
Chips & Granulars

▶ Freshness, fruit & structure.

CHIPS POSITIONING



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 (Bordeaux style).

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.

AGEING OBJECTIVES

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

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.

CUSTOM MADE

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

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

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.

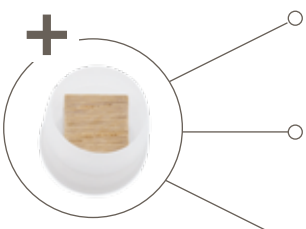
NOBISPARK RANGE

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.

SPIRIT RANGE

A full range of high quality chips developed specifically for spirits

HOMOGENEOUS TOASTING

NOBILE®
FRUIT SHINE

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

Aromatic expression:

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

FRENCH OAK

NOBILE®
BOURBON CASK

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

Aromatic expression:

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

AMERICAN OAK

SOFT OAK PROCESS

NOBILE®
OLD RESERVE

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

Aromatic expression:

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

AMERICAN OAK

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.

LAFFORT
l'œnologie par nature

Our certificates & listed products:

ZYMAFLORE® 011 BIO
OENOCELL® BIO
OENOGOM® BIO

BiO

More than 142 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

ROSÉ

At **LAFFORT®**, we are well aware of the technical skills and know-how required to make rosés. In this type of winemaking, success is based on control of the hue combined with aromatic complexity. Thanks to our R&D department, our team of oenologists and through close collaboration with our partners in the field, we have developed recognised expertise in this area, which is reflected in our range of targeted products specifically developed to make the best rosés.

Christophe ROSSI
Rosé brand manager

ROSÉ VINIFICATION

BIOPROTECTION

The use of non-*Saccharomyces* yeast strains enables the medium to be colonised without fermentation activity, thus limiting the presence of indigenous flora. Part of a strategy to reduce sulphite additions.

ZYMAFLORE® KHIO*MP*

DIRECT INOCULATION

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

ZYMAFLORE® ÉGIDE*TDMP*

DIRECT INOCULATION

BIOProtection on grapes and harvest reception equipment (by spraying).

ENZYMES

The use of enzymes in rosé wine vinification plays an essential role at the following stages:

- **Pressing:** the rapid, high-quality release of juice through the use of specific press enzymes allows for better management of uncontrolled maceration to obtain better aromas and ensure precise colour management.
- **Clarification:** full and clean depectinisation allows for better solids management, whether from flotation, natural settling or stabulation.
- **Aromatic optimisation:** the secondary activity of some of our specific enzymes contributes to enhanced aromatic expression (thiols, terpenes).

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

* Purified enzymes

ROSÉ VINIFICATION

FERMENTATION

The choice of yeast strain help direct and optimise the aromatic profile of a wine according to the winemaker's goal.

YEASTS NUTRITION

Appropriate nutrition is essential for a successful fermentation, in terms of its kinetics and from an organoleptic point of view.

YEAST PREPARATION ADDITIVE	NUTRIENT	PROTECTION
SUPERSTART® *Blanc* & *Rosé* To be used when rehydrating the yeast. Yeast rehydration product with a high sterols, vitamin and mineral content for optimising yeast metabolism throughout fermentation.	**NUTRISTART® AROM** Total nutrition - mixed, to correct nitrogen deficiencies in musts.	**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.

Decision Making Tool

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

HUE PRESERVATION AND AROMA PROTECTION

As an alternative to BIOProtection, **FRESHAROM®** protects musts from premature oxidation, thus preserving hue and aromas.

ROSÉ VINIFICATION

FINING – MUST OR WINE

Early fining, 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.

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

ORGANIC USABLE UE 2018/848

Natural origin

VEGEMUST® / VEGEFLOT®

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

OENOFINE® PiNK

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

OENOFINE® NATURE

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

VEGEFINE®

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

Synergistic formulations

POLYMUST® BLANC

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

POLYMUST® ROSÉ

PVPP, vegetable protein (patatin).
Stabilises hue, reduces phenol acids.

POLYLACT®

PVPP, potassium caseinate.
Inhibits browning.

Controlling oxidation

IN ADDITION TO OTHER FINING PRODUCTS

CHARBON ACTIF LIQUIDE HP

HUE MANAGEMENT

Activated carbon in stabilised aqueous solution.

- Optimal hue management.
- High decolorisation capacity.

Product under regulation, check the current regulations.

ROSÉ VINIFICATION

PREVENTING OXIDATION

POWERLEES® LIFE

Formulation of inactivated yeasts rich in reducing compounds including reduced glutathione.

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

➔ **As a preventive measure** (after fermentation):

- Significantly slow down oxygen consumption by oxidisable compounds in the wine.
- Stabilise the colour of rosés by avoiding browning due to oxidation.
- Preserve the aromatic profile from the end of fermentation until the bottle is opened.

➔ As a corrective measure:

- Refresh the aromatic profile of already oxidised wines.
- Fix ethanal and limit its volatility.

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.

PROTEIN STABILISATION

MICROCOL® ALPHA

Natural sodium bentonite respecting colour and aromas while also having good protein removal capacity.

MICROCOL® FT

Spécific for tangential filtration.
Natural calcium-sodium bentonite, intended for protein stabilisation of wines.

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.

CA^{2+}STAB

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

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.
- List of **LAFFORT®** products available for use in organic winemaking and/or the US National Organic, Program's (NOP) winemaking regulations.
- 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.
- Recommendations for labelling oenological products in wine.

Aware of the major challenge of guaranteeing its customers the best possible control in terms of food safety, **LAFFORT®** expects to see its current Quality Management System (ISO 22000) migrate to FSSC 22000 certification by June 2024.

SPARK

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 **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***.

François Botton
SPARK range manager

LAFFORT® SPARK
BASE WINE PRODUCTION

The quality of sparkling wines depends to a large extent on the meticulous preparation of the base wine. This fundamental step, often overlooked, plays a decisive role in the complexity, balance and elegance of the final sparkling wine. A few key factors for the success of your base wine.

BIOPROTECTION, SO_2 REDUCTION AND O_2 CONSUMPTION

BIOProtection aims to preserve the quality of freshly pressed grapes or must by protecting them from oxidation and the development of undesirable microorganisms, while avoiding excessive SO_2 additions. In this approach, non-*Saccharomyces* yeasts **ZYMAFLORE® KHIO**^{MP} and **ZYMAFLORE® ÉGIDE**^{TDMP} are used alternately, depending on the specific winemaking needs.

ZYMAFLORE® KHIO^{MP}

DIRECT INOCULATION

Yeast of the *Metschnikowia pulcherrima* species for BIOProtection at low temperature, suitable for stabulation. Strong capacity to consume oxygen in musts.

ZYMAFLORE® ÉGIDE^{TDMP}

DIRECT INOCULATION

Formulation of strains of the species *Torulaspora delbrueckii* and *Metschnikowia pulcherrima* for the BIOProtection of grapes, musts and harvesting equipment (by spraying). It can be used at various stages of the process: in a closed circuit in the grape crate washer; as a spray on the membranes of pneumatic presses before each load (or between two loads); in tankers, when musts are transported, with or without SO_2; when the first juices flow directly into the juice tank.

JUICE CLARIFICATION

Depectinisation of the juice after pressing is essential for rapid clarification. Low pH is often a limiting factor for musts intended for base wines. The use of **LAFAZYM® 600 XL**^{ICE} helps to break down the pectins responsible for turbidity, resulting in effective sedimentation in just a few hours and facilitating fining of the different must fractions.

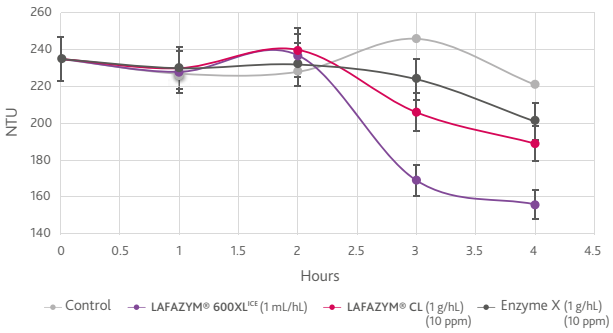
LAFAZYM® 600 XL^{ICE}

EXTREME pH

Fast and effective must clarification over a wide pH range (2.9 - 4.0) and temperature range.

- Preparation of pectolytic enzymes.
- **Provides rapid depectinisation even at low temperatures (effective from 5°C - 41°F).**
- Reduces settling time and improves consolidation of the solids.

Test on Pinot Noir must (Champagne)



Height of solids and turbidity after static settling.

pH	Total acidity g/L H_2SO_4	Total acidity meq/L	Density at 20°C - g/mL	Estimated sugar in musts - g/L	Alcohol level (16.83)	Total SO_2 mg/L
3.06	8.15	166.3	1068	156	9.25	144

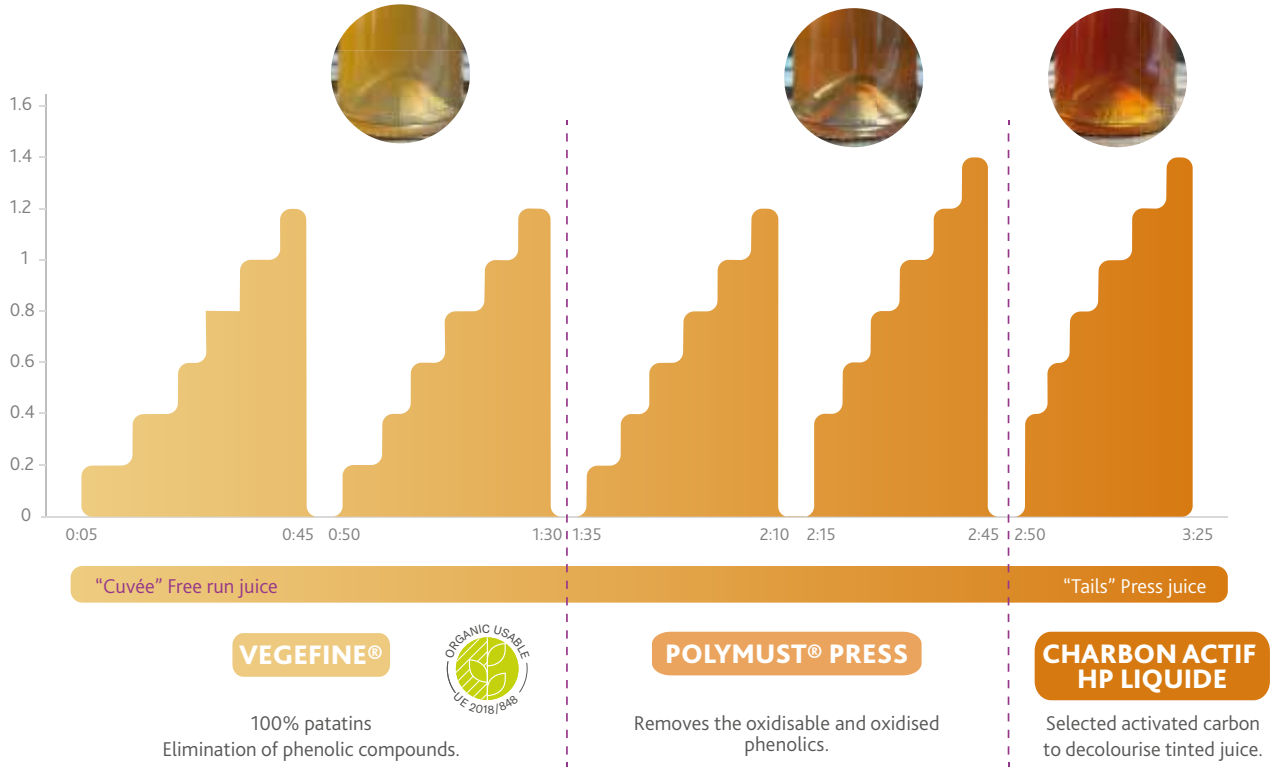
LAFFORT® SPARK
BASE WINE PRODUCTION

MUST FRACTIONING AND FINING

Must fractioning involves separating the juice into several fractions at different points in the press cycle. While this approach is strictly regulated in Champagne, it is advisable to fraction as a function of the press cycle, as described below. This approach makes it possible to separate the more delicate “free-run” musts from the press musts or “tails”, which contain potentially bitter or astringent compounds.

This strategy has a number of advantages:

- Aromatic quality: Fractioning makes it possible to preserve delicate aromas and varietal characteristics without spoilage due to over-extraction.
- Unwanted compounds are removed through precise, almost surgical, fining of the fractions that need it most. It is thus possible to precisely eliminate phenolic compounds and colouring matter from each of the fractions according to the grape variety.



FINING WITH OENOFINE®

OENOFINE® is a range of products based on **BIO**Sourced ingredients. The synergy between their raw materials makes them **good alternatives to PVPP** and its various applications.

OENOFINE® NATURE

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

- Oxydation management.

OENOFINE® PINK

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

- To be used on **"Blancs de Noir" in the pre-fermentation** phase for better management of oxidation and hue.

Non-fined control | **OENOFINE® NATURE**

LAFFORT® SPARK
BASE WINE PRODUCTION

PRODUCTION OF BASE WINES: A QUESTION OF STYLE...

Meticulous control of the alcoholic fermentation is essential in the production of sparkling base wine. This complex process is greatly influenced by the judicious choice of yeast strains and their associated nutrition.

CLASSIC

ZYMAFLORE® SPARK

Strain isolated in Champagne, tested, validated and recommended by the microbiology laboratory of the CIVC technical centre. Its presence during fermentation helps to preserve delicate aromas and authentic expression of the terroir.

ZYMAFLORE® 011 BIO

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

COMPLEXITY AND FRESHNESS

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. It imparts a structure and aromatic complexity typical of wines that have been through malolactic, while preserving the natural freshness of wines made without MLF.

ZYMAFLORE® KLIMA

Ability to preserve and even synthesise malic acid during fermentation: reinforces the acidity and freshness of wines to give balanced, expressive "cuvées".

Practical advice

For yeast nutrition, consider **SUPERSTART® SPARK**, a yeast preparation additive specifically designed for the difficult conditions found with sparkling wines and when restarting fermentation (Patent FR 2736651).

Decision Making Tool

Discover our **Yeast Nutrition DMT** on our website, in the **LAFFORT & YOU** area.

MALOLACTIC FERMENTATION STRATEGY

The decision to opt for MLF in the production of sparkling base wines depends on the winemaker's specific objectives in terms of style, aromatic complexity and taste balance. Choosing to initiate or block MLF requires an in-depth understanding of the required characteristics of the final product. If the decision is taken to opt for malolactic fermentation, **LAFFORT®** offers a strain of bacteria selected in Champagne specifically for base wines with a low pH.

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).

Find out more

Discover our **LACTOENOS® B16 *Standard* reactivation protocol** on our website, in the **LAFFORT & YOU** area.

LAFFORT® SPARK
BASE WINE PRODUCTION

PROTEIN STABILISATION

Ensuring protein stability of the base wine is a crucial step in the sparkling winemaking process. Meticulous and systematic verification of protein stability is essential in order to guarantee the clarity and quality of the final product. The usual method for achieving protein stability is the use of natural sodium bentonite.

MICROCOL® ALPHA

Micro-granulated natural sodium bentonite with strong protein-removal capacity, for stabilising and clarifying wines over a wide pH range.

- Strong capacity to remove heat-sensitive proteins over a wide pH range.
- Charge remains stable over time.
- Very good lees settling (strong clarification capacity).
- Conserves aromatic intensity.
- Contributes to the stabilisation of colouring matter.
- Helps improve the brightness of wines.

TARTARIC STABILISATION

Once the base wines are protein stable, proceed with tartaric stabilisation to prevent the formation of tartrate crystals in bottle, ensure the clarity of the wine and avoid any undesirable deposits during storage.

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 bitratrate.

- 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 vegetable origin, with a low degree of polymerisation and viscosity.

- The liquid formula (100 g/L) makes it easy to incorporate into the base wine.

In the traditional method, the addition is made entirely before filling to bottle.

INNOVATION NOBILE®

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.

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.

LAFFORT® SPARK
BASE WINE PRODUCTION

PRESERVATION OF BASE WINES

Preserving base wines in optimum conditions, in terms of temperature and exposure to oxygen, is essential to preserve the freshness and specific characteristics of each cuvée. By nature, base wines have low sulphite additions and care must be taken to ensure that there is no spoilage before bottling. With this in mind, our R&D department has developed **POWERLEES® LIFE.**

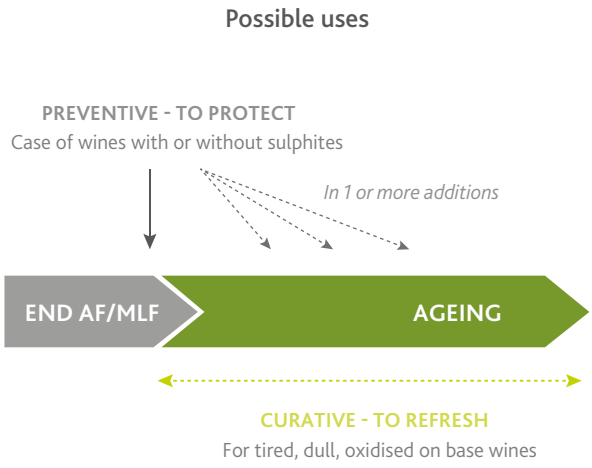
POWERLEES® LIFE

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

POWERLEES® LIFE offers a number of significant advantages:

- Protects wines from premature oxidation during ageing, whether or not they contain added sulphites.
- Significantly slows down oxygen consumption by oxidisable compounds in the wine.
- Preserves wine colour.
- **Refreshes the aromatic profile of already oxidised wines, notably reserve wines.**

POWERLEES® LIFE can be added once or several times as from the end of fermentation and throughout the ageing period. It offers a complementary solution to sulphur dioxide (SO_2) as part of a strategy to reduce sulphite additions while ensuring effective protection of the wines. This innovative product is thus part of an approach to preserving quality while meeting the challenges linked to the moderate use of sulphites.



AURÉLIE POULAIN
CONSULTANT OENOLOGIST IN CHAMPAGNE

"I recommend **POWERLEES® LIFE** for firming up wines with limited ageing potential and for its antioxidant action, which makes it possible to limit SO_2 additions and is part of a sulphite reduction strategy.
On very tired reserve wines, with oxidative or even aldehydic character, a dose of 20 g/hL (200 ppm) of **POWERLEES® LIFE** helps to restore tension, freshness and aromatic clarity, removing the oxidative aspect."

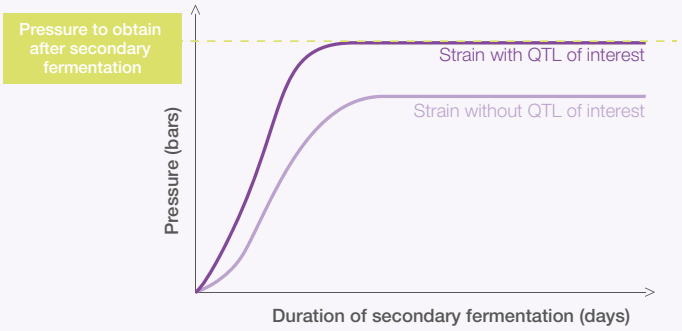
In conclusion, preparing base wines is a delicate process that requires expertise and a deep respect for the terroir. It is the very essence of creating exceptional sparkling wines, underlining the importance of each step in achieving excellence in the glass.

LAFFORT® SPARK
SECONDARY FERMENTATION

The fermentation takes place in a closed container, resulting in a significant increase in carbon dioxide ([CO_2]) pressure up to around 12 g/L. The secondary fermentation takes approximately 45 days, with distinct phases linked to the increasing pressure.

Yeasts selected for their ability to complete the 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.

TRADITIONAL METHOD

CHARMAT METHOD

SUPERSTART® SPARK

Yeast rehydration preparation adapted to sparkling wine conditions (Patent FR 2736651).
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 microbiology laboratory of the CIVC technical centre (Comité Interprofessionel du Vin de Champagne).

ZYMAFLORE® X16

Yeast for aromatic and modern sparkling wines.
High production of secondary aromas (white peach, white flowers, yellow fruits).

CLEANSPARK

Riddling adjuvant (bentonite/alginate).
Quick and complete removal of particles and sediments in bottles after ageing "sur lattes" (on lees).

TANSPARK

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.

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.

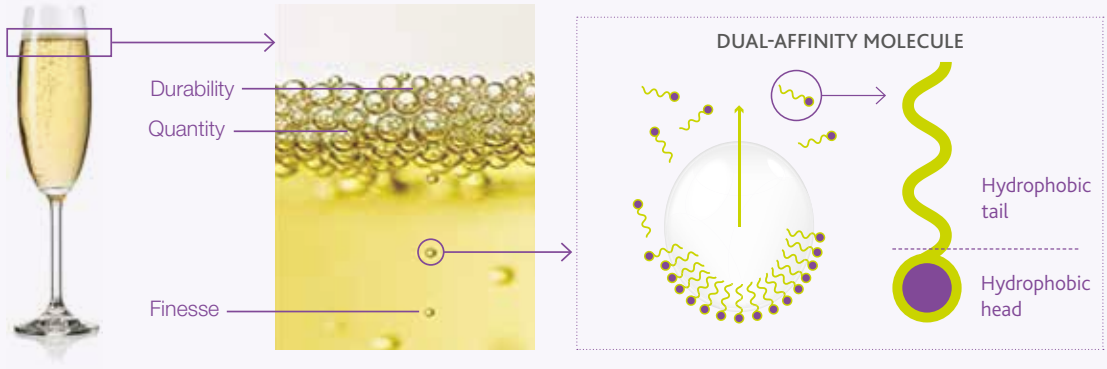
Actively contributes to bead fineness and mousse retention before adding the starter culture for secondary fermentation.

LAFFORT® SPARK
QUALITY OF BUBBLES

ROLE OF MANNOPROTEINS IN BUBBLE AESTHETICS

The ideal aesthetic of effervescence in sparkling wine is for tasters to observe **fine, elegant and persistent** bubbles in the glass, regularly supplying a generous and stable cordon (rim or collar) to form a **harmonious** foam. The research programme (**SPUM**) on the aesthetics of effervescence, launched by **LAFFORT®** in 2014 in collaboration with Prof. 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. **MANNOPARK®**, is a specific formulation resulting from this study.

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 birth, the bubble is charged with CO_2, its growth directly linked to the concentration of dissolved CO_2 in the wine. It then 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 the bubble lifespan and thus promoting the formation of the collar.

MANNOSPARK®

DRAWING DISGORGING

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.

*Comparison of bubble collar and size under standardised serving conditions for a Crémant rosé , with or without **MANNOSPARK®** (100 ml/hL added at bottling before secondary fermentation - bottle fermented, 12 months on lees).*

MANAGEMENT OF AGEING ON LEES AND SWEETNESS

OENOLEES®

DRAWING

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

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

OENOLEES® MP

DISGORGING

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.

ALCOHOLIC FERMENTATION RESTART PROTOCOL

For 100 hL of wine in stuck AF

PRELIMINARY OPERATION ON STUCK WINE

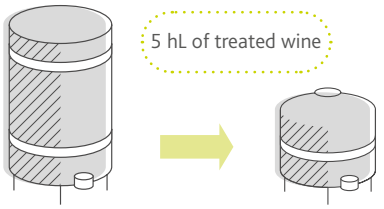
- Rack/centrifuge avoiding air.
- Adjust wine temperature to 20°C (68°F).
- Adjust SO_2 at 1 - 2 g/hL (10 - 20 ppm).
- Add: → For white wines: **BI-ACTIV®:** 40 g/hL (400 ppm).
  → For red wines: **OENOCELL®:** 40 g/hL (400 ppm).
- Mix wine anaerobically every 12 hours for 24 hours (minimum).
- Move on to step 2.

Stuck fermented wine

PRÉPARATION DU PIED DE CUVE

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.



Wine in stuck AF prepared in step 1

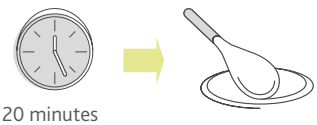
Wine for 5 hL starter

2.2. Yeast preaparation

- 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.

Water (40°C / 104°F) + SUPERSTART® SPARK/ ROUGE + ACTIFLORE® BO213

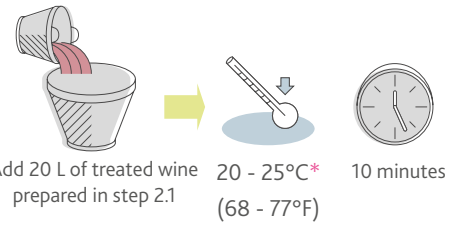
- Wait 20 minutes, then homogenise.


20 minutes

ALCOHOLIC FERMENTATION RESTART PROTOCOL

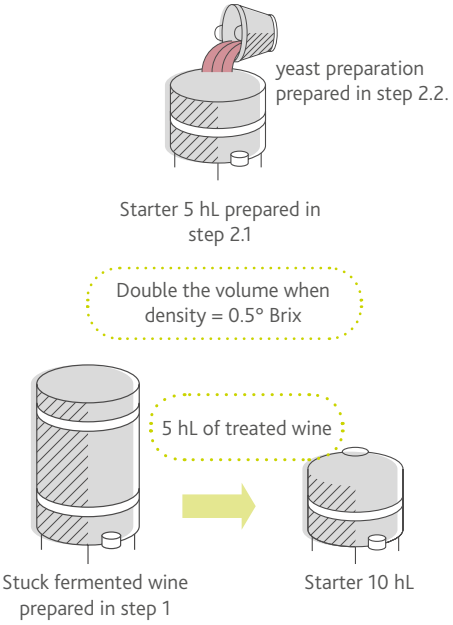
- Add immediately 20 L of treated wine from step 2-1.
- Wait 10 minutes, let cool to 20°C (68°F) and **maintain the temperature between 20 - 25°C (68 - 77°F).**
- The total time of the yeast rehydration must not exceed 45 minutes.

**Check with a thermometer.*



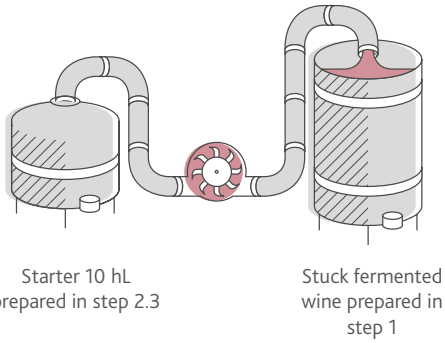
2.3. Acclimatation of the yeast preparation

- 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.



INCOROPORATION OF YEAST INOCULUM IN THE TANK

- Add the yeast innoculum 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).



Decision Making Tool

Discover our **RESTARTING FERMENTATION (AF) DMT** on our website, in the **LAFFORT & YOU** section.

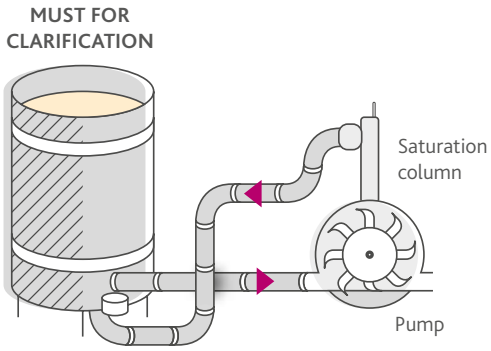
FLOTATION PROTOCOL WITH VEGEFLOT®

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.

PREPARING OF THE JUICE

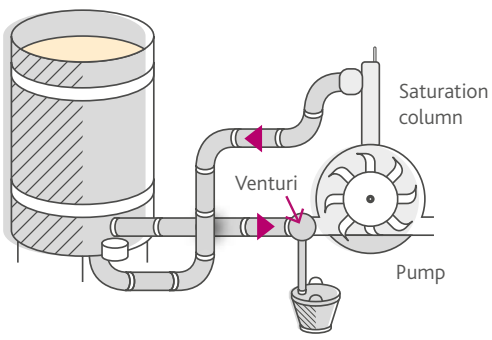
- Clarification by flotation involves migration of the particles of the must to the surface of the tank. This migration is prevented in the presence of pectins. The addition of pectolytic enzyme directly after grape pressing is necessary to accelerate the process.
  - → **LAFASE® XL FLOT**: 1 - 4 mL/hL.
  - → **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.

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.

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.

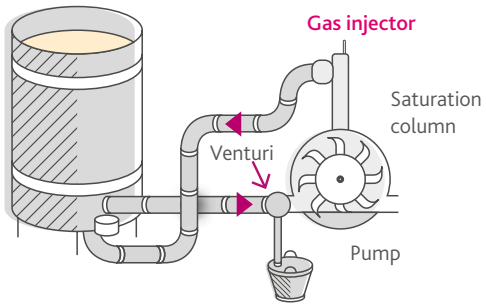
- **Inject VEGEFLOT® as slowly as possible.**
- Mix the tank for 20 to 25 minutes at a saturation pressure of 2 to 3 bar, without addition of gas.

FLOTATION PROTOCOL WITH VEGEFLOT®

STARTING THE FLOTATION PROCESS

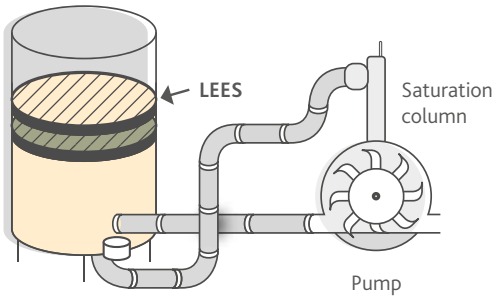
- Once the tank is homogenised, open the gas injection valve.
- The nitrogen inlet pressure should be between 5 and 7 bar.
- The gas flow rate must be between 25 - 60 L/min (depending on flotation setup). The saturation pressure must be adjusted to 5 bar.
- Check the quality of the flotation. To do this, 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



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

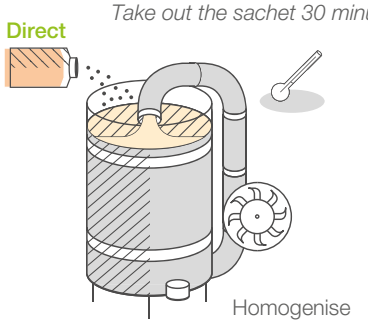
Discover our **FLOTATION** video on our website, at **LAFFORT & YOU** section.

LACTOENOS® RANGE INOCULATION

LACTOENOS® DIRECT

DIRECT INOCULATION

Take out the sachet 30 minutes before inoculation



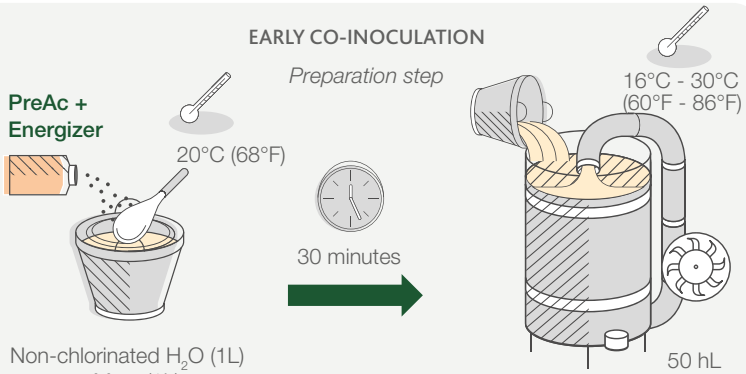
- Early co-inoculation
  24 - 48 h after start of AF.
  (16 - 30°C/ 60 - 86°F)
- Late co-inoculation
  1.010 density (<26°C / < 78°F).
- Sequential inoculation
  After AF, on running off
  (20°C - 22°C / 68 - 71°F).
- Curative inoculation
  (20°C - 22°C / 68 - 71°F).

LACTOENOS® PREAC

INOCULATION WITH ACCLIMATISATION

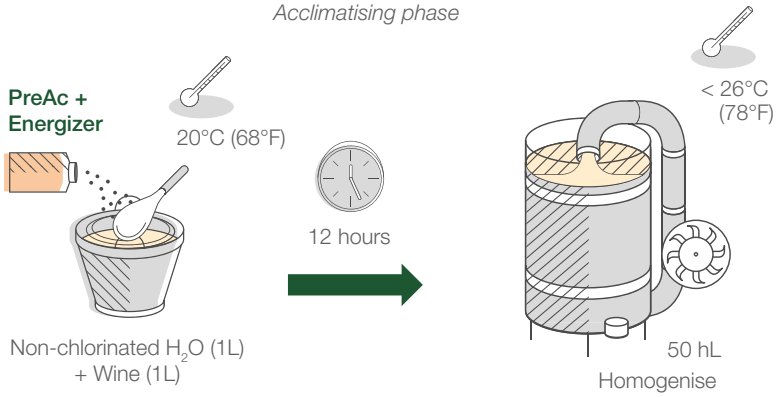
EARLY CO-INOCULATION

Preparation step



LATE CO-INOCULATION or SEQUENTIAL INOCULATION

Acclimatising phase



Find Out More

Discover our **RESTARTING MALOLACTIC FERMENTATION (MLF) protocol** 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

Annex VIII Part I Section C of Regulation (EU) 1308/2013 supplemented by Regulation (EU) 2019/934 allows the use of tartaric acid, malic acid and lactic acid for the acidification of musts and wines.

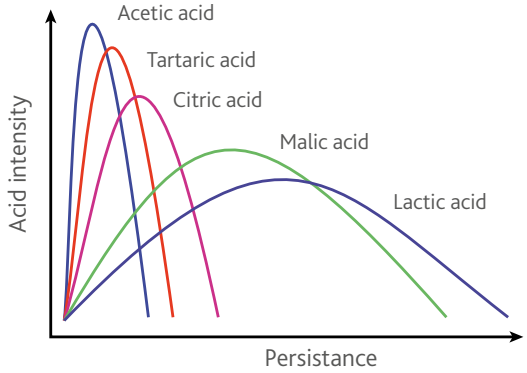
Acidification of fresh grapes, grape must, partially fermented grape must, new wine still in fermentation, and wine.

- 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 (Appendix V, section C, point 7).

Acidification of musts and wines



Lactic: soft, balanced.
Tartaric: lively, immediate.
Malic: sharp, less immediate.

TOOLS FOR ACIDIFICATION IN MUSTS AND WINES

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/L	$C_3H_6O_3$ 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.	- During MLF, the L form of malic acid is consumed by the lactic acid bacteria.	+++	Malic and lactic acids interact with bacterial metabolisms. However, the increasingly frequent control of MLF (use of selected starters) and compliance with hygiene rules mean that the risk of such spoilage is very low.
Organoleptic impact	Lively. Immediate. Dryness. Hardness.	Freshness. Greenness.	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.*

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