

2025

# STILL WINE CATALOGUE



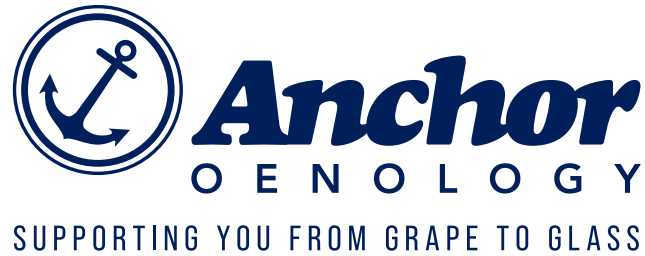
**Anchor**  
O E N O L O G Y



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# A COLLABORATION OF BRANDS FOR STILL WINE PRODUCTION

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Anchor Oenology provides products that support you from grape to glass in the production of white, rosé and red wines.

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**NOTE:** For information on all things sparkling wine related, production, products and protocols, see our *AO Sparkling Wine Catalogue 2025*.

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## ANCHOR OENOLOGY



# THE ANCHOR OENOLOGY TEAM

» For Harvest 2025, we will again be supporting you from grape to glass!



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# ORDERS AND DELIVERIES

## ACCOUNT DETAILS

- Open an account before the harvest season to allow adequate time for a credit check.
- Banking details:
  - Beneficiary:** Rymco (Pty) Ltd t/a Anchor Yeast
  - Bank:** Nedbank
  - Branch:** 198765 (Industria)
  - Account type:** Current
  - Account no.:** 196-328-3910
  - Reference - account holder:** Account number starting with SA
  - Reference - COD customers:** Invoice number (delivery after proof of payment)
  - Payment terms:** 30 days from account statement
- Normal terms and conditions apply for all account holders, otherwise COD.

## ORDERS & CONTACT DETAILS

- **Online orders:** Place your order at [www.anchoroenology.com](http://www.anchoroenology.com)
- **Email orders:** [biotechorders@anchor.co.za](mailto:biotechorders@anchor.co.za)
- **General enquiries:** 021 534 1351 | [oenology@anchor.co.za](mailto:oenology@anchor.co.za)
- **Website:** [www.anchoroenology.com](http://www.anchoroenology.com) (order online)
- **Facebook:** @AnchorOenology

## FINE PRINT

- No unused product will be taken back after the season.
- Products have adequate shelf-life, when stored correctly.

## CERTIFICATION & DOCUMENTATION

- **Enquiries:** Your Technical Sales Manager
- **Download:** Visit [www.anchoroenology.com](http://www.anchoroenology.com)

## DELIVERY SCHEDULE DURING HARVEST

- ★ **These areas will have 2 deliveries per day:**
  - Morning delivery order needs to be placed by 13:00 the previous day.
  - Second delivery for orders placed after 13:00 and before 08:00.

● **Order deadlines** for each delivery day of the week.

DELIVERY AREA	DAY OF WEEK FOR DELIVERY				
	Monday	Tuesday	Wednesday	Thursday	Friday
★ Wellington, Paarl, Franschhoek, Stellenbosch, Windmeul, Simondium, Klampmuts, Vlottenburg	● Mon 08:00	● Mon 13:00	● Tue 13:00	● Wed 13:00	● Thu 13:00
★ Kuilsriver, Durbanville, Philadelphia, Vredehoek, Bellville, Saltriver	● Mon 08:00	● Mon 13:00	● Tue 13:00	● Wed 13:00	● Thu 13:00
★ Worcester, Rawsonville, Villiersdorp, Robertson, Montagu, Bonnievale, Goudini, Swellendam, Hexriver Valley, Tulbagh	● Mon 08:00	● Mon 13:00	● Tue 13:00	● Wed 13:00	● Thu 13:00
Wolseley		● Mon 13:00		● Wed 13:00	
Caledon, Bredasdorp, Struisbaai, Struisbaai, Napier, Ceres			● Tue 13:00		
De Doorns, Touwsriver				● Wed 13:00	
McGregor			● Tue 13:00		
Darling, Malmesbury, Langebaan, Riebeeck West, Porterville, Piketberg	● Fri 13:00 Delivery Mon/Tue				● Thu 13:00
Riebeeck Kasteel		● Fri 13:00	● Tue 13:00		
Somerset West, Gordon's Bay, Strand		● Mon 13:00	● Tue 13:00		
Kleinmond				● Tue 13:00	
Elgin, Grabouw, Bot River		● Mon 13:00			
Hermanus		● Mon 13:00	● Tue 13:00 Delivery Wed/Thu		
Constantia			● Tue 13:00	● Wed 13:00	● Thu 13:00
Noordhoek				● Wed 13:00	
Tokai			● Tue 13:00		
Vredendal, Lutzville, Klawer				● Wed 13:00	

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PRODUCTS TO  
IMPROVE FERMENTATION

# INTRODUCTION

## NUTRITIONAL NEEDS OF THE YEAST

### NITROGEN - the key nutrient

- Strongly impacts the yeast population.
- Impacts the fermentation kinetics.
- Impacts the organoleptic quality of the finished wine.

#### *Organic nitrogen*

- Source: autolysed yeast.
- Twice as effective as inorganic nitrogen in terms of fermentation kinetics.
- Amino acid precursors of thiol and ester aromas.
- Can be used in organic and NOP winemaking since 2019.

#### *Inorganic or mineral nitrogen*

- Diammonium phosphate (DAP) or diammonium sulphate (DAS).
- Suitable nutrient after the first third of alcoholic fermentation.

### ERGOSTEROL - the most important lipid

- Indispensable to the yeast because it is an essential component of the yeast cell membrane.
- Maintains the membrane fluidity (resistance to ethanol, enhanced fermentation capacity).
- Ergosterol deficiency can lead to: the inability of the yeast to utilise organic nitrogen; a low yeast population; slow or stuck alcoholic fermentation.
- Severe clarification can increase the risk of sterol deficiency.
- Natural source: yeast autolysates.

### VITAMINS (B1, B3, B5 and B8)

- Thiamine (B1): The only vitamin authorised for direct addition.
- Biotin (B8), pantothenate (B5) and nicotinic acid (B3) are naturally present in yeast autolysates.
- Necessary for yeast multiplication.
- Indispensable for maintaining yeast viability when the must is very rich in assimilable nitrogen.

### MINERALS (magnesium and zinc)

#### *Magnesium*

- Key role in glycolysis (enzymatic cofactor).
- Responsible for yeast resistance to high alcohol levels.

#### *Zinc*

- Essential for glycolysis/alcoholic fermentation.
- Makes the yeast more resistant to stress.
- Improves the yeast fermentation capacity.
- Increased production of fermentation aromas.
- Natural source: yeast autolysates.

## TYPE OF COMMERCIAL PRODUCTS

Commercially available yeast nutritional options have undergone an evolution, shifting from the exclusive use of DAP to the wide variety of products currently available. These include:

### REHYDRATION NUTRIENTS

- Mainly inactivated yeast supplemented with either minerals or vitamins or both.
- Contains no ammonium salts.
- Cell membranes damaged during inactivation allow vitamins, minerals, amino acids and nucleic acids to 'leak' out of the cells. These can enhance fermentation efficiency and aroma and flavour production.
- *When to use:* Juice with a very low YAN; stressful must conditions; to enhance volatile aroma production.



## REHYDRATION PROTECTANTS

- Partially autolysed inactivated yeast.
- Partial autolysation makes sterols in the cell membrane more readily available for the fermenting yeast.
- Enhance tolerance to alcohol.
- *When to use:* Together with certain yeast strains when used under stressful fermentation conditions (low/high fermentation temperatures and high sugar musts); providing vitamins and minerals to fermenting yeast.

## COMPLEX YEAST NUTRIENTS

- Mainly consist of inactivated yeast and ammonium salts (DAP/DAS).
- Good source of vitamins and minerals.
- Can be enriched with added vitamins (usually thiamine) and minerals (usually magnesium).
- High concentration of organic nitrogen (amino acids).
- *When to use:* To support yeast strains with high nutritional requirements; low YAN musts; to prevent sluggish fermentations; to prevent the production of sulphur off-odours.

## YEAST HULLS

- Good adsorption capacity to bind to toxic medium chain fatty acids.
- Detoxification of fermentation environment.
- If part of the cell membrane is included, they can be a good source of sterols and lipids.
- *When to use:* Prevent or treat sluggish or stuck fermentations via detoxification; prevent sluggish/stuck malolactic fermentation; treat tainted wines (removal of cork-taint anisoles and Ochratoxin A).

The selection of yeast strain and specific fermentation conditions will dictate which product(s) is/are more suitable to use.

# CATALOGUE

## GLUTATHIONE SOLUTIONS

In must and wine, glutathione is present in the reduced form (GSH) or the oxidised form (GSSH) (two glutathione molecules linked with a sulphide bridge). Only the reduced GSH form has highly effective anti-oxidant properties that can positively influence wine aroma, longevity and quality. The natural GSH concentration in must is dependent on the grape variety, viticultural practices and winemaking practices.

### Anti-oxidative mechanisms

- Caftaric acid is one of the main phenols in must that is most susceptible to oxidation.
- GSH can react with caftaric acid via its -SH group.
- This reaction forms the Grape Reaction Product (GRP).
- This GRP is stable and colourless.

Due to the fact the GSH naturally present in the wine is highly sensitive to oxidation, research has shown that it is beneficial to supplement the must with additional glutathione. Whilst the use of pure glutathione in wine production is not approved, glutathione-rich inactivated yeast is approved for use. Although inactivated yeasts are intact cells, their cell membranes that are responsible for regulating the flow of molecules in and out of the cell, are damaged due to the inactivation process. Small molecules like vitamins, minerals, amino acids and GSH, can leak out and have a positive impact on the wine. The glutathione accumulated intracellularly during the production process of the inactivated yeast is then released in the must.

### Benefits of increased glutathione levels during winemaking

- Increased colour stability and protection in white and rosé wines.
- The preservation of volatile thiols during ageing.
- Significant increase in esters and terpenes.
- More aroma intensity and balance.
- Increased longevity of the wine with a decrease in the loss of fruity aromas.
- Increased volume and mouthfeel due to the release of polysaccharides.

## Addition of glutathione-rich inactivated yeast

Research has shown that the best results with glutathione-rich inactivated yeast are reported when additions take place in the early stages of alcoholic fermentation. It is also important to ensure that the yeast has sufficient nutrition in the forms of organic and inorganic nitrogen, to avoid the yeast using glutathione as a nutrient source.

### | IOC GLUTAROM

**Early preservation and protection of aroma in white and rosé wines.**

- Glutarom is a specific nutrient based on inactivated yeasts rich in glutathione and polysaccharides. Due to its formulation and preparation process, it protects against oxidation and loss of aroma.
- Application: Prevents the oxidation of polyphenols; grape varieties with low levels of glutathione will be better protected against oxidation; enhances varietal thiols; ensures the rapid release of yeast polysaccharides that will protect and stabilise aromas over time; add at the start of alcoholic fermentation or even before yeast inoculation; in the case of sluggish fermentation, consider a late addition in order to preserve the aromas in musts more vulnerable to oxygen.
- Dosage: 15 - 30 g/hL
- SKU: 1 kg

## YEAST REHYDRATION

### | ANCHORFERM

**Enhance yeast viability.**

- A rehydration nutrient to increase yeast viability and fermentation capabilities.
- Composition: Inactivated yeast and thiamine.
- Application: Thiamine stimulates yeast growth and metabolism; inactivated yeast are rich in vitamins and minerals and other trace elements required for optimum yeast performance, as well as reducing the risk of stuck fermentation and off-odours; sterols and long chain fatty acids improve alcohol tolerance.
- Dosage: 20 g/hL
- SKU: 1 & 5 kg

### | ANCHOR REVIVE

**Enhance yeast viability and wine quality.**

- A 100% yeast-derived formulation that provides high levels of essential growth factors like vitamins (pantothenate and biotin) and minerals that act as enzymatic co-factors (magnesium, manganese and zinc).
- Composition: Inactivated and autolysed yeast.
- Application: Improve yeast acclimatization, implantation, viability and metabolism; enhanced fermentative aromas due to optimised yeast metabolism; precursor assimilation optimise the release of varietal aroma compounds by the yeast.
- Dosage: 30 g/hL
- SKU: 1 & 5 kg

## NUTRITION

Determine the nitrogen deficiency for a yeast with moderate requirements, based on the YAN of the must and the potential alcohol content:

ASSIMILABLE NITROGEN OF THE MUST	POTENTIAL ALCOHOL CONTENT			
	< 12.5%	12.5 - 13.5%	13.5 - 14.5%	> 14.5%
> 200 mg/L	No deficiency	No deficiency	Low	Moderate
150 - 200 mg/L	No deficiency	Low	Moderate	High
120 - 150 mg/L	Low	Moderate	High	Very high
90 - 120 mg/L	High	High	Very high	Very high
< 90 mg/L	Very high	Very high	Extreme	Extreme

## Organic

### NATUFERM PURE

#### A nutrient source of organic nitrogen.

- A nutritional source that is especially suitable in the case of nitrogen deficiency and/or high potential alcohol percentage.
- Composition: Autolysed yeast.
- Application: Ensures regular, complete alcoholic fermentation; ensures the yeast can withstand nitrogen deficiencies and/or must with high potential alcohol; preserves and enhances the aromatic typicity of grape varieties; contributes to the biosynthesis of esters; high in amino acids; high in trace elements.
- Dosage: 20 - 40 g/hL (depending on the must's initial YAN content and/or potential alcohol strength).
- SKU: 1 kg

### NATUFERM BRIGHT

#### Enhanced ester and thiol production in white and rosé wines.

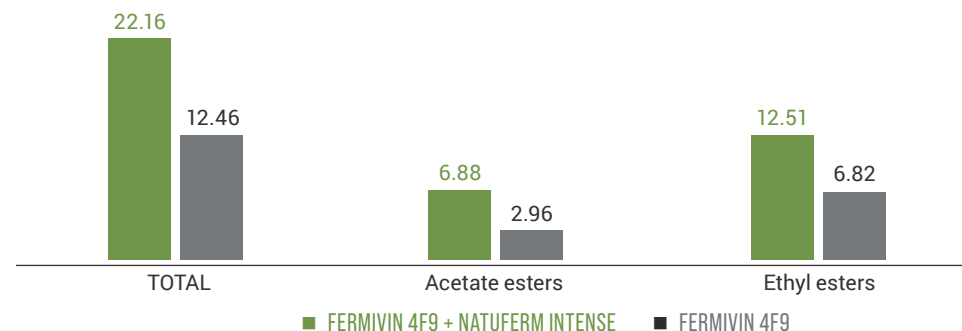
- Natuferm Bright is very high in amino acids (aroma precursors), which play an important role in assisting the yeast in the release of thiols during alcoholic fermentation. Its high ergosterol content, essential for yeast cell functioning, also make it a suitable nutrient for challenging fermentation conditions.
- Composition: Autolysed yeast.
- Application: Promotes the release of aromatic thiol and ester compounds; maintains the ability of the yeast to ferment sugars; corrects small assimilable nitrogen deficiencies.
- Dosage: 20 - 40 g/hL
- SKU: 1 kg

### NATUFERM INTENSE

#### Enhanced aroma intensity in white and rosé wines.

- Natuferm Intense is a yeast derivative naturally rich in amino acids, vitamins, zinc and magnesium. It supports yeast in the production of qualitative wines.
- Composition: Inactivated and autolysed yeast.
- Application: Enhances the aroma intensity and complexity by promoting the production of esters and acetates during alcoholic fermentation; enriches wine with ethyl esters, stable aromas over time and preserves the fruitiness; improves the complexity and mouthfeel, as if wine was aged on lees; ensures a steady kinetic for regular growth of biomass, avoiding yeast starvation and stuck fermentation; adapted to barrel fermentation.
- Dosage: 40 g/hL
- SKU: 1 kg

An Italian Muscat wine treated with 40 g/hL of **NATUFERM INTENSE** at inoculation.  
Positive volatile aroma compounds in OAV.



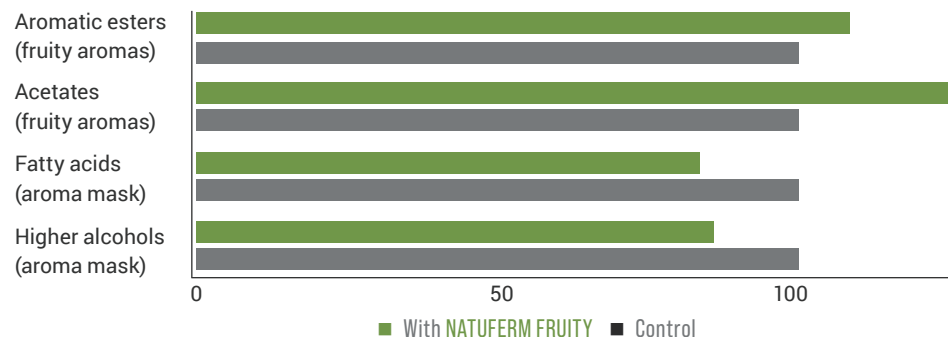
### NATUFERM FRUITY

#### Enhanced fruitiness and longevity of aromas in red wines.

- Natuferm Fruity is selected for its richness in amino acids that act as precursors for the production of ester aromas during alcoholic fermentation.
- Composition: Autolysed yeast.
- Application: Provides organic nitrogen, an efficient form of YAN to ensure achievement of fermentation; rich in ergosterols to preserve yeast membrane fluidity and viability until the end of fermentation; naturally rich in vitamins; naturally rich in amino acids, precursors of fruity esters; tendency to preserve PDMS to increase the longevity of fruity aromas and impact the qualitative ageing aromas of the wine; efficient fermentation avoids the formation of unwanted reductive aromas.
- Dosage: 20 - 40 g/hL
- SKU: 1 kg

Fruitiness and its preservation over time in red wines.

Syrah fermented with **NATUFERM FRUITY** is richer in fruity aromas (esters and acetates).  
The aroma intensity is greater due to the reduced presence of aroma masking agents).



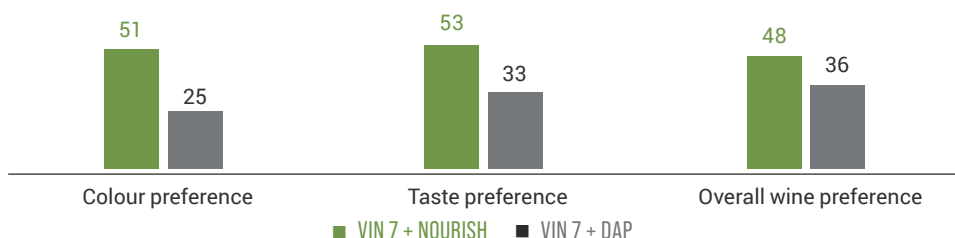
## Complex

### ANCHOR NOURISH

#### Complete fermentation and quality yeast performance.

- Nourish is a formulation that provides a complex source of organic and inorganic nitrogen during fermentation. It also delivers essential vitamins, minerals, trace elements, amino acids and stress resistance factors like sterols and unsaturated fatty acids.
- Composition: Inactivated yeast, DAP and thiamine.
- Application: Regulated yeast growth, maintain membrane permeability and improve alcohol tolerance; compensate for nitrogen deficient must; reduce the risk of sluggish or stuck fermentations; ensure efficient, balanced and complete alcoholic fermentation; provide optimal nutrition that allow for greater aroma intensity, balance and complexity; result in fresher, fruitier and less vegetal wine aromas; improve overall wine quality.
- Dosage: 20 - 40 g/hL
- SKU: 1 & 5 kg

Ranking preference test with VIN 7 with **NOURISH** compared to DAP.



### ANCHOR CONQUER

#### Secure fermentation under challenging conditions.

- Conquer is a complete and complex nutrient formulation that ensures optimal yeast nutrition, especially for more challenging fermentation conditions.
- Composition: Inactivated and autolysed yeast, DAP and thiamine.
- Application: Survival factors ensure the optimal functionality of the cell, especially under stressful fermentation conditions; ensure a balanced and complete fermentation; avoid sluggish or stuck fermentations; provide essential elements that reduce stress responses from the yeast; prevent the formation of undesirable metabolic by-products.
- Dosage: 20 - 40 g/hL
- SKU: 1 & 5 kg

Total quality-enhancing volatile aroma compounds (mg/L). With **CONQUER**, aroma production is increased by up to 40%, compared to a competitor product or DAP.



## DETOXIFICATION & PROTECTION

### EXTRAFERM D'TOX

#### Remove unwanted compounds from must.

- Consists of pure yeast hulls able to improve wine quality by adsorbing toxic compounds from must and wine.
- Composition: Yeast hulls.
- Application: Removal of medium chain fatty acids that could negatively impact the viability of the yeast; enhance fermentation capabilities of the yeast.
- Dosage: 20 - 40 g/hL
- SKU: 1 kg

Medium chain fatty acids (C<sub>6</sub>, C<sub>8</sub> and C<sub>10</sub>) can negatively influence the alcoholic and malolactic fermentations by interfering with the ability of the cell to take up substrates, as well as negatively influence the growth of the yeast and bacteria. A dosage of 20 g/hL **EXTRAFERM D'TOX** can reduce the fatty acid concentration by almost 30%.

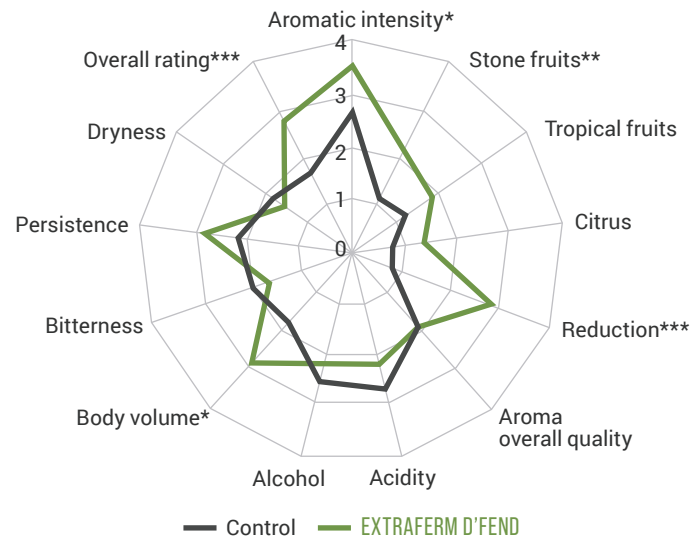


## EXTRAFERM D'FEND

### Protects against oxidation.

- A unique blend of inactivated and autolysed yeast, rich in antioxidant nucleophilic compounds. It preserves fruit and freshness, clean aromas over time and the palate is round and full.
- Composition: Inactivated and autolysed yeast.
- Application: Protects white and rosé wines from oxidation; immediate and long-lasting protective effect during wine ageing; gives roundness to wines, the aromas are clean, the palate is persistent and fuller bodied; prevents oxidation of wines with low or no SO<sub>2</sub>, during ageing and storage; Extraferm D'fend should be added just before the end of alcoholic fermentation or to the wine.
- Dosage: 20 - 30 g/hL
- SKU: 1 kg

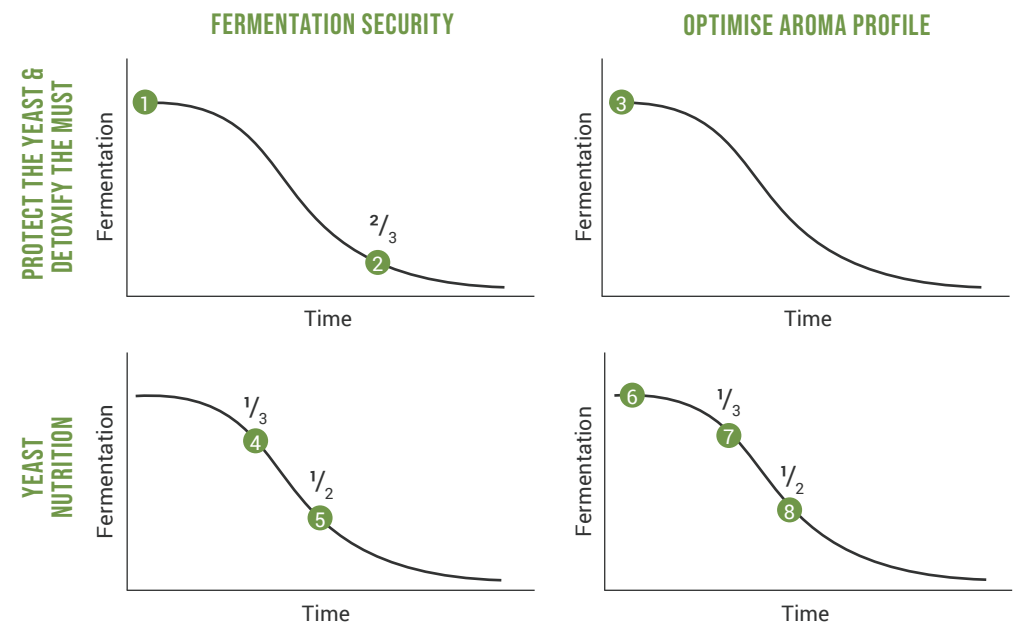
Verdejo wine from Spain without and with **EXTRAFERM D'FEND** at 20 g/hL.  
Tasting (11 experts) after 12 months in bottle.



## PRACTICAL CONSIDERATIONS

### APPLICATIONS (see reference numbers in graphs)

- 1 **Rehydration:** 20 g/hL **ANCHORFERM**.
- 2 **At 2/3 of fermentation:** 20 - 40 g/hL **EXTRAFERM D'TOX**
- 3 **Rehydration:** 30 g/hL **REVIVE**.
- 4 **During 1/3 of fermentation:** 20 - 40 g/hL **NATUFERM PURE** (normal conditions) **OR** 20 g/hL **CONQUER** (challenging conditions).
- 5 **At 1/2 of fermentation:** 20 g/hL **CONQUER** (challenging conditions).
- 6 **At the beginning of fermentation:** 15 - 20 g/hL **NATUFERM BRIGHT** (white & rosé must) **OR** 40 g/hL **NATUFERM INTENSE** (white & rosé must) **OR** 20 - 40 g/hL **NATUFERM FRUITY** (red must) **AND** 20 g/hL **NOURISH** (if organic nutrition is insufficient).
- 7 **During 1/3 of fermentation:** 15 - 20 g/hL **NATUFERM BRIGHT** (white & rosé must).
- 8 **At 1/2 of fermentation:** 20 g/hL **NOURISH** (when organic nutrition is insufficient).



# PRODUCT SUMMARY

APPLICATION	FERMENTATION IMPROVEMENT PRODUCTS	Nitrogen source		Ingredients						Wine		
		Organic	Inorganic	Ergosterol (lipids)	Amino acids	Thiamine	Mg/Zn	Other vitamins	Other minerals	White	Rosé	Red
REHYDRATION	ANCHORFERM	■		++	++	+	+	+		■	■	■
	ANCHOR REVIVE	■		+++			+			■	■	■
NUTRITION	ANCHOR NOURISH		■		++	+	+	++	++	■	■	■
	ANCHOR CONQUER		■	++	+++	+	+	++	++	■	■	■
	NATUFERM PURE	■		+	++	+	+	++	+	■	■	■
AROMA & QUALITY ENHANCEMENT	NATUFERM BRIGHT	■		+	+++	+	+	++	+	■	■	
	NATUFERM FRUITY	■		+	+++	+	+	++	+			■
	NATUFERM INTENSE	■		+	+++	+	+++	++	+	■	■	■
DETOXIFICATION	EXTRAFERM D'TOX			+++						■	■	■
PROTECTION	EXTRAFERM D'FEND	■		++	+					■	■	

3

YEAST FOR  
ALCOHOLIC FERMENTATION



# INTRODUCTION

The reason for the selection of a commercial, cultivated yeast culture for inoculation, is the fact that they are very well characterised in terms of their sensory contributions during the fermentation. Significant compounds produced during fermentation include thiols, esters, higher alcohols, volatile acids, aldehydes and terpenes. Research has shown that the yeast has a distinct influence on the final wine aroma profile and the long term effects are only detectable 6 - 12 months after fermentation.

## SPONTANEOUS FERMENTATIONS

- Require excellent fruit quality (no rot, spoilage, damage or split berries).
- More time consuming.
- Difficult to control/predict.
- Greater risk of stuck/sluggish fermentations.
- Perceived to be a more accurate reflection of *terroir*.
- Less repeatability from vintage to vintage.
- Different yeast populations can add to complexity, texture and mouthfeel.
- Larger risk for spoilage.

## INOCULATED FERMENTATIONS

- Controlled and complete fermentation process.
- Consistent style and quality.
- Shorter lag phase and duration of fermentation.
- Sluggish or stuck fermentations unlikely.
- More tolerant to grape defects and nutritional deficiencies.
- More temperature and SO<sub>2</sub> tolerant.
- Enhanced aromatics, colour and varietal characteristics.
- Predictable sugar to alcohol conversion rate.

## YEAST MECHANISMS FOR MODIFYING WINE AROMA AND FLAVOUR

- Secreting enzymes that liberate aroma-active compounds from precursors.
- Transforming existing grape-derived compounds to aroma-active compounds.
- Synthesising aroma compounds (*de novo*).
- Releasing macromolecules (mainly during autolysis).

With so many options and constant innovations in the area of fermentation, it is important to focus on selecting the correct yeast strain for a specific application. In order to do this, consider the variety/cultivar, the desired style of wine and the fermentation conditions/technical parameters.

## CATALOGUE

Anchor Oenology provides you with three distinct ranges: Anchor, Fermivin and IOC. **Anchor** is selected and developed for the South African industry and the new-world style of wine production. **Fermivin** provides the winemaker with a more traditional option, focusing on yeast strains that were mainly selected from Europe and for producing more varietal-style wines. **IOC** yeast focuses on the production of unique and technical sparkling and still wines.

## BIOPROTECTION AND BIO-ACIDIFICATION

### | IOC GAÏA

[LOW SO<sub>2</sub> WINES]

#### Bioprotection for grapes and must.

- *Metschnikowia fructicola*.
- Sensory: Neutral.
- Application: All varieties; prevent alcoholic fermentation and spoilage.
- Notes: Reduce pre-fermentation sulphiting; combat natural harmful microflora; facilitates the implantation of selected *S. cerevisiae* starter culture; provides microbial security during grape harvest transport, pre-fermentation maceration, maceration, clarification, cold storage, transport of must and air-drying of grape bunches.
- Dosage: 7 - 20 g/hL
- SKU: 500 g



## WHEN AND HOW TO USE GAÏA

- **At the machine during mechanical harvesting:**

*Protect your grapes as early as possible.*

To avoid any proliferation of microorganisms from the harvest and during transport to the cellar.

- **During transport of handpicked grapes:**

*Manage long transport times.*

Suitable for temperatures >15 °C, long transport times, extended waiting times and degraded sanitary conditions.

- **On the grapes during drying:**

*Limit development of Botrytis cinerea during drying process (e.g. Amarone).*

Reduces the development of rot often observed in the drying chambers.

- **At the reception of grapes in the cellar:**

*Protect the must for the duration of the pre-fermentation stages.*

Prevents the activity of spoilage microorganisms or the early start of fermentation.

- **When filling cold pre-fermentation maceration tanks:**

*Fight against rising volatile acidity while limiting the start of fermentation.*

Fight against *Hanseniaspora uvarum* with limited fermentation start, allowing for extraction of anthocyanins during skin contact.

- **In the press:**

*Limit the risks of starting fermentation and reduce SO<sub>2</sub> additions.*

Limits the development of fermentative yeasts, especially in the case of lower SO<sub>2</sub> additions, to allow for good clarification after pressing.

- **After the pressing of white juice for sparkling wines (traditional method):**

*Limit spoilage and control the sensory profile.*

With global warming, increased pH levels and the desire to limit SO<sub>2</sub> concentrations, an addition of Gaïa at the beginning when filling the settling tank can help to reduce yeast or acetic acid bacteria growth and limit unwanted aromatic development that will harm the elegance and finesse of sparkling wines made in the traditional method.

- **During the maceration of white and rosé must:**

*To limit the risk of fermentation starting and to reduce SO<sub>2</sub> usage.*

Limits the development of fermentative yeasts, especially in the case of reduced sulphur levels or too high temperatures, or in the case of delayed processing.

- **Before yeast inoculation, on must used to produce sparkling wines through the Charmat method:**

*Avoid the start of fermentation and the production of ethanal during must warming.*

During this very specific process, the warming of the must (stored at cold temperature) can last up to 72 hours and can cause the development of wild microorganisms as a source of ethanal. The addition of Gaïa in the cold must before starting the process can avoid this.

- **On the juice during storage:**

*Protection of juice during storage or transport over extended periods.*

## IOC CALYPSO NEW

[LOW SO<sub>2</sub> WINES]

### Enhancing and protecting of aromas against oxidation during juice stabulation on grape lees.

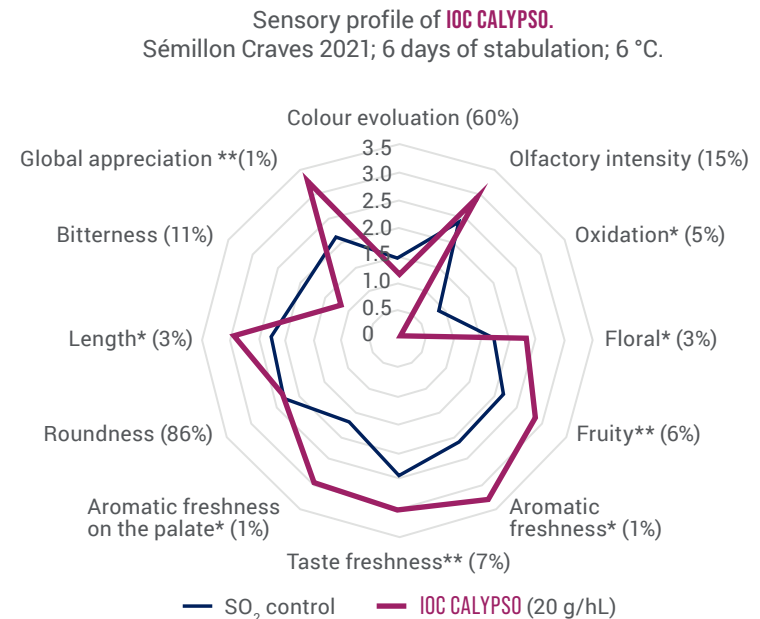
- *Metschnikowia pulcherrima.*

- Application: All grape varieties. Release and protection of aroma compounds; protection against oxidation; limit/reduce SO<sub>2</sub> usage.

- Notes: Add ICO Calypso as early as possible in the press, exiting the press or when filling the tank; follow with *S. cerevisiae* inoculation for alcoholic fermentation; more efficient at low temperatures (<12 °C).

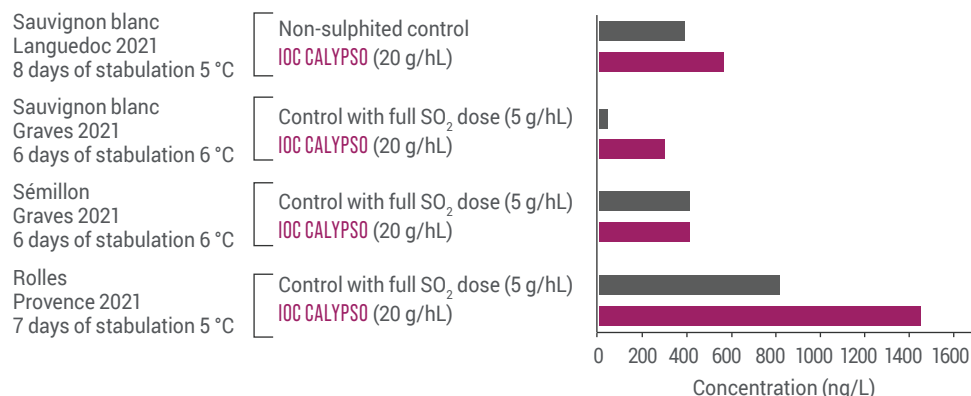
- Dosage: 5 - 20 g/hL

- SKU: 500 g



**IOC CALYPSO** revealing varietal fruity thiols during cold stabulation of white or rosé juices. Experiments carried out on different wineries; results obtained for 3MHA (passion fruit) and 4MMP (boxwood) are similar to those noted here for 3MH (citrus).

Content in 3MH for white wines.



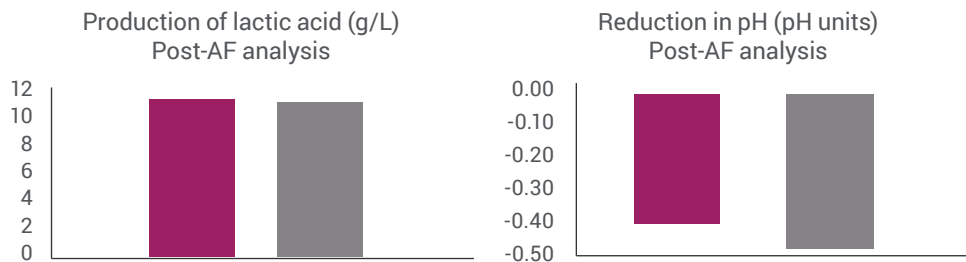
## IOC BOREAL NEW

Contributes to aromatic complexity and increased freshness via bio-acidification.

- *Lachancea thermotolerans*.
- Sensory: Balance and freshness; greater roundness; aromatic complexity.
- Application: All grape varieties. Acidification; microbial stability and bioprotection.
- Notes: Inoculate 24 hours before selected *S. cerevisiae*; ensure temperature of 18 - 25 °C; consider co-inoculation of bacteria in wines that require MLF.
- Dosage: 25 g/hL
- SKU: 500 g

A significant impact on must acidification.

20 g/hL of **IOC BOREAL** at  $T_0$ , then 25 g/hL of **IOC 18-2007** after 48 hours; yeast fed at  $T_0$  and  $1/3$  AF.



■ MERLOT 2018: sugars 239 g/L; pH 3.66;  $T^{\circ}$  = 24 °C  
 ■ MERLOT 2019: sugars 250 g/L; pH 3.54;  $T^{\circ}$  = 24 °C

## NON-SACCHAROMYCES

### FERMIVIN VINEAE

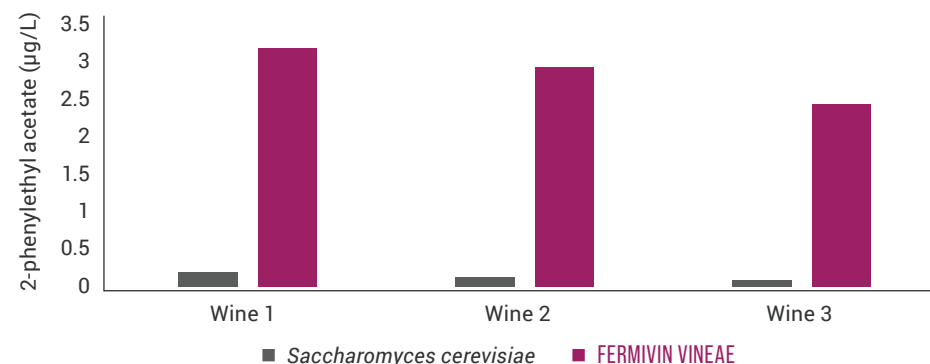
Floral, complex, aromatic wines with mouthfeel and volume.

- A *Hanseniaspora vineae* yeast for white, rosé, red, sparkling wines and ciders to increase aroma (rose, white floral), complexity and texture.
- Application: Produces ten times more phenylethyl acetate and two times more benzenoids which boosts the aroma profile; lysis is about six times faster, this reduces the lees ageing time (compared to *S. cerevisiae*).
- Dosage: 20 g/hL
- SKU: 500 g

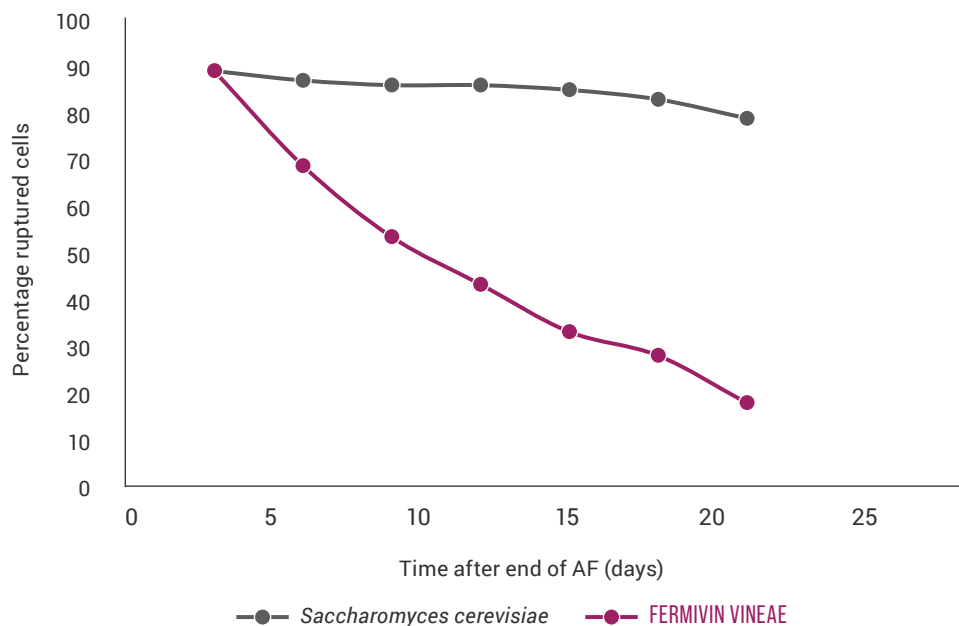
### WINEMAKING WITH FERMIVIN VINEAE

- This yeast ferments till 10% alcohol, whatever the YAN level is. Co-inoculate 80% Fermivin Vineae (20 g/hL) and 20% *S. cerevisiae* (5 g/hL).
- The addition of thiamine will optimize the production of ester aromas.
- The high production of 2-phenylethyl acetate creates aromatic wines, even in neutral varieties.
- Fast autolysis means the strain is well adapted for lees ageing and barrel fermentation.
- The addition of DAP will drastically reduce the viability of this yeast. ONLY ADD DAP after the addition of the selected *S. cerevisiae* strain. This will induce autolysis of the Fermivin VINEAE and as a result hasten its contribution to the mouthfeel.

2-Phenylethyl acetate production with **FERMIVIN VINEAE** compared to *Saccharomyces cerevisiae* yeast strains.



Yeast autolysis with **FERMIVIN VINEAE**, in comparison with other yeast strains used.



## WHITE AND ROSÉ WINE

### EXOTICS MOSAIC

**Iconic, barrel-fermented white and rosé wines with intense mouthfeel.**

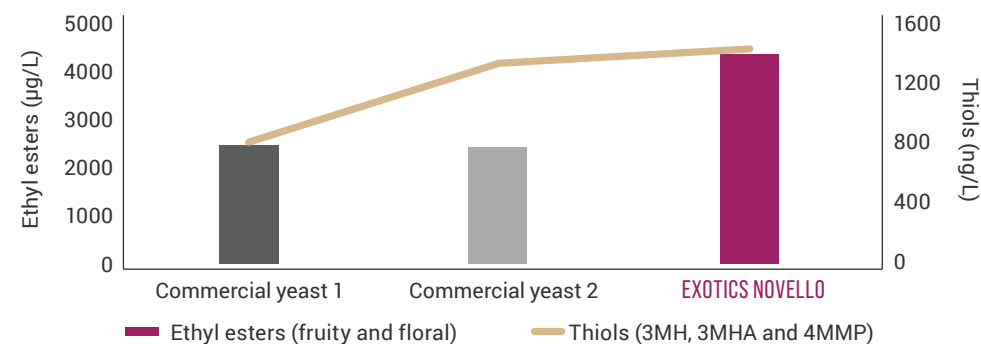
- *S. cerevisiae* x *S. paradoxus* hybrid.
- Sensory: Guava, granadilla, grapefruit, tropical fruit salad and stone fruit.
- Application: Chenin blanc, Chardonnay and Viognier; rosé wines.
- Notes: Fermentations above 18 °C; high glycerol production; good mouthfeel; fructophilic; pectolytic activity.
- Dosage: 30 g/hL
- SKU: 250 g

### EXOTICS NOVELLO

**Iconic, fresh and fruity white and rosé wines with thiol aromas.**

- *S. cerevisiae* x *S. cariocanus* hybrid.
- Sensory: Fruity and floral esters, with enhanced thiol aromas of granadilla and guava.
- Application: Sauvignon blanc, Chenin blanc and Colombard; rosé wines.
- Notes: Cold tolerance of 15 °C; enhanced softness; increased complexity, balanced with freshness.
- Dosage: 30 g/hL
- SKU: 250 g

Aroma impact of **EXOTICS NOVELLO** in Sauvignon blanc.



### ALCHEMY I

**White wines with fruity and floral esters.**

- Yeast blend.
- Sensory: Fruity and floral esters, tropical fruit and citrus aromas and some volatile thiols such as granadilla, grapefruit, gooseberry and mango aromas add to complexity.
- Application: Tank fermentations of Sauvignon blanc, Chenin blanc, Chardonnay, Viognier, Riesling and Pinot gris.
- Notes: Cold fermentation; high alcohol tolerance.
- Dosage: 20 g/hL
- SKU: 1 kg

## ALCHEMY II

### White wines with volatile thiols.

- Yeast blend.
- Sensory: Granadilla, grapefruit, gooseberry and guava.
- Application: Tank fermentations of Sauvignon blanc, Chenin blanc and Colombard.
- Notes: Cold fermentation; high alcohol tolerance; New Zealand style Sauvignon blanc.
- Dosage: 20 g/hL
- SKU: 1 kg

## ALCHEMY IV

### Rosé wines with intense red fruit aromas.

- Yeast blend.
- Sensory: Red fruit aroma intensity like cherry, raspberry, redcurrant and pomegranate, rounded and smooth wines.
- Application: All varieties.
- Notes: Stable esters; wines to be aged; terpenes produced; masks green characters.
- Dosage: 30 g/hL
- SKU: 1 kg

## LEGACY VIN 2000

### Full-bodied white wines with good mouthfeel.

- *S. cerevisiae* x *S. cerevisiae* hybrid.
- Sensory: Fresh pineapple, papaya, grapefruit, tropical fruit and citrus, as well as floral.
- Application: Chardonnay, Chenin blanc and Viognier.
- Notes: Steady fermentation rate; high alcohol tolerance; fructophilic; also suitable for barrel fermentations.
- Dosage: 20 g/hL
- SKU: 1 kg

## LEGACY VIN 13

[RESTART]

### Aromatic white and fruity rosé wines.

- *S. cerevisiae* subsp. *cerevisiae* x *S. cerevisiae* subsp. *bayanus* hybrid.
- Sensory: Fresh fruit salad, pineapple, floral; red fruit in rosé.
- Application: All white varieties; rosé wines.
- Notes: Robust and aromatic; fast fermentation rate; extremely sugar, alcohol and cold tolerant; restart stuck fermentations; good mouthfeel at low fermentation temperatures in rosé production.
- Dosage: 20 g/hL
- SKU: 1 kg; available on pre-order: 5 & 10 kg

## LEGACY VIN 7

### Thiolic white wines.

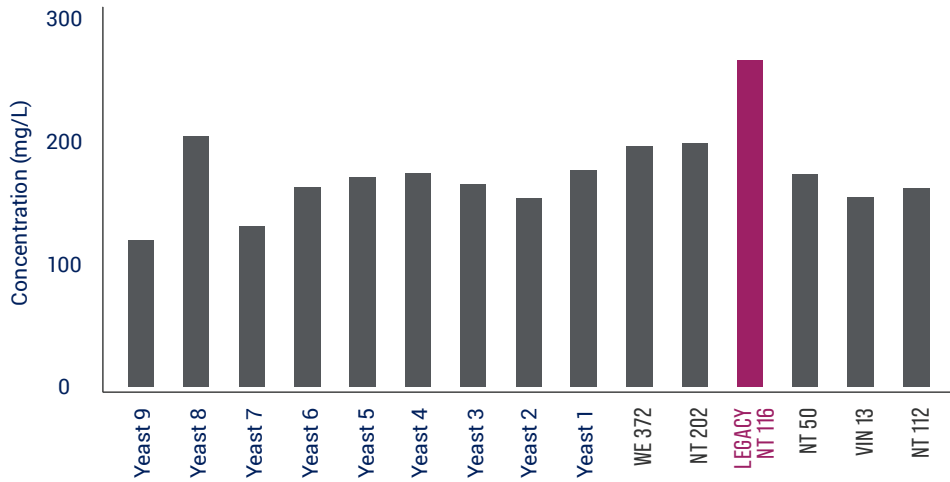
- *S. cerevisiae* (diploid) x *S. kudriavzevii* (haploid) hybrid.
- Sensory: Guava, granadilla, grapefruit and gooseberry.
- Application: Sauvignon blanc, Chenin blanc and Colombard.
- Notes: Can foam and produce volatile acidity under stress conditions; ensure sufficient complex nutrition and temperature control; enhanced 4MMP release.
- Dosage: 20 g/hL
- SKU: 1 kg; available on pre-order: 5 & 10 kg

## LEGACY NT 116

### Crisp, aromatic white and fruity rosé wines.

- *S. cerevisiae* x *S. cerevisiae* hybrid.
- Sensory: Tropical fruit salad, zesty citrus and volatile thiols, like guava and gooseberry aromas, enhances neutral varieties.
- Application: Chenin blanc, Chardonnay, Colombard and Pinot gris; rosé wines.
- Notes: High sugar, alcohol and cold tolerance; intense ester production.
- Dosage: 20 g/hL
- SKU: 1 kg; available on pre-order: 5 & 10 kg

Mannoprotein release by LEGACY NT 116.



## LEGACY WE 14

### Natural sweet white wines.

- *S. cerevisiae*.
- Sensory: Neutral sensory contribution in white wines.
- Application: All white varieties for sweet wine production.
- Notes: Resistant to *Botrytis cinerea* toxins; cold sensitivity allows for the arrest of fermentation at the desired sugar concentration.
- Dosage: 30 g/hL
- SKU: 1 kg

## LEGACY N 96

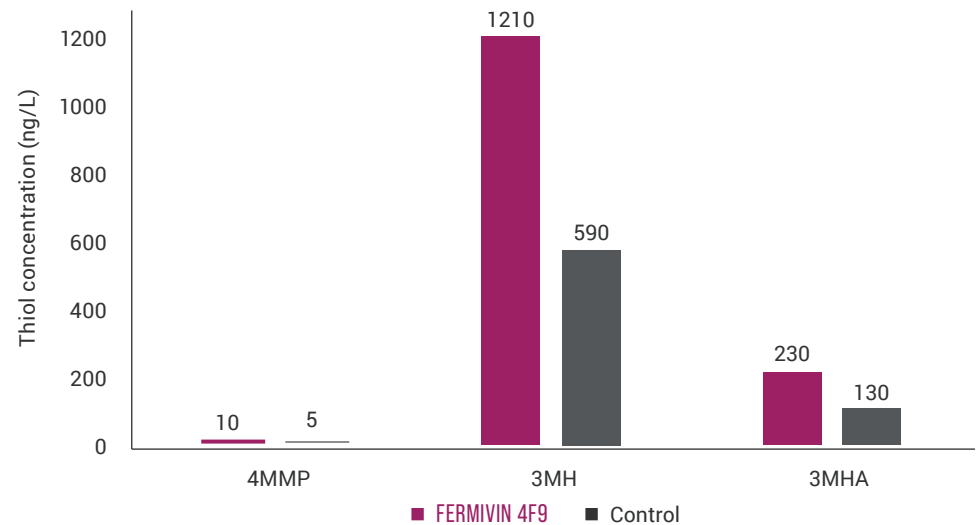
### Strong fermenting, all-purpose wine yeast.

- *S. cerevisiae* subsp. *bayanus*.
- Sensory: Neutral sensory contribution allows varietal character to dominate.
- Application: All white varieties, Cap Classique base wines and cider production.
- Notes: Robust and respects varietal character.
- Dosage: 20 g/hL
- SKU: 1 kg; available on pre-order: 5 kg

## FERMIVIN 4F9 In-Line Ready

### Fruity white and rosé wines with a long finish.

- *S. cerevisiae* subsp. *bayanus*.
- Sensory: Intense, exotic fruit, guava, granadilla, well-balanced and round on the palate.
- Application: All white varieties, especially Sauvignon blanc, Chardonnay and Viognier; wines to be aged on fine lees; thiol-styled rosé wines.
- Notes: For improvement of wine body and volume; good thiol converter; ester production.
- Dosage: 20 g/hL; In-Line Ready dosage: 30 g/hL
- SKU: 500 g



## FERMIVIN XL

### Red-berry style rosé wines.

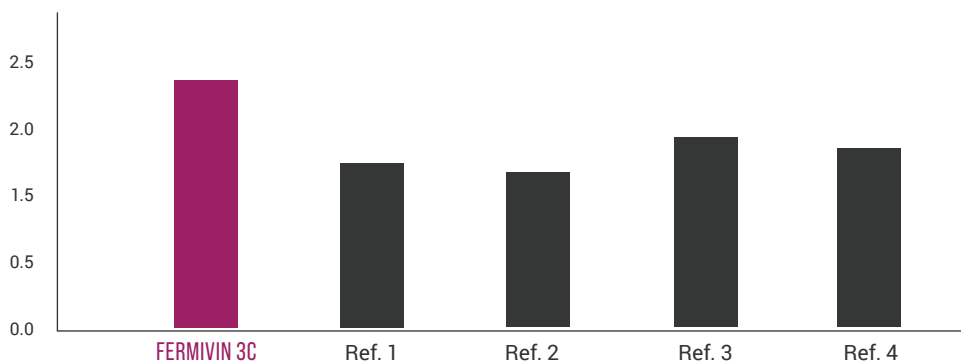
- *S. cerevisiae*.
- Sensory: Red and black fruits, low astringency; roundness on the palate and balance.
- Application: All varieties, especially Cabernet Sauvignon and Merlot.
- Notes: Adsorbs astringent tannins and increases softness.
- Dosage: 20 g/hL
- SKU: 500 g

## FERMIVIN 3C NEW

Elegant, round, fruity and complex white wines.

- *S. cerevisiae*.
- Sensory: Intense, complex pear, floral and citrus and tropical fruit aromas. Round and elegant wines with volume.
- Application: For the production of high-end, round wines with a long finish on the palate. Ideal for barrel fermentation and maturation on lees of varieties like Chardonnay, Viognier, Pinot gris and Chenin blanc.
- Notes: High production of  $\beta$ -damascenone, nor-isoprenoids and polysaccharides. Longer lag phase and slower fermentation kinetics.
- Dosage: 20 g/hL
- SKU: 500 g

Concentration of  $\beta$ -damascenone ( $\mu\text{g/L}$ ) in Chardonnay wines produced by FERMIVIN 3C and compared to various strains (Rhône Valley, France).

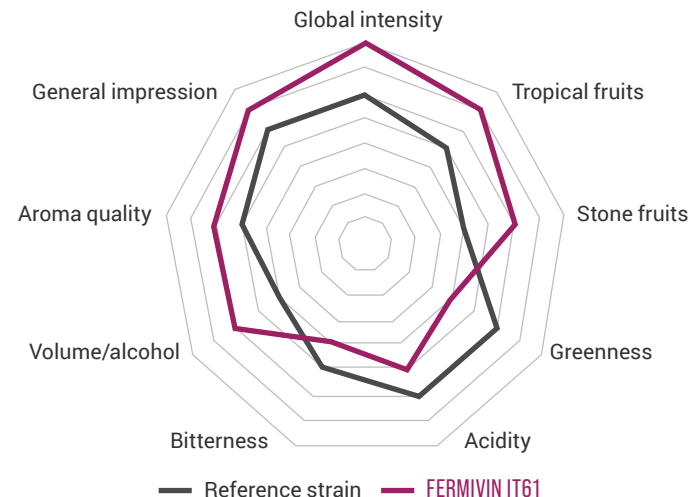


## FERMIVIN IT61 NEW In-Line Read

Intense tropical white and rosé wines.

- *S. cerevisiae*.
- Sensory: Aromatic, fresh and complex wines. Very intense and clean, citrus, zesty and grapefruit notes. Good mouthfeel, long finish and persistence.
- Application: Intense aromatic expression and complexity in white and rosé wines; recommended for tank and barrel fermentations.
- Notes: Aromatic and intense wines with good mouthfeel. Thiol/tropical style wines with lower volatile acidity.
- Dosage: 30 g/hL
- SKU: 500 g

Sensory tasting of wines fermented with FERMIVIN IT61 compared to a reference strain in the market (Italy).



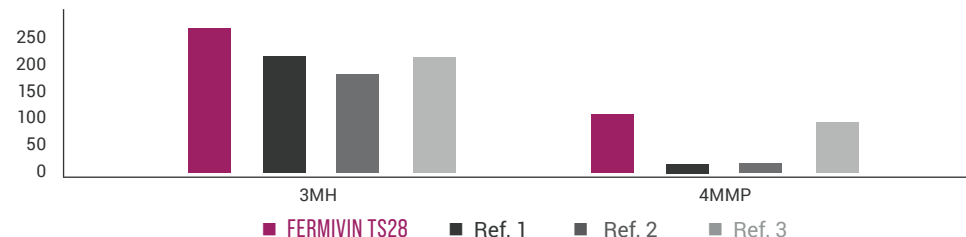
## FERMIVIN TS28 NEW In-Line Read

Green and crisp thiol style wines.

- *S. cerevisiae*.
- Sensory: Intense wines with thiol-type aromas; citrus, tropical fruits and guava.
- Application: Sauvignon blanc, Riesling. Thiol varieties with crisp aromas and good length on the palate.
- Notes: Enhanced production of 3MH and 4MMP.
- Dosage: 30 g/hL
- SKU: 500 g

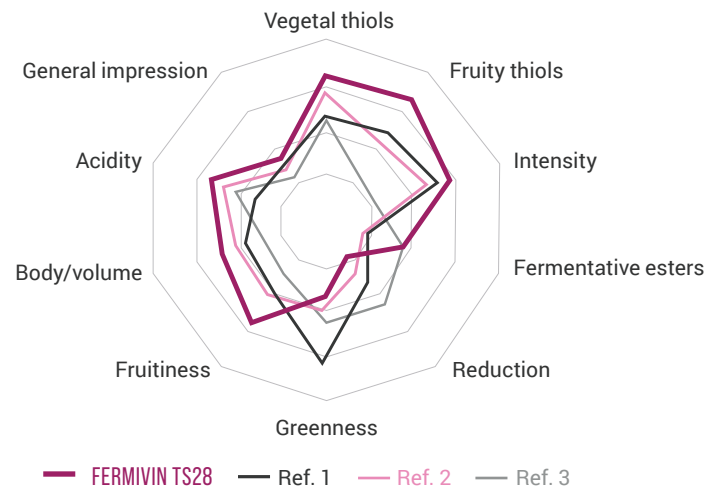
As a result of its  $\beta$ -lyase activity, FERMIVIN TS28 is very effective at bringing out varietal aromas, especially 3MH and 4MMP.

Thiol analysis (ng/L) of Sauvignon blanc wines obtained with FERMIVIN TS28 (Loire Valley, France)



The wines fermented with **FERMIVIN TS28** are described as intensely aromatic fruity wines with citrus, tropical fruits and boxwood aromas.

Tasting of Sauvignon blanc wines organised by IFV (France).



## FERMIVIN PDM In-Line Read

[RESTART]

**Robust and reliable fermentation with neutral sensory contribution.**

- *S. cerevisiae* subsp. *bayanus*.
- Sensory: Clean, varietal aromas respectful of the grape variety.
- Application: Fast and complete alcoholic fermentation in a wide temperature range and high alcohol levels.
- Notes: Complete and very fast fermentation kinetics.
- Dosage: 30 g/hL
- SKU: 500 g; 10 kg

## IOC 18-2007

[RESTART]

**Enhances varietal aromas.**

- *S. cerevisiae*.
- Sensory: Neutral.
- Application: All white varieties.

- Notes: Fermentation under difficult conditions (low temperature and pH; high alcohol); restarting stuck fermentations; respects varietal character.
- Dosage: 20 g/hL
- SKU: 500 g

## IOC B 2000

**Fresh and aromatic white and rosé wines.**

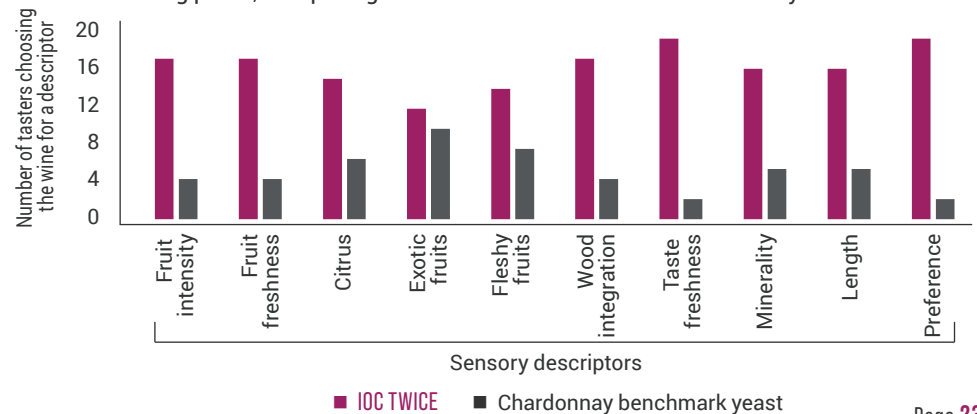
- *S. cerevisiae*.
- Sensory: Ester aromas, varietal notes, intense fruity and fresh bouquet.
- Application: All white varieties; rosé wines from Shiraz, Grenache, Merlot and Cabernet Sauvignon.
- Notes: Use for grapes weak in naturally occurring aromatic precursors; respects varietal character; exotic fruits and citrus aromas in rosé wines.
- Dosage: 20 g/hL
- SKU: 10 kg

## IOC TWICE

**White wines with balanced mouthfeel and freshness.**

- *S. cerevisiae*.
- Sensory: Citrus, lemon, peach, apricot, floral, roundness and freshness.
- Application: Chardonnay, Viognier, Grenache and Sémillon.
- Notes: Creating wines with a balance between volume and fresh finish; increased intensity of complex fruity aromas; increased fattiness and roundness; also suitable for semi-sweet wines.
- Dosage: 20 g/hL
- SKU: 500 g

Sensorial analysis (paired tasting) of a Chardonnay (South Africa) by 20 professionals on a tasting panel, comparing **IOC TWICE** with a benchmark Chardonnay strain.



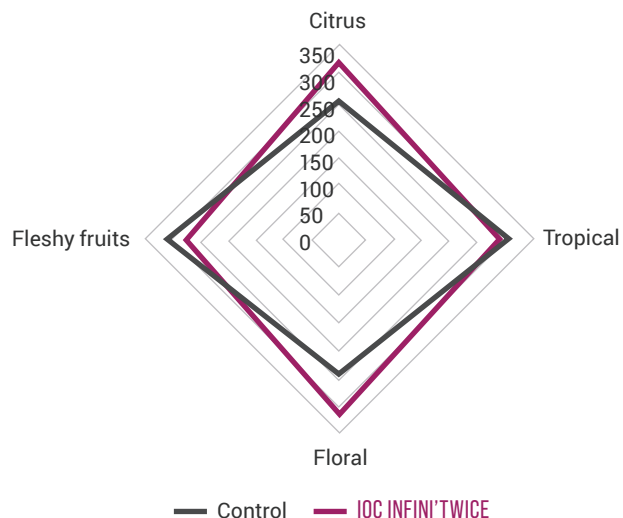


## IOC INFINI'TWICE NEW

White wines with increased body and freshness.

- Blend of *S. cerevisiae*.
- Sensory: Aromas of lemon, exotic fruits, apricot and peach, complemented by light floral notes. Balance between fullness/roundness and freshness.
- Application: Production of fresh, complex and balanced white wines; ideal for Chardonnay, but also Viognier, Sémillon, Grenache etc.
- Notes: Enhanced freshness, balanced with mouthfeel.
- Dosage: 20 - 30 g/hL
- SKU: 500 g

Chardonnay (Burgundy):  
13.6% alc.; YAN: 156 mg/L; no nutrition; T: 15 °C (then 18 °C).  
Impact on aromatic compounds grouped by families.

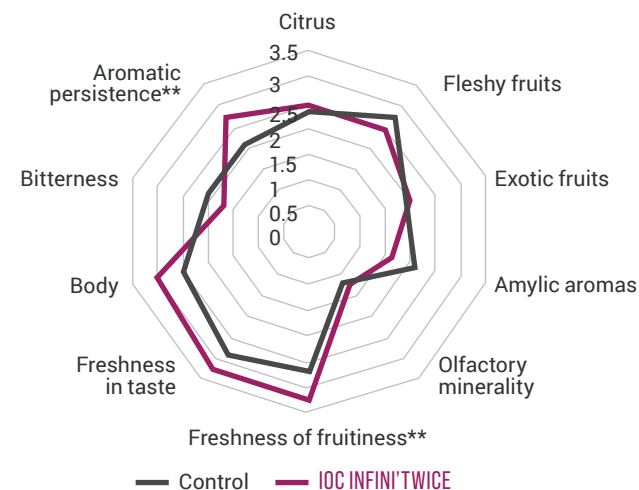


## IOC DYNAMIX NEW

A blend of yeast strains for terroir expression.

- A blend of *S. cerevisiae* strains.
- Sensory: Expresses the microbial biodiversity and originality of each fermentation according to vintage and harvest.
- Application: Ensures the safe completion of fermentation and the absence of off-flavours.
- Dosage: 20 g/hL
- SKU: 500 g

Chardonnay (Languedoc):  
13.7% alc.; YAN : 110 mg/L; nutrition T0 & T1/3 ; T: 18 °C.  
Sensory analysis.

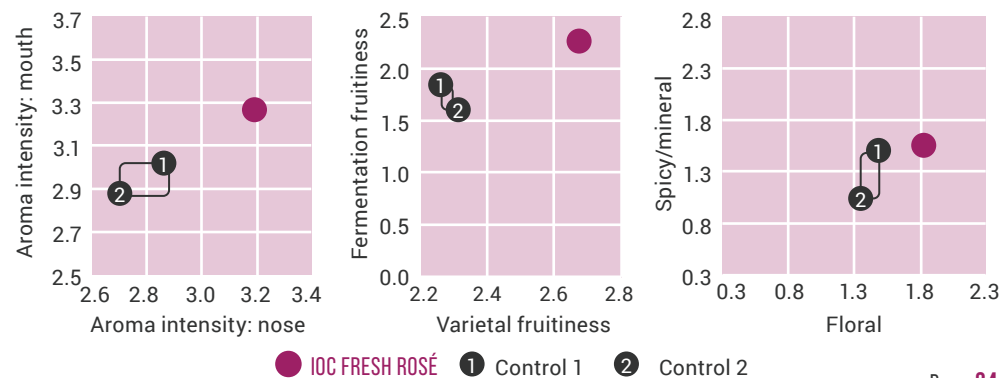


## IOC FRESH ROSÉ

Complex and round rosé wines.

- *S. cerevisiae*.
- Sensory: Floral, citrus, spice and varietal characters.
- Application: Shiraz and Cabernet Sauvignon.
- Notes: Contributes to mouthfeel; reduces aggressive sensations like acidity, dryness and bitterness; expresses the varietal notes; floral notes.
- Dosage: 20 g/hL
- SKU: 500 g

Experiments carried out in Cabernet Sauvignon by die Gironde Chamber of Agriculture in Bordeaux, France, shows the impact of **IOC FRESH ROSÉ** in comparison with two control yeast strains: rosé wine that is more fruity, floral and spicy.





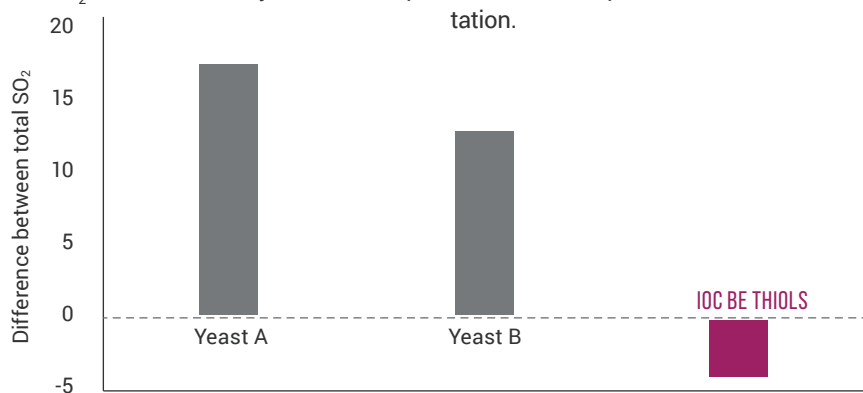
## Low SO<sub>2</sub> solutions

### IOC BE THIOLS

#### White and rosé wines with fruity thiols.

- *S. cerevisiae*.
- Sensory: Citrus, exotic fruits and pineapple.
- Application: All white thiol varieties, like Sauvignon blanc, Colombard, as well as Chenin blanc; rosé wines from Shiraz, Cabernet Sauvignon and Merlot.
- Notes: Reduced formation of ethanal; none to low SO<sub>2</sub> production.
- Dosage: 20 g/hL
- SKU: 500 g

The difference in total SO<sub>2</sub> (mg/L) measured in the must and the finished wine of a Sauvignon blanc (initial sulphur addition of 50 mg/L; pH 3.3; alcohol 12.25%). **IOC BE THIOLS** is a low SO<sub>2</sub> solution with very little to no impact on the total sulphur concentration during fermentation.



## RED WINE

### EXOTICS MOSAIC

#### Iconic, barrel-aged red wines.

- *S. cerevisiae* x *S. paradoxus* hybrid.
- Sensory: Red and black fruits, violets, cocoa aromas and flavours.
- Application: Shiraz, Merlot and Pinotage.
- Notes: Fermentations above 18 °C; high glycerol production; good mouthfeel; fructophilic; partially degrades malic acid.
- Dosage: 30 g/hL
- SKU: 250 g

### EXOTICS NOVELLO

#### Soft, full-bodied and aromatic red wines.

- *S. cerevisiae* x *S. cariocanus* hybrid.
- Sensory: Fresh, fruity and floral red wines with a softened, but structured palate.
- Application: All red varieties.
- Note: Decreased astringency, dryness and bitterness; increased mouthfeel and quality; increased red, black fruit and spicy notes; decreased green and vegetal characters.
- Dosage: 30 g/hL
- SKU: 250 g

### ALCHEMY III

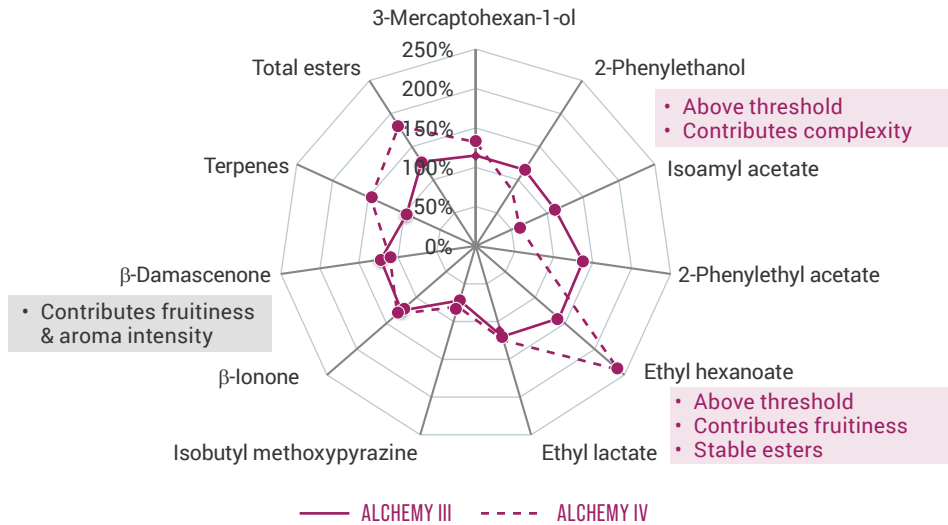
#### Complex red wines.

- Yeast blend.
- Sensory: Complex, rose, floral, fruit and raspberry characters with good structure and body.
- Application: All red varieties.
- Notes: Stable fruit esters; masks green characters; wines with increased ageing potential.
- Dosage: 30 g/hL
- SKU: 1 kg

### ALCHEMY IV

#### Red wines with intense red fruit aromas.

- Yeast blend.
- Sensory: Red fruit aroma intensity like cherry, raspberry, redcurrant and pomegranate, rounded and smooth wines.
- Application: All red varieties.
- Notes: Stable esters; wines to be aged; terpenes produced; masks green characters.
- Dosage: 30 g/hL
- SKU: 1 kg

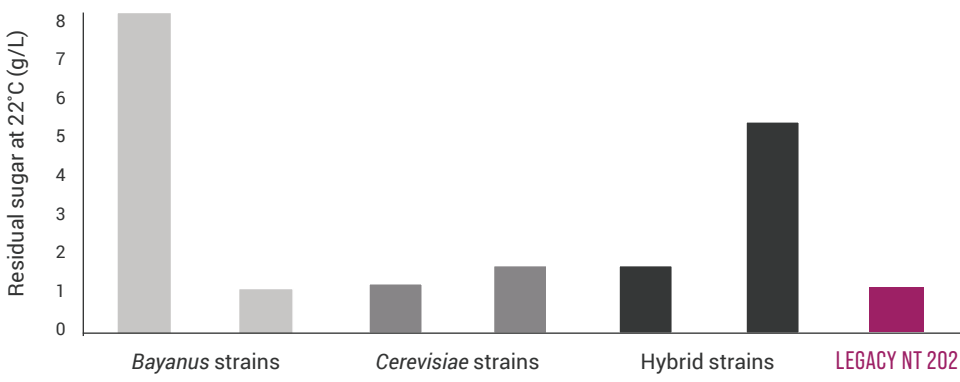


### LEGACY NT 202

**Intense, structured and complex red wines.**

- *S. cerevisiae* x *S. cerevisiae* hybrid.
- Sensory: Red and black fruits, blackberry and blackcurrant, tobacco and prune, as well as fresh plum.
- Application: Pinotage, Merlot and Cabernet Sauvignon.
- Notes: Fructophilic; stimulates MLF.
- Dosage: 30 g/hL
- SKU: 1 kg; available on pre-order: 5 kg

Fructose utilisation by LEGACY NT 202 in a 24 °Balling must with 30 g/L more fructose than glucose (residual sugar at 22 °C).

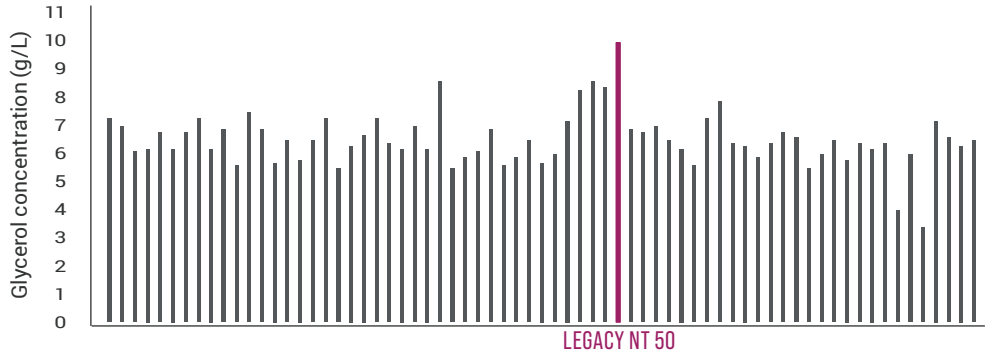


### LEGACY NT 50

**Fruity, rounded and easy drinking red wines.**

- Incomplete *S. cerevisiae* x *S. kudriavzevii* hybrid.
- Sensory: Strawberry, cherry, blackberry, blackcurrant, some spice and chocolate.
- Application: Cabernet Sauvignon, Pinotage, Pinot noir, Merlot, Shiraz and Tempranillo.
- Notes: Suitable with or without barrel ageing; suitable for cold soaking; masks green characters; high glycerol concentration softens the mouthfeel.
- Dosage: 30 g/hL
- SKU: 1 kg; available on pre-order: 5 kg

Glycerol production of LEGACY NT 50 in comparison with 68 other commercial wine yeast strains.



### LEGACY NT 116

**Full-bodied red wines for barrel maturation.**

- *S. cerevisiae* x *S. cerevisiae* hybrid.
- Sensory: Blackberry and blackcurrant, Bordeaux-style wines.
- Application: Cabernet Sauvignon and Shiraz.
- Notes: Intense fruit on the palate; suitable for cold soaking; enhances varietal character.
- Dosage: 30 g/hL
- SKU: 1 kg; available on pre-order: 5 & 10 kg

## LEGACY NT 112

### Red wines with firm tannin structure.

- *S. cerevisiae* x *S. cerevisiae* hybrid.
- Sensory: Blackberry and blackcurrant.
- Application: Cabernet Sauvignon and Shiraz.
- Notes: Traditional style red wines to be aged; fructophilic; can produce SO<sub>2</sub> under stress conditions; suitable for micro-oxygenation and thermovinification.
- Dosage: 30 g/hL
- SKU: 1 kg

## LEGACY WE 372

### Fruity and floral red wines.

- *S. cerevisiae*.
- Sensory: Strawberry, cherry, raspberry and blackberry, fruity and floral.
- Application: All red varieties.
- Notes: Cold sensitive; softer, feminine-style wines.
- Dosage: 30 g/hL
- SKU: 1 kg; available on pre-order: 5 kg

## LEGACY WE 14

### Fruity Pinotage wines.

- *S. cerevisiae*.
- Sensory: Red fruit and cherry.
- Application: Pinotage.
- Notes: Must be co-inoculated with a robust red wine yeast strain.
- Dosage: 15 - 20 g/hL (in co-inoculation).
- SKU: 1 kg

## FERMIVIN VR5

NEW

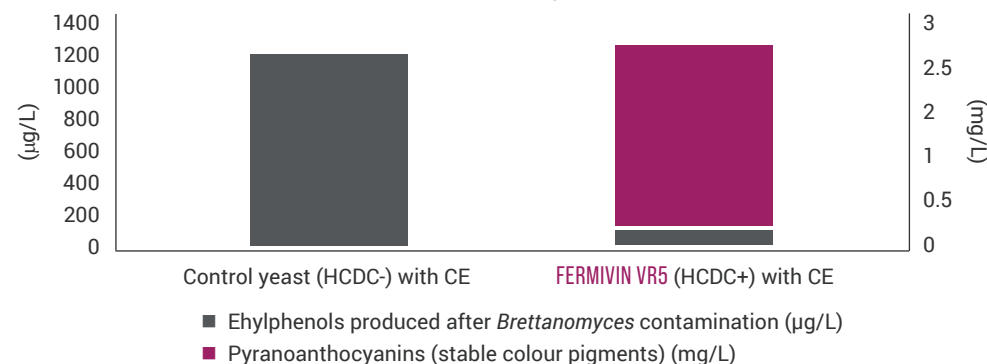
In-Line Ready

### Red wines to be aged.

- *S. cerevisiae*.
- Sensory: Blackcurrant, prune, cherry, spicy hints, full-bodied and plenty of structure and stable colour.
- Application: All red varieties, especially Shiraz.
- Notes: Promotes optimum extraction of polyphenols and their stabilisation over time.
- Dosage: 20 - 30 g/hL
- SKU: 500 g; In-Line Ready SKU: 500 g; 10 kg

The colour preservation and *Brettanomyces* prevention with the use of **FERMIVIN VR5**, a HCDC+ yeast, in contaminated red wine.

The hydroxycinnamate decarboxylase (HCDC) activity of some yeast strains can promote the formation of stable colour pigments via the formation of vinylphenols thus making these compounds unavailable for *Brettanomyces* to produce off-odours.



## FERMIVIN MT48

### Fruity and spicy red wines.

- *S. cerevisiae*.
- Sensory: Expressive wines with soft tannins, cherry, raspberry, blackberry, plum, floral and spice; full-bodied.
- Application: All red varieties, especially Merlot and Shiraz.
- Notes: Suitable for wines matured for short periods; high concentration of glycerol produced.
- Dosage: 20 - 30 g/hL
- SKU: 500 g

## FERMIVIN A33

### Structured and complex red wines.

- *S. cerevisiae*.
- Sensory: Complex aromas of fruit, blackcurrant and blackberry, tobacco and chocolate hints; well-balanced.
- Application: All red varieties, especially Cabernet Sauvignon, Cabernet franc and dark-fruit style Pinotage.
- Notes: Promotes polyphenol extraction and stabilises anthocyanins.
- Dosage: 20 - 30 g/hL
- SKU: 500 g

## FERMIVIN XL

### Fruity and smooth red wines.

- *S. cerevisiae*.
- Sensory: Red and black fruits, low astringency, roundness on the palate and balance.
- Application: All red varieties, especially Cabernet Sauvignon and Merlot.
- Notes: Adsorbs astringent tannins and softens mouthfeel.
- Dosage: 20 g/hL
- SKU: 500 g

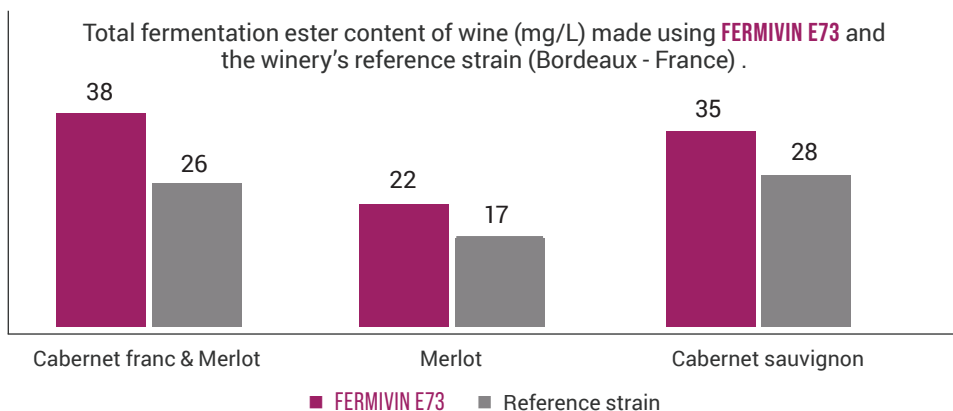
## FERMIVIN E73

NEW

In-Line Ready

### Early release, fruity red wines.

- *S. cerevisiae*.
- Sensory: Highly perfumed wines, fruity and with deep colour. Medium body. Supple, fruity red wines with hints of red and black fruit (strawberry, raspberry and cherry).
- Application: Fruity, balanced wines for early consumption.
- Notes: Especially suitable for fermenting must that undergoes cold pre-fermentation maceration. Use together with Rapidase Extra Color to optimise colour and phenol extraction.
- Dosage: 30 g/hL
- SKU: 10 kg



## IOC R 9008

### Complex, soft red wines from mature fruit.

- *S. cerevisiae*.
- Sensory: Ripe fruits, unctuous, volume, softness.
- Application: Merlot, Cabernet Sauvignon, Cabernet franc, Malbec and Grenache.
- Notes: High polysaccharide production limits the burning sensation in high alcohol wines; promotes longevity; decreases the risk of herbaceous aromas and aggressive tannin sensations; minimises the perception of dryness and bitterness; intensifies minerality, salinity and mouthfeel persistence.
- Dosage: 20 g/hL
- SKU: 500 g

## IOC RÉVÉLATION TERROIR

### Fruity red wines with finesse and colour intensity.

- *S. cerevisiae*.
- Sensory: Varietal fruit aromas, strawberry, gooseberry, blackberry, freshness, finesse, elegance.
- Application: Pinot noir, Merlot, Grenache noir and Tempranillo.
- Notes: Excellent ability to preserve colour; increases colour intensity; accentuate varietal aromas; creates a good balance between freshness and maturity of the fruit; enhances the finesse and elegance of the wine.
- Dosage: 20 g/hL
- SKU: 500 g

## IOC SMOOZBERRY

NEW

### Red wines with fruit intensity and volume.

- *S. cerevisiae*.
- Sensory: Revealed varietal aromas, such as beta-damascenone, which enhances fruity aromas, certain esters and some varietal thiols. This enhances black fruity notes (blackberry and blackcurrant) and contributes to freshness.
- Application: Robust yeast ideal for fermenting concentrated harvests. Increased release of mannoproteins coat dry tannins and reduce burning sensations, naturally contributing to fullness and roundness.
- Notes: High alcohol tolerance (16%); compatible with co-inoculation for MLF.
- Dosage: 20 - 30 g/hL
- SKU: 500 g

# RESTART FERMENTATION

## FERMIVIN CHAMPION

### Restarting stuck fermentations.

- *S. cerevisiae* subsp. *bayanus*.
- Sensory: Neutral.
- Application: All varieties.
- Notes: Respects varietal character.
- Dosage: 30 - 60 g/hL
- SKU: 500 g

## IN-LINE READY FERMIVIN YEAST: Pioneers of direct inoculation in winemaking

The In-Line Ready Fermivin® yeast, a breakthrough in the field of inoculation, is one such game-changing development that has reshaped the winemaking landscape.



## INCEPTION OF IN-LINE READY

Introduced in 2013, In-Line Ready Fermivin yeast marked a paradigm shift, offering winemakers a simplified and efficient method of yeast inoculation. Unlike conventional processes that necessitate rehydration, In-Line Ready multiplication and production of Fermivin yeast allow for an immediate addition to the must, saving time and costs, while preserving the fermentation process.

Since its inception in 2010, In-Line Ready technology has been tested extensively across the world. Wineries in diverse regions, including South Africa, Spain, France, and Portugal have tested this invention under varying conditions. The results constantly showed comparable fermentation kinetics, population dynamics, and analytical characteristics to the matching strain made classically and rehydrated, demonstrating the versatility and reliability of In-Line Ready Fermivin yeast.

## THE UNIQUE FORMULA: ENHANCING VIABILITY AND ROBUSTNESS

The key to In-Line Ready's popularity is its distinctive multiplication and production process. This tailored approach strengthens the yeast, making it more resistant to the stresses experienced during direct inoculation, such as a low temperatures and acidity. The result is a yeast that is more viable and adaptable than the classically produced corresponding yeast that is directly added (*see diagram next page*). Also, this process makes yeast able to handle the challenges of fermentation with similar speed to the classically produced and added after a rehydration protocol yeast strain.

## BENEFITS OF IN-LINE READY

### • Time and cost-efficiency

ILR yeasts are designed for easy and direct addition to musts or grapes without rehydration. This lowers rehydration energy costs, saves time, and avoids the specialisation and training of manpower. The inoculation is made more consistently, effortless and faster.

### • Global reliability

Used extensively worldwide for 11 years, ILR yeast consistently performs well under varying conditions, showcasing its reliability.

### • Robustness and viability

The unique multiplication process enhances ILR yeast viability, making it resilient to stresses like low temperatures and acidity during direct addition.

### • Consistent fermentation

Similar fermentation kinetics and popularity dynamics to classically produced strains.

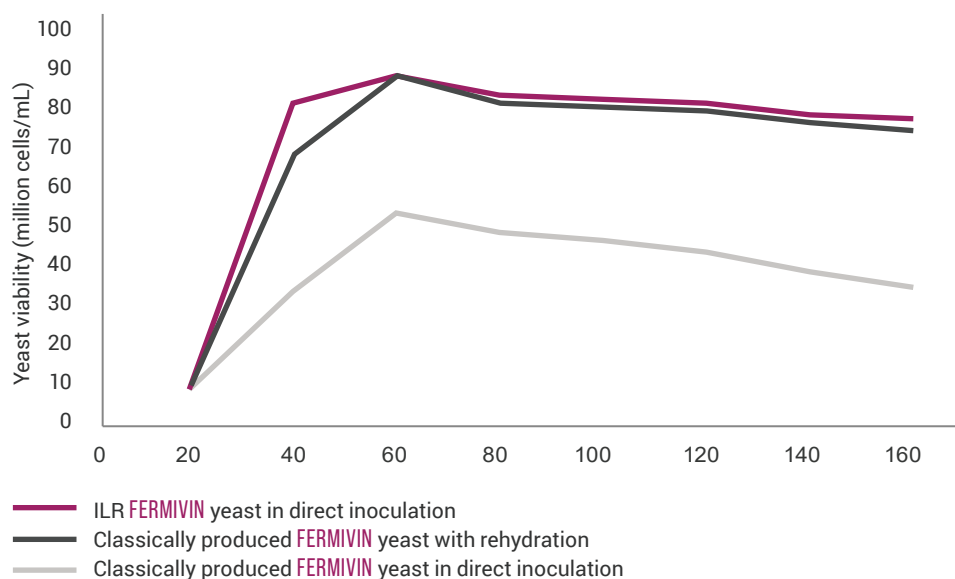
### • Quality of the wine

ILR yeasts have been selected for their quality in the winemaking process, resulting in the production of qualitative wines with good aroma, structure, and colour for white, red, rosé, sparkling, and brandy wines.

### • Quality assurance

ILR-specific production guarantees the same or even superior viability, fermentation kinetics, and wine flavour quality compared to classic Fermivin yeasts added after rehydration, providing assurance of high-quality results.

Viability comparison of In-Line Ready and classically produced **FERMIVIN** yeasts, added directly or after rehydration.



## OPTIMISING IN-LINE READY YEAST DIRECT INOCULATION

- Inoculate the chosen ILR **FERMIVIN** yeast at 30 g/hL.
  - When filling the tank.
  - For red winemaking, you can also add the ILR yeast at the reception desk, when filling the tank with the crushed grapes, or at the top of the filled tank.
- The temperature of the juice inoculated with the ILR yeast must be 15 °C or higher. The addition of **EXTRAFERM D'TOX**, rich in sterols, helps to preserve the integrity of the yeast cell wall. A dose of 20 - 40 g/hL is recommended at the same time as the ILR yeast. The lower the turbidity, the higher the added dose.
- Carry out standard pump-over of the must for better homogenisation of the yeast.
- To provide a high content of free amino acids in the fermenting must, it is recommended to add **NATUFERM BRIGHT** in white and rosé must and **NATUFERM FRUITY** in reds at a minimum of 20 g/hL.

## IN-LINE READY FERMIVIN YEAST

YEAST	Positioning	Features	Tasting notes	White wine	Rosé wine	Red wine	Alcohol tolerance (%)	Fermentation temperature limits (°C)	Relative nitrogen demand
<b>FERMIVIN IT61</b>	Intense tropical with volume	High production of thiols and esters	Grapefruit, tropical fruit, pineapple	■	■		13.5	16 - 30	Medium
<b>FERMIVIN TS28</b>	Green and crisp thiol style wine	Important releaser of thiols	Boxwood, gooseberry, mineral (stone, gun flint)	■			14.5	15 - 22	Medium
<b>FERMIVIN 4F9</b>	Fruity wines with a long finish	Good thiol converter, volume and esters	Grapefruit, stone fruits, tropical fruits, volume	■	■		15.5	14 - 20	Medium
<b>FERMIVIN VR5</b>	Red wine to be aged	High extraction of polyphenols, flavours, colour stability	Red and black fruits, jam, spices, full-bodied			■	15.5	18 - 32	Low
<b>FERMIVIN E73</b>	Early release fruity red wine	Cryophilic, high production of fermentation esters	Red berries, stone fruits, freshness			■	15	10 - 28	High
<b>FERMIVIN PDM</b>	Multipurpose yeast	Secure fermentations, clean aromas	Varietal and terroir typicities	■	■	■	16	13 - 30	Low

# ANCHOR YEAST | WHITE AND ROSÉ WINES

YEAST	Product application		Product characteristics	Tasting notes	Tolerance				Nitrogen demand
	White wine	Rosé wine			Fructose	Temperature (°C)	Alcohol (%)	Osmotic (°B)	
<b>EXOTICS MOSAIC</b>	Complexity and mouthfeel	Mouthfeel	Intense aromas for complex wines Partially consumes malic acid Has pectinolytic activity which contributes to wine clarification	Exotic fruits, stone fruits, floral and mouthfeel	■	18 - 28	15.5	25	Average
<b>EXOTICS NOVELLO</b>	Complexity and freshness	Thiols	Exotic, iconic, fresh and fruity white wines Enhanced softness	Fresh and fruity (passion fruit, gooseberry, grapefruit and guava)	■	15 - 28	15.5	25	Average
<b>ALCHEMY I</b>	Fruity esters		Scientifically formulated blend for optimum aroma profile Fruity and floral esters, some thiols Adds to complexity	Fruity and floral		12 - 20	15.5	25	Average
<b>ALCHEMY II</b>	Thiols		Scientifically formulated blend for optimum aromatic profile Highest thiol releaser and converter	Passion fruit and guava		12 - 20	15.5	25	Average
<b>ALCHEMY IV</b>		Red fruit	Scientifically formulated blend for optimum aromatic profile Longevity of esters Significant aroma intensity, especially red fruits	Intense red fruit, round and smooth, and decreased greenness		16 - 28	16	26	Average
<b>LEGACY VIN 2000</b>	Complexity and citrus		Especially suited to barrel fermentations Complex and aromatic wines Reliable fermentation	Floral, citrus, tropical, pineapple and papaya	■	12 - 16	15.5	25	Low
<b>LEGACY VIN 13</b>	Fruity ester	Amylic	High ester producer Releaser and converter of thiols Floral and muscat notes Robust fermenter	Fruity, floral, terpenes and muscat	■	10 - 30	17	27	Low
<b>LEGACY NT 116</b>	Fresh and fruity	Fresh and fruity	Produces acetate esters (tropical fruit salad) Zesty citrus and volatile thiols	Tropical fruits, citrus and thiols		11 - 28	16	26	Low
<b>LEGACY VIN 7</b>	Thiols		Most effective yeast for thiol liberation Intense aromatics	Grapefruit, guava, passion fruit and gooseberry		13 - 16	14.5	24	Complex
<b>LEGACY N 96</b>	Varietal characters	Varietal characters	Robust strain for neutral sensory contribution	Enhanced varietal aromas	■	11 - 30	16.5	27	Low
<b>LEGACY WE 14</b>	Sweet wines	Sweet wines	Natural sweet wines, including noble late harvests	Sweet wines		14 - 20	15	24	High

# FERMIVIN YEAST | WHITE & ROSÉ WINES

YEAST	SPECIES			WINE		TYPES OF WINE	FEATURES	TASTING NOTES IN WINE	Alcohol tolerance [%]	Temperature range [°C]	Nitrogen demand
	<i>S.c. var. cerevisiae</i>	<i>S.c. var. bayanus</i>	<i>H. vineae</i>	White	Rosé						
FERMIVIN VINEAE			■	■	■	Very floral, aromatic wines with volume	Produces 10 times more phenyl ethyl acetate and two times more benzenoids compared to <i>S. cerevisiae</i> yeasts	Floral aromas and good mouthfeel	10	15 - 22	+
FERMIVIN 3C	■			■		Elegant, round, fruity and complex wines	High production of polysaccharides and β-damascenone	Citrus, acacia, well balanced	14	16 - 22	++
FERMIVIN IT61	■			■	■	Intense tropical with volume	High production of thiols and esters	Grapefruit, citrus, pineapple, grapefruit with volume	14.5	15 - 28	++
FERMIVIN TS28	■			■		Green and crisp thiol style wines	Important releaser of thiols	Boxwood, gooseberry, mineral (stone, gun flint)	14.5	15 - 22	+++
FERMIVIN 4F9		■		■	■	Fruity round white and rosé wines	Good thiol converter, volume and esters	Grapefruit, stone fruits, tropical fruits, volume	15.5	14 - 20	++
FERMIVIN PDM		■		■	■	Multipurpose yeast	Secure fermentation, clean aromas	Varietal and terroir typicity	16	13 - 30	+
FERMIVIN CHAMPION		■		■	■	Difficult conditions	Very robust yeast, ferments in extreme conditions, high alcohol tolerance, fructophilic	Varietal and terroir, neutral Restart fermentation	18	15 - 30	++

# IOC YEAST | WHITE AND ROSÉ WINES

YEAST	Wine style	Alcohol resistance [%]	Nitrogen requirement	Optimal temperature [°C]	Lag phase	Fermentation speed	Production of VA	Production of SO <sub>2</sub>
IOC BE THIOLS	Thiol fruity freshness	15	Average	13 - 25	Short	Very rapid	Low	Almost none
IOC B 2000	Fresh, amylic and fruity	14	Low	12 - 24	Short	Average	Low	Average
IOC TWICE	Freshness and volume	15	High	18 - 25	Short	Slow to average	Low	Very low
IOC INIFINI'TWICE	Balance of freshness and complexity	15.5	Average	18 - 23	Short	Average	Low	Very low
IOC DYNAMIX	Complex, varietal wines	16	Average	14 - 28	Short	Average	Low	Very low
IOC FRESH ROSÉ	Fruity, floral and spicy wines	16	High	14 - 24	Short	Average	Low	Low



# ANCHOR YEAST | RED WINES

YEAST	Product application	Product characteristics	Tasting notes	Tolerance				Nitrogen demand	MLF
				Fructose	Temperature (°C)	Alcohol (%)	Osmotic (°B)		
<b>EXOTICS MOSAIC</b>	Complexity and mouthfeel	Intense aromas for complex wines Partially consumes malic acid Has pectinolytic activity, which contributes to wine clarification	Red and black fruit, cocoa and floral	■	18 - 28	15.5	25	Average	+++
<b>EXOTICS NOVELLO</b>	Freshness and mouthfeel	Soft, full-bodied and aromatic wines	Black and red fruit, spice and soft tannins		15 - 28	15.5	25	Average	++
<b>ALCHEMY III</b>	Complexity	Scientifically formulated blend for optimum aromatic profile Stable fruity esters with significant aroma contribution Big producer of phenylethanol for rose aroma and complexity Good structure and body	Rose, floral, fruity, structure and body		16 - 28	16	26	Average	++
<b>ALCHEMY IV</b>	Intense red fruit	Scientifically formulated blend for optimum aromatic profile Longevity of esters - wines to be aged Significant aroma intensity, especially red fruits Masks green characters	Intense red fruit, round, smooth and decreased greenness		16 - 28	16	26	Average	++
<b>LEGACY NT 202</b>	Structure and complexity	Stimulates MLF High alcohol tolerance	Blackberry, blackcurrant, tobacco, prune and red berries	■	18 - 28	16	26	Average	+++
<b>LEGACY NT 50</b>	Fruitiness and softness	Enhances strawberry, raspberry, cherry and blackberries Blackcurrant and spicy aromas Masks green characters	Blackberry, blackcurrant, cherry and spice		13 - 28	16.5	26.5	High	++
<b>LEGACY NT 116</b>	Full-bodied and fruity	Producer of acetate esters Red fruit aromas	Blackberry, blackcurrant and red berries		11 - 28	16	26	Low	++
<b>LEGACY NT 112</b>	Structured and dark fruit	Traditional wine style	Blackberry, blackcurrant and structure	■	20 - 28	15.5	26	Average	+
<b>LEGACY WE 372</b>	Light and fruity	Enhances red berry and floral aromas	Red berry and floral; lighter wine style		18 - 28	15.5	24.5	Average	++
<b>LEGACY WE 14</b>	Pinotage	Fruity wines; co-inoculate with another <i>S. cerevisiae</i>	Red fruits and cherry notes		14 - 28	15	25	High	

# FERMIVIN YEAST | RED WINES

YEAST	Species		Types of wine	Features	Tasting notes	Alcohol tolerance (%)	Temperature range (°C)	Nitrogen demand	HDC % (ability to enhance colour)
	<i>S.c. var. cerevisiae</i>	<i>S.c. var. bayanus</i>							
FERMIVIN A33	■		Structured and complex wines	Enhances polyphenol content	Complex aromas of fruits, chocolate, tobacco, well-balanced	15.5	22 - 30	+++	65
FERMIVIN MT48	■		Fruity, spicy red wines	High production of glycerol	Red fruits, plum, floral, spices and smooth body	15.5	20 - 30	+	20
FERMIVIN VR5	■		Mid-palate fruity structured red wines favours colour stability	High extraction of polyphenols,	Red and black fruits, jam, spices, full-bodied	15.5	18 - 32	+	80
FERMIVIN XL	■		Fruity smooth red and rosé wines decreasing astringency	High adsorption of harsh tannins red fruits	Balanced, harmonious,	15.5	20 - 30	++	15
FERMIVIN E73	■		Early release fruity red wines	Cryophilic, high production of fermentation esters	Red berries, stone fruits, freshness	15	10 - 28	+++	20
FERMIVIN PDM		■	Multipurpose yeast	Secure fermentation, clean aromas	Varietal and terroir typicity	16	13 - 30	+	
FERMIVIN CHAMPION		■	Difficult conditions	Very robust yeast, ferments in extreme conditions, high alcohol, tolerance, fructophilic	Varietal and terroir	18	15 - 30	++	

# IOC YEAST | RED WINES

YEAST PRODUCT	Wine style	Alcohol resistance (%)	Nitrogen requirement	Optimal temperature (°C)	Lag phase	Fermentation speed	Production of VA	Production of SO <sub>2</sub>	MLF compatibility
IOC R 9008	Ripe fruit and non-herbaceous	16	Low	18 - 13	Short	Average	Average	Very low	Good
IOC RÉVÉLATION TERROIR	Fresh, amylic and fruity	14	Low	12 - 24	Short	Average	Low to average	Very low	Good
IOC SMOOZBERRY	Black fruits and varietal typicity	16	Average	18 - 26	Short	Average	Average	Very low	Good

# 4



## BACTERIA FOR MALOLACTIC FERMENTATION

# INTRODUCTION

## EFFECTS OF MALOLACTIC FERMENTATION ON WINE COMPOSITION AND QUALITY

### REDUCTION IN ACIDITY

L-malic acid is catabolised to the weaker L-lactic acid during malolactic fermentation (MLF), with a corresponding loss in acidity. This decrease can vary due to the buffering capacity of the wine, as well as initial pH, but the acid will typically decrease by 1 to 3 g/L and the pH may rise by 0.1 to 0.3 units.

### FLAVOUR CHANGES

The decrease or increase in certain wine aroma and flavour attributes is dependent on the bacteria strain characteristics, the intensity of the varietal aroma characteristics and the winemaking techniques employed. Besides de-acidification, flavour descriptors for wines that have undergone MLF include: buttery, lactic, nutty, yeasty and oaky, as well as impacting fruity and vegetative aromas and mouthfeel. The mechanisms by which lactic acid bacteria (LAB) can modify the wine flavour include:

- The removal of existing flavour compounds due to adsorption to the cell wall.
- The production of new flavour compounds via the metabolism of sugars, amino acids and other substrates.
- The metabolism of grape and yeast-derived secondary metabolites to lesser or more flavourful compounds.

**Diacetyl.** The production of diacetyl via citric acid metabolism increases the buttery, nutty aromas. Depending on the wine type and style, low amounts of diacetyl can contribute positive buttery notes and complexity, but can at high concentrations be considered spoilage. In order to increase the diacetyl content consider: selecting a strong diacetyl-producing strain, lower bacteria inoculation rate, lower pH and temperature, shorter lees contact, higher redox potential and stabilisation of the wine immediately after the completion of malic and citric acid metabolism.

**Mouthfeel.** The impact on mouthfeel could possibly be associated with the biosynthesis of exocellular polymers, such as polysaccharides, the production of glucans or the metabolism of existing polysaccharides via  $\beta$ -glucanase activity. MLF can also increase anthocyanin and tannin condensation which reduces the astringency in red wines.

**Fruity and vegetative aromas.** Wine LAB are able to produce certain esters, like ethyl lactate and isoamyl acetate, whilst also displaying esterase activity that could impact the aroma profile. Enhanced fruity aromas during MLF have also been associated with a decrease in vegetative aromas.

**Grape-derived precursors.** Wine LAB that exhibit glycosidic activity can hydrolyse glycoside precursors via enzymatic reaction and release volatile aroma compounds like nor-isoprenoids, volatile phenols, monoterpenes and aliphatics.

**Acetaldehyde and other carbonyls.** During MLF, the concentration of acetaldehyde and other carbonyls generally decrease.

**Oak influence.** Wine LAB can metabolically interact with oak compounds. As a result, wines that have undergone MLF in barrel, are described as softer, richer and fuller in flavour and less astringent, with a tendency to exhibit more colour, compared to MLF in stainless steel tanks.

**Amino acids and undesirable aroma compounds.** A variety of amino acids can be utilised by LAB to produce volatile sulphur compounds (methionine), N-heterocycles (ornithine and lysine) and biogenic amines.

## CATALOGUE

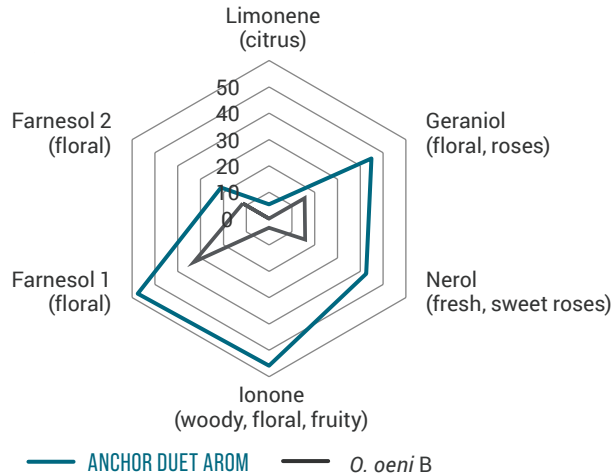
### CO-INOCULATION

#### | ANCHOR DUET AROM

**Enhanced fruit and spicy notes.**

- Blend of *Oenococcus oeni* x *Lactiplantibacillus plantarum*.
- Application: Enhanced aroma intensity; red fruit characters via ester production; enhanced spicy notes; increases terpenes and nor-isoprenoids via  $\beta$ -glucosidase activity that enhance fruity and floral characteristics; increased wine quality.
- Dosage: 1 g/hL
- SKU: 25 g (25 hL)

The *L. plantarum* strain with  $\beta$ -D-glucosidase activity, like in **ANCHOR DUET AROM**, can liberate bound aroma compounds like monoterpenes and nor-isoprenoids. These compounds enhance the fruity and floral profile of the wine.

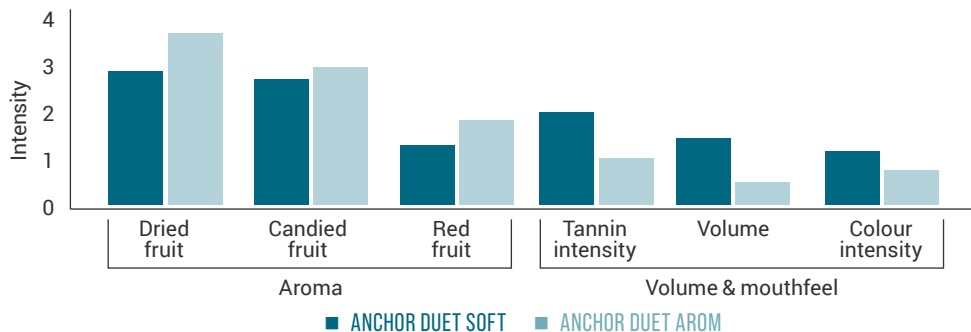


## ANCHOR DUET SOFT

Enhanced mouthfeel and softness.

- Blend of *Oenococcus oeni* x *Lactiplantibacillus plantarum*.
- Application: Enhanced mouthfeel; decreased green characters; reduced astringency; enhanced dark fruit aromas; increased wine quality.
- Dosage: 1 g/hL
- SKU: 25 g (25 hL)

The **DUET RANGE** is developed to enhance the overall wine quality and the different blends have different sensory impacts in the wine. A comparison of this bacteria range for co-inoculation (with tannin additions) and their impact on the sensory profile.

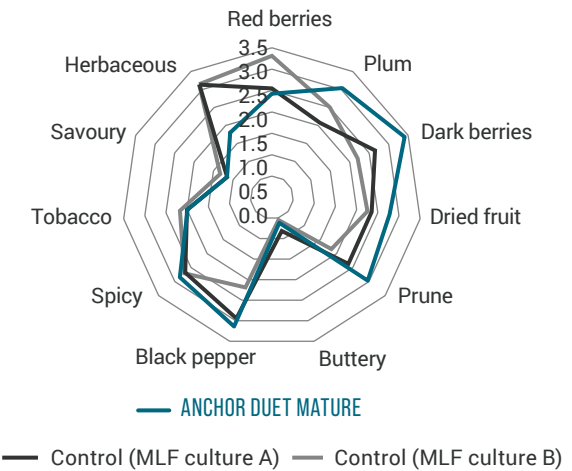


## ANCHOR DUET MATURE

Enhanced dark fruit profile during fermentation and maturation.

- Blend of *Oenococcus oeni* x *Lactiplantibacillus plantarum*.
- Application: Increased plum and dark berry aromas; hints of spice and black pepper; enhanced plum and dark berry aromas; hints of spice and black pepper; enhanced floral notes; increased blackberry and blackcurrant notes (DMS release during maturation).
- Dosage: 1 g/hL
- SKU: 25 g (25 hL)

**ANCHOR DUET MATURE** in comparison with other commercial co-inoculation cultures; South African Cabernet Sauvignon.



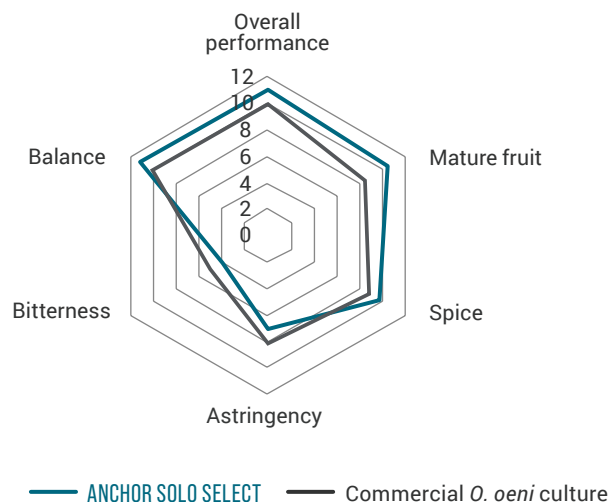
## SEQUENTIAL INOCULATION

### ANCHOR SOLO SELECT

Structure and balance.

- *Oenococcus oeni*.
- Application: Ensure a secure malolactic fermentation; enhance structure; increase spicy and dark fruit aroma notes; restart stuck malolactic fermentation.
- Dosage: 1 g/hL
- SKU: 25 g (25 hL)

A comparison of **ANCHOR SOLO SELECT** and a commercial *Oenococcus oeni* culture in Merlot (Bordeaux, France) to show the sensory impact.



## IOC INOBACTER

### Low pH must and wine.

- *Oenococcus oeni*.
- Application: Tolerant of very low pH conditions (>2.9); ensure MLF under challenging conditions; requires three steps: reactivation, starter culture and inoculation.
- Dosage: 0.72 g/hL (bacteria) and 4 g/L (reactivation medium).
- SKU: 25, 100 & 1 000 hL

# PRODUCT SUMMARY

APPLICATION	BACTERIA	Red wine	White wine	Sparkling base wine	<i>Oenococcus oeni</i>	<i>Lactiplanti-bacillus plantarum</i>	Optimum temperature (°C)	Alcohol tolerance (%)	pH tolerance	TSD <sub>2</sub> tolerance (mg/L)
CO-INOCULATION	ANCHOR DUET AROM	■			■	■	18 - 28	16	≥3.5	50
	ANCHOR DUET SOFT	■	■		■	■	15 - 28	15	≥3.2	50
	ANCHOR DUET MATURE	■			■	■	18 - 28	16	≥3.3	50
SEQUENTIAL INOCULATION	ANCHOR SOLO SELECT	■			■		14 - 28	16	≥3.2	50
	IOC INOBACTER		■	■	■		18 - 22	14	≥2.9	60

# 5

ENZYMES TO

IMPROVE PROCESSING & QUALITY



# INTRODUCTION

Due to the challenges posed by the grape berry structure, commercial enzyme preparations focus on four main enzyme families: pectinases, glycosidases,  $\beta$ -glucanases and secondary activities. These enzyme formulations can be used to achieve and enhance quantitative, qualitative and processing benefits.

## PECTINASES

- Consist of pectin lyase, pectin methylesterase and polygalacturonase enzyme activity.
- The polysaccharides in the cell wall and middle sheath are hydrolysed to remove the physical barrier preventing diffusion of anthocyanins, tannins and aroma precursors.
- Weakens the cell walls of the pulp and hydrolyses the soluble pectin.
- Decreases the viscosity due to pectin hydrolysis and electrostatic turbidity destabilisation then leads to sedimentation.

### Impact

- Improve colour intensity and stability.
- Increase aroma precursor extraction.
- Increase free-run and press juice yields.
- Induce clarification.
- Improve filtration.

## GLYCOSIDASES

- Maximise the aromatic potential by increasing the extraction process.
- Odourless aromatic precursors are present in the grape skin in a form linked to sugars.
- Sequential hydrolysis of the sugars release volatile aroma compounds like terpenols and nor-isoprenoids.

### Impact

- Release bound aroma compounds.

## $\beta$ -GLUCANASES

### Impact

- Improved filtration of *Botrytis* must.
- Enhanced yeast autolysis through a reduction in the time required, as well as increasing the quantity of released yeast compounds.

## SECONDARY ACTIVITIES

- Can be beneficial or detrimental.
- Hemi-cellulases usually accompany pectinase formulations.
- Cinnamyl esterases lead to the production of vinyl phenols: beneficial in red wines when reacting with polyphenols to form stable colour compounds; detrimental in white wines and causes off-odours.
- Anthocyanases are detrimental to wine colour.

It is imperative to select an enzyme formulation based on the requirements of the winery, keeping in mind that the enzymatic activity will be influenced by: the temperature (lower temperatures slow down activity and higher temperatures denature the enzyme); the contact time and the dosage (determined by the grape variety, process, temperature and type of enzyme).

# CATALOGUE

## CLARIFICATION

ENZYMATIC ACTIVITIES	EFFECT ON MUST & WINE
<b>Pectin esterase</b> <b>Pectin lyase</b> <b>Polygalacturonase</b> <b>Glucanase</b>	Effects viscosity of juice, suspended particles and filterability of the wine. Improves decanting of sediments.



## RAPIDASE CLEAR

### Clarification of must.

- This is an enzyme for fast and efficient grape must and wine clarification. Rapidase Clear decreases the viscosity allowing for more compact lees during settling and clearer must and wine.
- Application: Pectin degradation; decrease in lees percentage; decrease in turbidity.
- Dosage: 1 - 3 g/hL or 1 - 4 mL/hL.
- SKU: 100 g; 1, 5 & 20 kg

## RAPIDASE CLEAR EXTREME

### Clarification under difficult conditions.

- An enzyme for fast, efficient clarification of grape must in difficult and extreme conditions. The use of this enzyme allows for more compact lees and clearer must when settling conditions are difficult, including low temperatures, pH and/or hard to settle varieties.
- Application: Pectin and side chain degradation down to 6 °C; decreases viscosity; promotes solid particle aggregation; decrease in settling time and turbidity; increase in clear juice percentage.
- Dosage: 1 - 4 g/hL
- SKU: 100 g

# EXTRACTION AND MACERATION

ENZYMATIC ACTIVITIES	EFFECT ON MUST & WINE
<b>Pectin lyase</b> <b>Polygalacturonase</b>	Break down pectins from the middle lamella and primary cell wall. Promote the release of tannins and anthocyanins found in granular form inside the vacuole.
<b>Cellulase</b> <b>Hemicellulase</b>	Promote the release of tannins associated with the cell wall. Promote the extraction of aroma precursors.

## RAPIDASE EXTRA PRESS

### Efficient grape pressing.

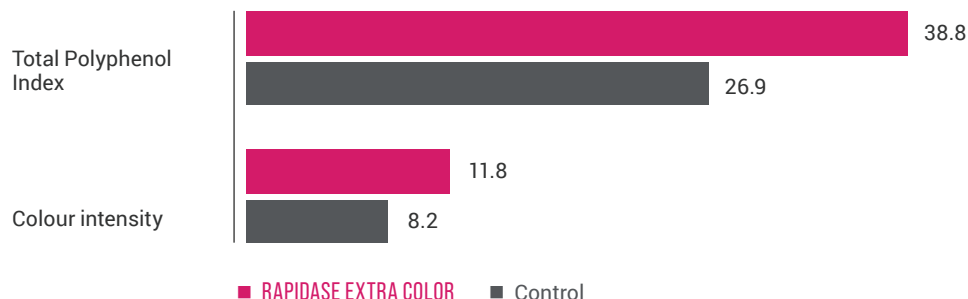
- Enzyme for fast, efficient pressing of grapes. Use of this enzyme allows for the release of juice by weakening skins and reducing pectin water retention capacity.
- Application: Pectin and insoluble protopectin degradation; increases juice yield; allows for softer and shorter pressing cycles and thus preserves grape must from oxidation; increased percentage of free-run and press juice.
- Dosage: 1.5 - 2.5 mL/100 kg
- SKU: 1, 5 & 20 kg

## RAPIDASE EXTRA COLOR

### Colour and polyphenol extraction in quality maceration.

- This enzyme allows for targeted extraction of colour and polyphenols contained in grape skins and reduces the requirement for more mechanical methods like punch-downs.
- Application: Grape skin cell wall degradation; increased anthocyanin extraction; enhances colour stability.
- Dosage: 2 - 4 g/100 kg
- SKU: 100 g & 1 kg

A fermentation with and without **RAPIDASE EXTRA COLOR** usage during maceration in Cabernet Sauvignon analysed at the end of malolactic fermentation. This product leads to increased levels of both the colour intensity and polyphenols.



# PROCESS IMPROVEMENT

## RAPIDASE FLOTATION

### Enhanced efficiency during flotation.

- Enzyme for fast, efficient flotation of grape must. The use of this enzyme enables rapid viscosity decrease, allowing for faster migration of solid particles.
- Application: Soluble pectin degradation; reduces flotation time; promotes more compact foam by facilitating the accumulation of haze particles; decrease in the percentage lees and turbidity.
- Dosage: 1 - 2 mL/hL
- SKU: 5 kg

## RAPIDASE FILTRATION

### Facilitate and speed up filtration.

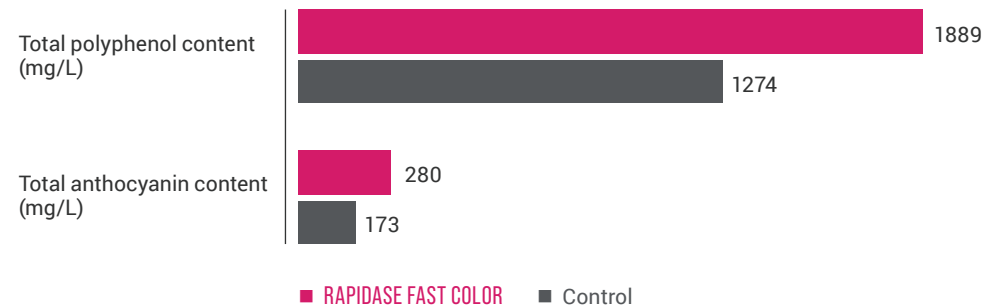
- Rapidase Filtration is a liquid enzyme formulation with a broad spectrum of hydrolases active on polysaccharides that slow and hinder the filtration of wine. It facilitates filtration by reducing wine clogging power, while safeguarding quality.
- Application: This liquid enzyme preparation displays pectolytic actions (specifically polygalacturonase and  $\alpha$ -N-arabinofuranosidase) and  $\beta$ -glucanase activity.
- Dosage: 3 - 6 mL/hL
- SKU: 1 kg

## RAPIDASE FAST COLOR

### Colour and polyphenol extraction during short maceration.

- Highly concentrated enzyme for fast colour and polyphenol extraction in short maceration processes during red wine production. This enzyme has been specifically designed to enhance the colour extraction process within a short maceration period. The subsequent processes of draining, pressing and clarification are also facilitated.
- Application: Degradation of grape skin cell walls; increase in anthocyanin concentration.
- Dosage: 1 - 3 mL/hL
- SKU: 5 kg

Croatina grapes from Northern Italy was made with and without a **RAPIDASE FAST COLOR** treatment and analysed after one day of maceration. The treatment with this product gave the highest total polyphenol and anthocyanin content.



## AROMA EXTRACTION

ENZYMATIC ACTIVITIES	EFFECT ON MUST & WINE
<b>Pectinase</b> <b>Cellulase</b> <b>Hemicellulase</b>	Extraction of aroma precursors.
<b>Glycosidase</b>	Hydrolyse odourless aroma precursors to odorous volatile substances: <ul style="list-style-type: none"><li>• Varietal aroma: key to the aromatic profile and typicality of the wine.</li><li>• Enhance precursors from aromatic varieties.</li></ul>

## RAPIDASE EXPRESSION AROMA

### Aroma precursor extraction in white and rosé wines.

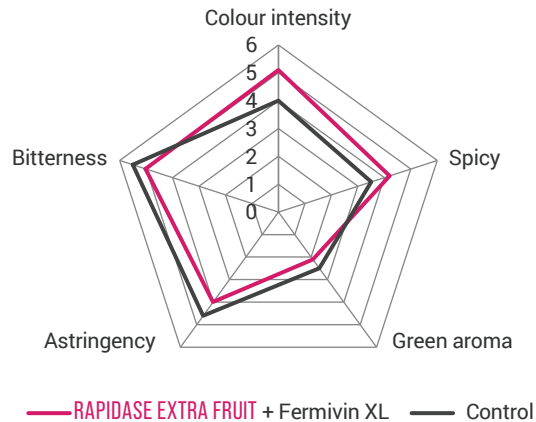
- An enzyme for fast, early and targeted aroma precursor extraction in white and rosé grape maceration. Skin contact allows for enhanced aroma intensity and complexity. Sufficient skin integrity is maintained to ensure effective downstream processing.
- Application: Skin and pulp cell wall degradation; reduces maceration time; replaces more oxidative mechanical methods; increased thiol extraction.
- Dosage: 2 - 4 g/100 kg
- SKU: 100 g

## RAPIDASE EXTRA FRUIT

### Aroma precursor extraction in red wines.

- This enzyme allows for the targeted extraction of aroma precursors contained in red grape skins that enhance fruity characteristics.
- Application: Skin and pulp cell wall degradation; reduces maceration time; increased roundness, raspberry and cherry characteristics; reduced astringency and herba- ceous characters.
- Dosage: 2 - 4 g/100 kg
- SKU: 100 g

**RAPIDASE EXTRA FRUIT** has a significant impact on the extraction of aroma precursors from grape skins and also on the colour quality. In the sensory analysis of a Pinot noir comparing the treatment of this product in combination with Fermivin XL with that of a control, the treated wines had enhanced colour intensity and showed a positive impact on the aroma and mouthfeel properties of the wine.



## AGEING AND MICROBIAL CONTROL

### ENZYMATIC ACTIVITIES

### EFFECT ON MUST & WINE

#### Glycosidase

Hydrolyse odourless aroma precursors to odorous volatile substances:

- Varietal aroma: key to the aromatic profile and typicality of the wine.
- Enhance precursors from aromatic varieties.

#### $\beta$ -glucanase

Promote yeast autolysis: boost fullness and mouthfeel of the wine.  
Promote filterability under challenging harvest conditions.

#### Lysozyme

Inhibition of Gram positive bacteria (LAB):

- Avoid the lactic acid spike when the alcoholic fermentation is stuck.
- Inhibit MLF after the alcoholic fermentation; stabilise after MLF and before bottling.

## RAPIDASE BATONNAGE

### Enhancing yeast autolysis to release mannoproteins.

- Enzyme for fast, early release of colloids in wines matured on lees.
- Application: Yeast cell wall degradation; enhanced release of mannoproteins and other beneficial colloids like polysaccharides; increases the mouthfeel and balance of the wine.
- Dosage: 3 - 5 g/hL
- SKU: 100 g

## DELVOZYME

### Prevent lactic acid bacteria spoilage.

- Delvozyme, a purified enzyme based on lysozyme extracted from egg white, is a viable additive for achieving optimum microbial control.
- Application: Avoid bacterial spoilage during alcoholic fermentation; controlling the onset of MLF; inhibit MLF; microbiological stabilisation of wine after MLF.
- Dosage: 100 - 500 mg/L
- SKU: 1 kg

# RAPIDASE | FAST AND EFFICIENT ENZYMES

PRODUCT	Application	Effect	Dosage	Liquid/ Granulate	Packaging
<b>RAPIDASE EXPRESSION AROMA</b>	Aroma precursor extraction in white and rosé macerations	Skin and pulp cell wall degradation	2 - 3 g/100 kg	G	100 g
<b>RAPIDASE EXTRA PRESS</b>	Fast, efficient pressing of grapes	Grape skin and pectin degradation	1.5 - 2.5 mL/100 kg	L	5 & 20 kg
<b>RAPIDASE CLEAR</b>	Fast, efficient grape must clarification	Pectin main and side chains degradation	1 - 2,5 g/hL 1 - 2.5 mL/hL	G L	100 g 1 kg & 20 kg
<b>RAPIDASE CLEAR EXTREME</b>	Complete clarification in difficult conditions	Pectin main and side chains degradation down to 6 °C	1 - 3 g/hL	G	100 g
<b>RAPIDASE FLOTATION</b>	Fast, efficient grape must flotation	Advanced pectin main chain degradation	1 - 2 mL/hL	L	5 kg
<b>RAPIDASE FAST COLOR</b>	Fast colour and polyphenol extraction in short maceration processes	Fast red grapes skin cell wall degradation	1 - 3 mL/100 kg	L	5 kg
<b>RAPIDASE EXTRA FRUIT</b>	Aroma precursor extraction in red grape macerations	Red grapes skin and pulp cell wall degradation	2 - 3 g/100 kg	G	100 g & 1 kg
<b>RAPIDASE EXTRA COLOR</b>	Enhanced colour and polyphenol extraction in red wines	Advanced red grapes skin cell wall degradation	2 - 3 g/100 kg	G	100 g & 1 kg

6



PRODUCTS FOR  
FERMENTATION & CLARIFICATION

# INTRODUCTION

Clarification is the process (natural or induced), whereby 'undesirable', insoluble, suspended particles are removed from the juice and/or wine and the liquid becomes 'clear'. These insoluble, suspended particles may include pectins, proteins, tannins, other phenolic compounds, pieces of grape skin, pulp and stem, as well as yeast, bacteria and tartrates. Fermentation in the presence of these solids usually leads to decreased varietal aromas, a bitter taste and a higher concentration of reductive odours. In contrast, clarified must tends to deliver fresher, fruitier aromas and a lower concentration of higher alcohols.

## CLARIFICATION VIA SEDIMENTATION/COLD SETTLING

- Reliant on gravity.
- Energy-intensive and labour intensive process.
- Require cooling and the use of commercial enzyme preparations.
- Requires little special equipment. is a practical limit to the efficiency, as particles smaller than 1 µm sediment very slowly, if at all.
- Time-consuming.
- Rate of settling is dependent on the temperature, viscosity and colloidal content (particle size and density).
- Intense cleaning required (tartrate build up) and a loss of total acidity.
- Higher lees percentage and percentage of volume loss.

## CLARIFICATION VIA FLOTATION

- Requires specialised apparatus: flotation unit, pressurisation pump, gas supply and dosage pump.
- Requires the use of enzymes and flotation aids.
- Flotation gasses include nitrogen (most popular), carbon dioxide, oxygen, argon and air. A pressure of 5 - 7 bars allow the bubbles to move at a speed slow enough to adhere to particles and not create unnecessary foam.
- Cost effective, fast and efficient.

- Can be done right after pressing.
- Low energy consumption/cost.
- Faster production flow (optimise tank space).
- Higher juice yield, less lees and less oxidised juice.
- No loss of tartaric acid.

Fining agents used during clarification control browning due to oxygen and improve the overall wine stability. Traditional fining agents include mineral substances (bentonite and silica), animal-derived agents (casein, egg white, gelatine and isinglass), polysaccharides (chitin, chitosan), alginates and polyphenols (tannins).

## ALTERNATIVE FINING AGENTS

Due to the demand from consumers, winemakers are continually looking for alternatives to animal-derived and allergenic products in the winemaking process.

Alternatives now include pea proteins, as well as products focusing on fungal-derived chitin (*Aspergillus niger*), as well as chitin by-products like chitosan and chitin-glucan. These products can now be used as alternatives for casein and gelatine during the fining and clarification processes, including their use as flotation adjuvants.

Chitin and chitosan are renewable polymers that have excellent properties of biodegradability, bio-compatibility, non-toxicity and adsorption. These characteristics make them ideal alternatives to animal-derived fining agents and approved for use in organic and vegan wine production.

Similarly, alternatives to casein like pea proteins and PVPP, can have an impact on phenolic compounds, colour, browning potential and the sensory attributes of the wine.

Various products exist to aid with the process of clarification, be it via sedimentation or flotation. The selection of the clarification method should be influenced by the practical parameters due to the cellar setup, as well as the desired juice quality. In addition, the selection of clarification aids can now also be influenced by consumers and their need for wines produced with products free from animal-derived origins.

# CATALOGUE

## CLARIFICATION

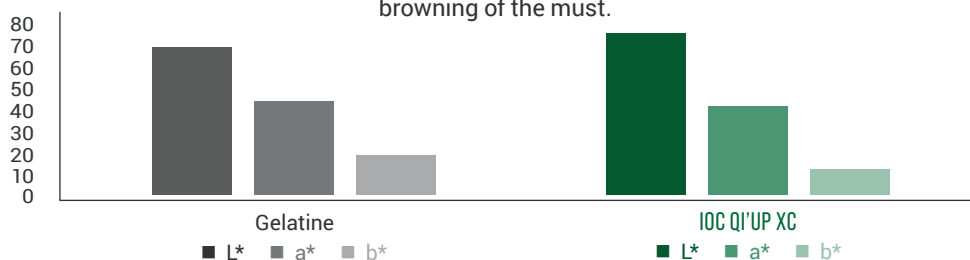
### | IOC QI'UP XC

[VEGAN WINES] [FLOTATION]

#### Concentrated solution for the flotation of white, rosé and red juice.

- A concentrated chitin derived flotation additive that is natural, biodegradable and non-allergenic.
- Application: Enhances the speed and performance with which the particles separate from the suspension; alternative to the use of gelatine; increase fresh fruit aromas.
- Dosage: 3 - 10 g/hL (white or rosé must) or 10 - 15 g/hL (red must from thermovinification).
- SKU: 1 kg

A Cinsaut rosé must (Languedoc, France) after flotation, comparing **IOC QI'UP XC (5 g/hL)** with gelatine (10 g/hL) for flotation efficacy. This product displays excellent efficiency in reducing the yellow component (b\*) by approximately 35%. It also prevents oxidation and the browning of the must.



**IOC QI'UP XC** preserves and optimises the aromatic expression of rosé wine, increasing the volatile thiols with more than 40% compared to the control treatment of pea proteins. The treated wine was scored as fresher with intense citrus notes. The control as heavier with overripe strawberry aromas.



### | IOC COLORPROTECT V

[VEGAN WINES] [FLOTATION] [SETTLING]

#### Prevent and treat oxidation.

- A blend of bentonite, PVPP and vegetable proteins that has been developed to be used on must for preventing oxidation and pinking. It reduces the levels of oxidisable and oxidised phenolic compounds in must.
- Application: Protecting musts that are sensitive to oxidation; reduces brown colouring in oxidised must; significant reduction of pinking phenomena; reduces the level of protein instability.
- Dosage: 25 - 80 g/hL
- SKU: 1 kg

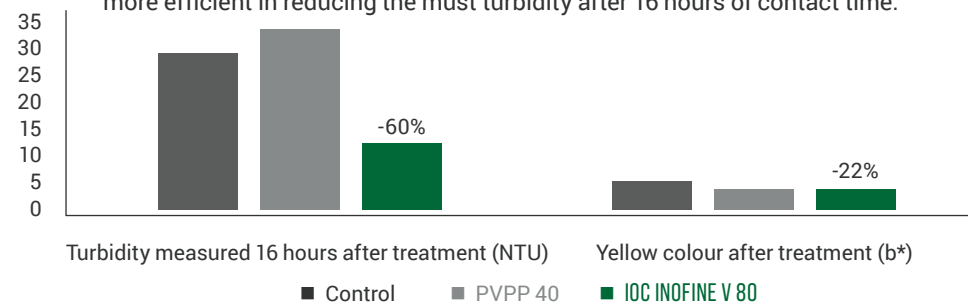
### | IOC INOFINE V

[VEGAN WINES] [FLOTATION] [SETTLING]

#### Prevent oxidation in must.

- Inofine V is a formula made up exclusively from pea proteins combined with mineral-derived additives, particularly used for applications involving must clarification due to its high reactivity with oxidisable and oxidised phenolic compounds.
- Application: Alternative to gelatine; coupled with a fining agent, it provides efficient flotation of suspended matter; reduce turbidity in must.
- Dosage: 10 - 30 g/hL
- SKU: 1 & 15 kg

The efficacy of the pea protein **IOC INOFINE V (at 80 g/hL)** was compared with PVPP (at 40 g/hL) and a control treatment in a Grenache rosé during settling. Whilst this product displays comparable efficiency with PVPP in reducing yellow oxidised phenolic compounds, it is more efficient in reducing the must turbidity after 16 hours of contact time.



## | IOC BENT'UP

[VEGAN WINES] [FLOTATION]

### Bentonite for flotation.

- High-performance, active sodium bentonite powder for flotation. Brings about excellent cap compaction for optimal juice recovery.
- Application: Suitable for flotation; effective clarification and sediment compaction; rapid flotation times; remove protein fractions, oxidation enzymes and unstable phenolic fractions; removes thermosensitive proteins; use together with Acticarbon.
- Dosage: 30 - 80 g/hL
- SKU: 15 kg

## | IOC ACTICARBONE

### Remove discolouration.

- This active vegetal charcoal is created for the treatment of discolouration in must.
- Application: Remove discolouration without affecting the aroma profile; can be used with flotation, combined with enzymes and fining additives; treat must as soon as possible, in combination with a pectolytic enzyme.
- Dosage: To determine dosage, contact your Technical Sales Manager (authorised legal dosage: 100 g/hL).
- SKU: 15 kg

## FINING

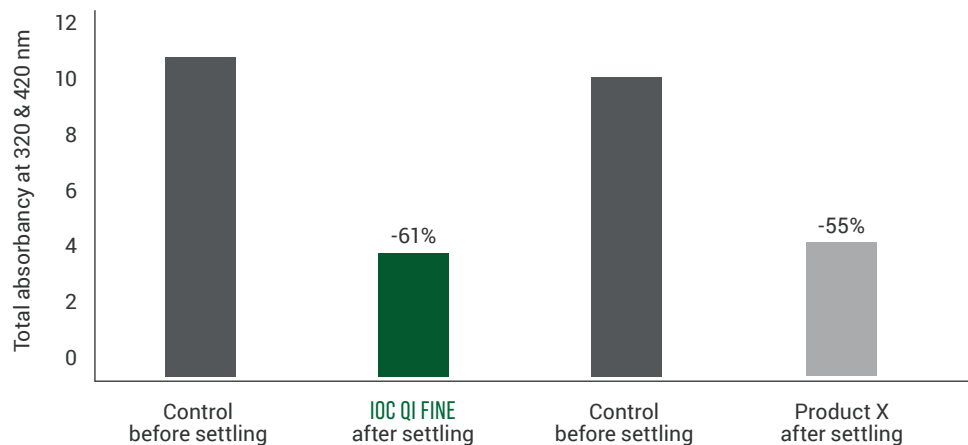
## | IOC QI FINE

[VEGAN WINES] [SETTLING]

### Fining must during settling to improve the mouthfeel.

- A natural, biodegradable, non-allergenic product for fining must and wine. Qi Fine is a blend of chitosan and pea protein, specifically selected for its strong reactivity to phenolic compounds.
- Application: Correct the brown colour of oxidised must; reduce bitterness and astringency; reduces harsh phenolic taste of tannins.
- Dosage: 10 - 30 g/hL (white and rosé free-run must) or 20 - 50 g/hL (white and rosé press juice).
- SKU: 1 kg

A Pinot noir cuvée must from South Africa was treated with two fining agents during settling. The results show that **IOC QI FINE** (at 30 g/hL) is more efficient than a competitor product in reducing the phenolic compounds that cause browning of the must, bitterness and astringency. The turbidity is also reduced to 29 NTU, in comparison with the 45 NTU by Product X.



## | IOC QI NO[OX]

[VEGAN WINES]

### Remove discoloured, oxidised compounds and improve the sensory profile.

- Consists of pea protein, chitosan and selected, ultrafiltered bentonite that assists with rapid sedimentation. It is an alternative to casein. It has been developed for its anti-oxidative properties, to be used in must.
- Application: Removes the brown discolouration, as well as caramel and Madeira notes; increases freshness; reduces vegetal notes and bitterness.
- Dosage: 30 - 80 g/hL
- SKU: 1 kg



# PVPP: WHAT ARE THE ALTERNATIVES?

Faced with a drastic rise in the price of PVPP and increasingly uncertain availability, the use of this fining agent, which until now has been indispensable in many winemaking processes, is beginning to be seriously questioned. Already controversial because of its synthetic origin, its seemingly limitless inflation was a step too far. IOC has been involved for many years in finding alternatives to PVPP and now has concrete solutions for moving away from this fining agent.

## AN IMPORTANT TOOL: OENOLOGICAL CHITOSAN

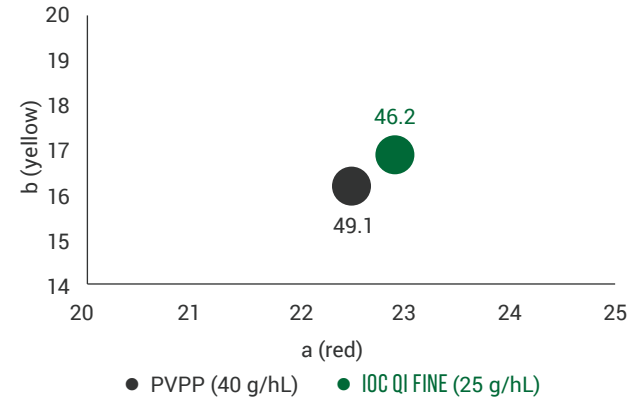
Since 2009, IOC's R&D department has been working on developing new fining agents based on the unique properties of oenological chitosans of fungal origin. This derivative of chitin from the fungus *Aspergillus niger* (the only source, along with more recently *Agaricus bisporus*, authorised for use in oenology), is a natural biopolymer of the polysaccharide family, like cellulose or starch. There are various types of chitosans, depending on their chemical configuration and molecular weight. Some of them are developed for their fining properties.

The proven fining properties of chitosan are as follows:

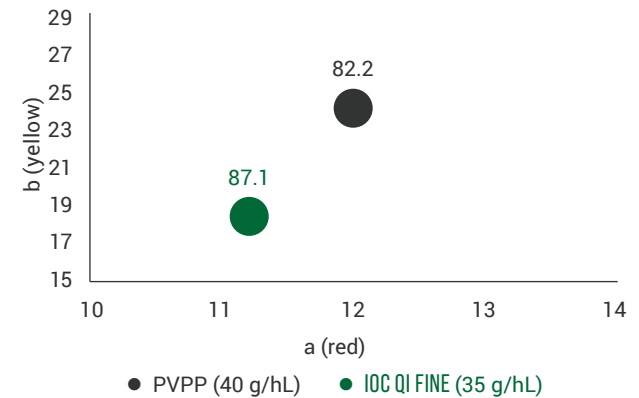
 <p><b>PHYSICAL ACTION:</b> clarification properties</p> <p>▼</p> <p>High capacity and speed of flocculation and sedimentation due to its high load density</p>	 	 <p><b>CHEMICAL ACTION:</b> antioxidant properties</p> <p>▼</p> <p>Interaction with polyphenols Metal traps (Cu, Iron) Anti-radical properties</p>
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# QI FINE AND QI NO[OX], SOLUTIONS ADAPTED AND STUDIED AS ALTERNATIVES TO PVPP

Chromaticity coordinates L, a, b (corrected) of wines at the end of alcoholic fermentation. Cabernet franc - Loire (2022).



Chromaticity coordinates L, a, b (corrected) of wines at the end of alcoholic fermentation. Grenache - Provence (2022).



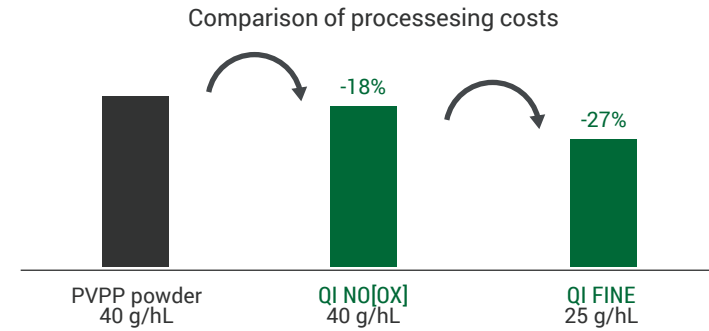
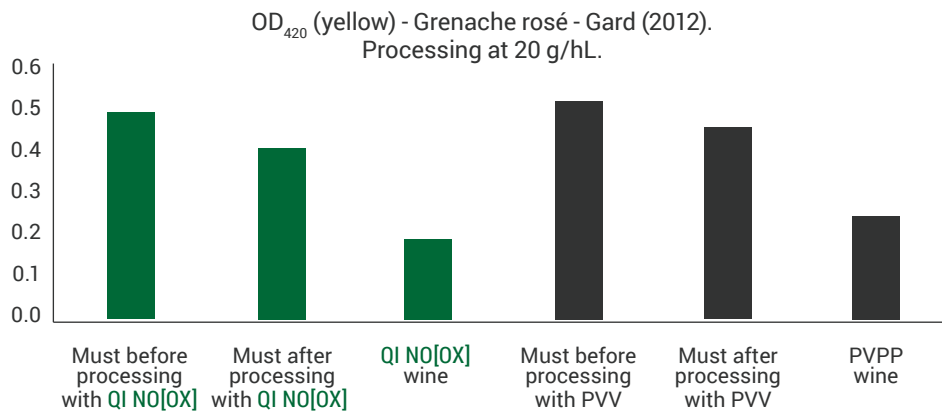
IOC's Qi FINE formula, composed of chitosan and pea protein, demonstrates a similar ability to reduce colour intensity as PVPP, with a 37% reduction in the processing dose (40 g/hL PVPP vs 25 g/hL Qi FINE). At slightly lower doses, it is more effective (40 g/hL PVPP vs 35 g/hL Qi FINE).

Qi NO[OX] is also a strong alternative to the use of PVPP. It is composed of chitosan, pea protein and bentonite. The presence of bentonite will make it more suitable for use on wine, allowing for better sedimentation of the product at this stage as the elements are finer. It also has a slightly lower chitosan content than Qi FINE. Qi FINE will therefore be more interesting for use on must, thanks in particular to the anti-radical properties of chitosan.

In sensory terms, chitosan-based processing is preferred in the majority of cases, since it is a fining agent that is more respectful of the wines, partly due to its antioxidant action which preserves the aromas.

## ECONOMICALLY SPEAKING: WHAT ARE THE IMPLICATIONS?

These alternatives, in addition to having proven technological advantages, are now more economical solutions at the recommended doses than a conventional processing with PVPP. Processing with Qi NO[OX] at the same dose provides a saving of almost 7%, up to 27% for processing with Qi FINE at the tested dose, showing similar results to PVPP (37% lower dose).



# PRODUCT SUMMARY | VEGAN SOLUTIONS FOR CLARIFICATION

APPLICATION	PRODUCT	Composition	Notes
SETTLING	IOC INOFINE V	Pea protein	Available in liquid formulation.
	IOC COLORPROTECT V	Bentonite, PVPP & pea protein	Protect oxidation sensitive must. Prevents atypical ageing of white wines. Reduces browning in oxidised wines. Significantly reduces pinking. Available in liquid formulation.
	IOC QI FINE	Chitosan & pea protein	Alternative to gelatine. Adsorbs oxidised phenolic compounds. Correct bitterness & astringency.
FLOTATION	IOC INOFINE V	Pea protein	Alternative to gelatine. Available in liquid formulation.
	IOC QI'UP XC	Chitosan	Optimise aromatic freshness. Alternative to gelatine.
	IOC BENT'UP	Bentonite	Eliminates protein fractions & particles in suspension. To be used in combination with Qi'UP XC or Inofine V in difficult conditions.
	IOC COLORPROTECT V	Bentonite, PVPP & pea protein	Reduced browning in oxidised wines. Available in liquid formulation. To be used in combination with a flotation agent.

# 7

## TANNINS TO ENHANCE WINE QUALITY



# INTRODUCTION

Tannins are generally added during three main stages of wine production: fermentation, ageing/cellaring and before bottling. The timing of the tannin addition, the composition of the specific product and the individual must/wine matrix will influence the impact that the tannin(s) will have in the wine.

## ANTI-OXIDANT ACTION

Tannins have anti-oxidant properties and can stop oxidation reactions that occur due to the production of free radicals. Thus, acting in synergy with SO<sub>2</sub> and/or ascorbic acid, tannins offer more control over the redox parameters of the must during fining.

## COLOUR STABILISATION

Condensed tannins can form stable complexes through their interaction with wine anthocyanins (co-pigmentation). The ellagic tannins have an anti-laccase action which prevents the browning of the wine. All these interactions contribute to stabilising the wine colour during ageing.

## MOUTHFEEL AND STRUCTURE

Through their interaction with the saliva proteins, wine tannins are responsible for astringency during tasting. A moderated and delicate astringency creates an impression of structure, as well as volume and mouthfeel persistence. In addition, the formation of complexes between tannins and polysaccharides convey a smooth and generous mouthfeel sensation. Tannins will thus help your wine to evolve towards more volume and roundness.

## FINING

Young wines may be subject to unstable colour, green sensations and taste astringent, or even bitter. Those defaults can be lessened during the fining process, during which commercial tannins contribute as an adjuvant by combining with wine proteins. They contribute to the clarification and stabilisation of the wine and can also treat the effect of overfining.

# AROMATIC IMPACT AND EFFECT ON SULPHUR COMPOUNDS

Some sulphur compounds convey unpleasant aromas. In red wines, tannins combine with those substances and reduce their negative impact. Alternatively, tannins sourced from specific wood varieties can impart specific sensory characters in the wine and therefore enhance the aroma profile.

# CATALOGUE

## ANTI-OXIDANT

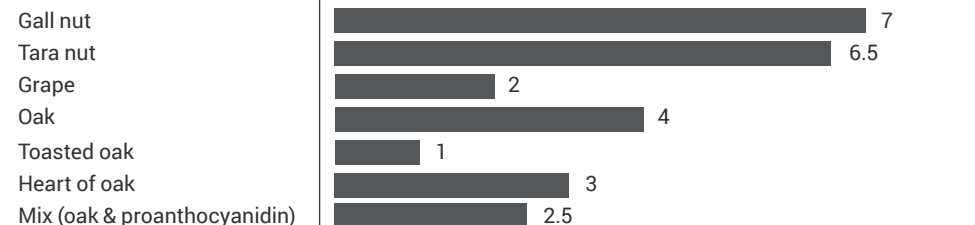
### | IOC ESSENTIAL ANTIOXIDANT

**Protect must and wine from oxidation.**

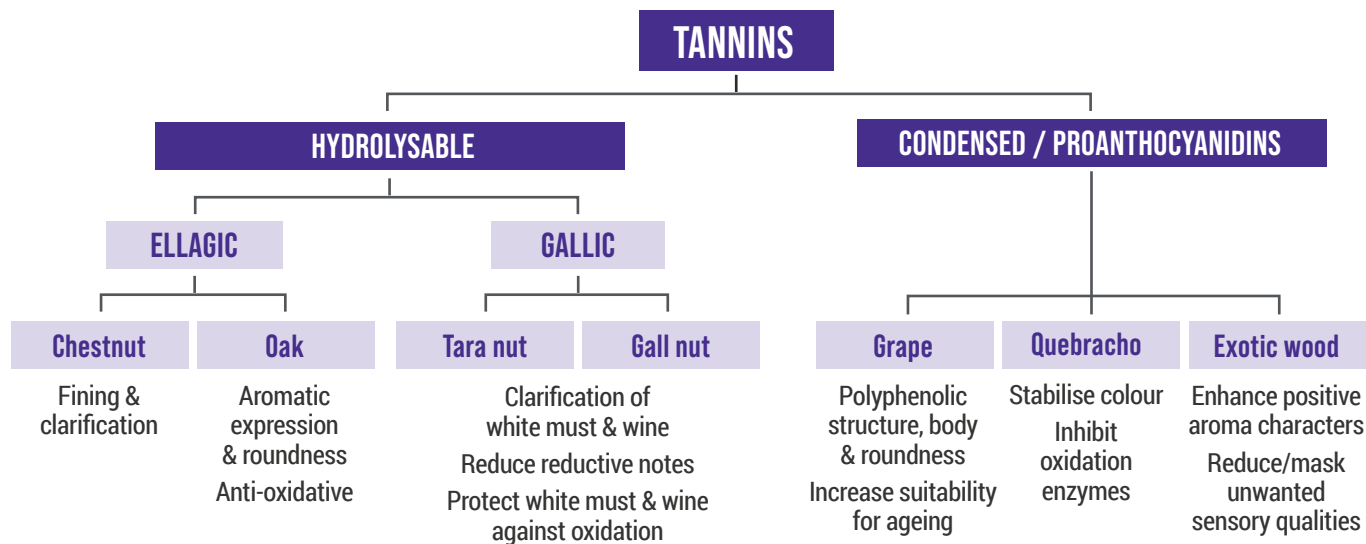
- A tannin with one of the best antioxidant potentials on the market. Limits SO<sub>2</sub> additions.
- Composition: Gallic tannin (gall nut).
- Application: Prevent the oxidation of must and wine without adding bitterness or astringency; ideal for the production of white and rosé wines; inhibits enzymatic activities of laccase and tyrosinase that are responsible for oxidising must from *Botrytis*-affected harvest.
- Dosage: 1 - 10 g/hL
- SKU: 1 kg

The anti-oxidant capacity of polyphenols extracted from various botanical sources. **IOC ESSENTIAL ANTIOXIDANT** proves to have the highest anti-oxidant potential with an anodic charge of close to 8 µC. It is the most easily oxidisable and consequently the most reactive to oxidation in wines. Grape and toasted oak tannins have a lower anti-oxidant capacity.

#### IOC ESSENTIAL ANTIOXIDANT



Anti-oxidant capacity (anodic charge at 500 mV)



## IOC TANIN CRISTALLIN

### Structure and stability of wines over time.

- Composition: Gallic tannin (tara nut).
- Application: Protects against oxidases and eliminates protein-related hazes. Adapted for early use on grapes or must, or during bottling of sparkling base wines for better preservation.
- Dosage: 2 - 6 g/hL
- SKU: 1 kg

## PROTECT AND STABILISE COLOUR

### IOC TANIN BOUQUET R36

#### Stabilise colour, enhance freshness and red fruit aromas.

- A tannin for the fermentation of rosé, and young and medium aged red wines. This product increases the red berry fruit taste, with a strong action in stabilising the colour. It has the biggest sensory impact when added during alcoholic fermentation.
- Composition: Ellagic and condensed tannins (mimosa and cherry wood; quebracho free).
- Application: Increases the concentration of glycosylated aroma precursors; intense aromas of cherry, strawberry and blueberry that complement varietal and

fermentation aromas; promotes colour stabilisation; prevents oxidation of primary aromas.

- Dosage: 2 - 15 g/hL (rosé wine) or 5 - 20 g/hL (red wine).
- SKU: 1 kg

### IOC TANIN SR

#### Prevent oxidative spoilage and encourage colour stability.

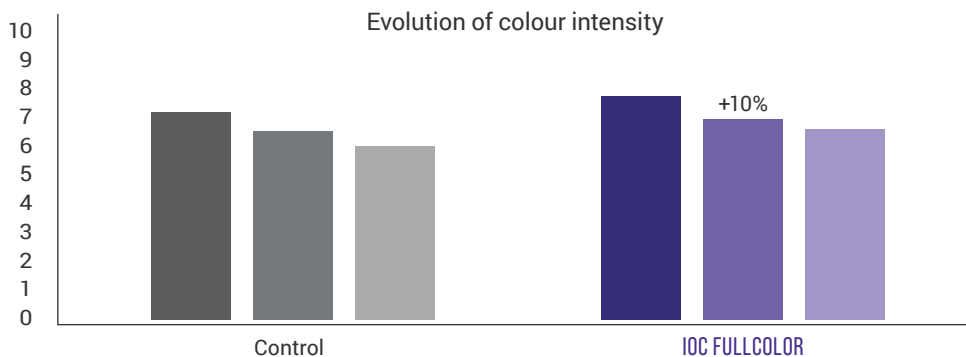
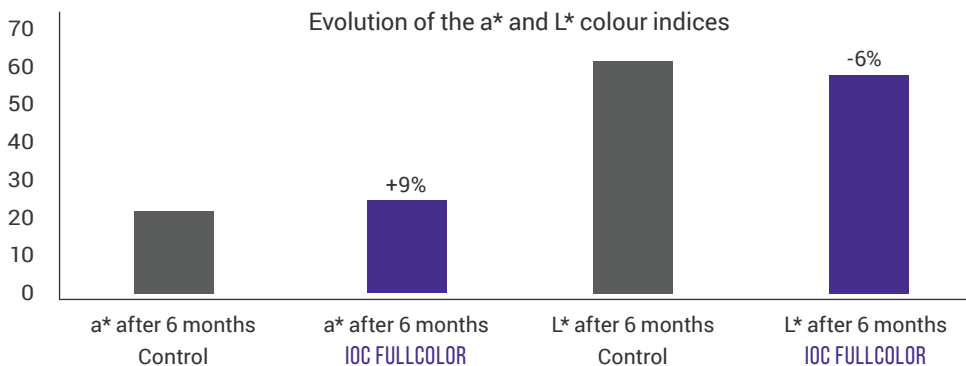
- Tanin SR is an extract of tannins with a tannic acid content greater than 70% to be used during fermentation. Efficiently reduces the activity of polyphenoloxidases.
- Composition: Proanthocyanidin tannin (quebracho).
- Application: When used during prefermentation, it prevents the oxidative spoilage of anthocyanins. Stabilise colour and improve structure during the maceration of red wines.
- Dosage: 15 - 30 g/100 kg (maceration) or 15 - 30 g/hL (vinification).
- SKU: 1, 5 & 15 kg

## IOC FULLCOLOR

### Protection and stabilisation of colour.

- An oenological tool for enhancing and protecting colour stabilisation during fermentation, whilst enhancing structure, reducing astringency and increasing mouthfeel.
- Composition: Ellagic and proanthocyanidin tannins (chestnut and mimosa; quebracho free) and polysaccharides.
- Application: Use at the fermentation stage to increase phenol compound stability and reduce tannin impact; enhance the body and structure of the wine; aid colour stabilisation and help avoid colour loss; protect the anthocyanins from oxidation and precipitation at the fining stage; inhibits laccase and tyrosinase.
- Dosage: 20 - 80 g/hL
- SKU: 1 kg

The addition of 40 g/hL IOC FULLCOLOR (to a wine thermotreated and fermented in liquid phase) resulted in the following: a 9% increase in the red colour intensity ( $a^*$ ), a 6% decrease in clarity which results in a darker wine ( $L^*$ ) and a 10% increase in the colour intensity.



## IOC ESSENTIAL PEP

### Protect colour and enhance structure

- Essential PEP provides notable anti-oxidant properties that can be added during the alcoholic fermentation, fining or pre-bottling stages. It protects the colour of wines like a pure grape tannin.
- Composition: Proanthocyanidin tannins (grape and mimosa).
- Application: Increase colour stabilisation in rosé and red wines during fermentation; increased structure in red wines; improved qualitative characteristics when added during the fining process; protection against oxidation when used before final racking and the end of barrel storage; improves the body and aromatic complexity of the wine when added during fining and pre-bottling stages.
- Dosage: 5 - 30 g/hL
- SKU: 500 g

## IOC ESSENTIAL PEL

### Enhance structure and suitability for ageing.

- A tannin preparation with significant anti-oxidative properties, perfect for improving the quality of wines by increasing their softness and aromatic intensity. It enhances ageing in barrels.
- Composition: Proanthocyanidin and gallic tannins (grape skin, mimosa and tara nut).
- Application: Increase anti-oxidant protection and ensure long-lasting freshness (fermentation, racking and pre-bottling); improving the structure and flavour balance (pre-bottling); improve taste perception, compensate for polyphenol deficiency; contribute roundness.
- Dosage: 1 - 20 g/hL
- SKU: 500 g

## IOC TANIFASE ELEVAGE

### Protect against oxidation and enhance aroma expression.

- Tanifase Elevage is a hydrolysable tannin to increase the balance in red wines. Replaces the use of oak chips during red wine fermentations. It highlights the aromatic expression and roundness of wines while protecting them against oxidation.
- Composition: Ellagic tannin (oak).
- Application: Stabilise colour and aroma; increase balance; it improves elegance, length and aromatic expression; regulates oxido-reductive phenomena during fermentation.
- Dosage: 5 - 15 g/hL
- SKU: 1 kg

# RESTORE FRESHNESS AND MASK VEGETAL NOTES

## | IOC ESSENTIAL PASSION

### Enhance freshness and aroma profile.

- Essential Passion is elaborated from red fruit trees and can be added to rosé and red wines during ageing or up to 10 days before bottling. Early usage (free-run to ageing stage) will rapidly develop the phenolic potential and effectively build the structure of the wine.
- Composition: Proanthocyanidin tannin (cherry wood).
- Application: Enhance fruity aromas; increase the delicacy of the wine; increase the aromatic intensity; anti-oxidative properties; sweetness; increased intensity of varietal aromas and freshness.
- Dosage: 1 - 15 g/hL
- SKU: 500 g

## | IOC ESSENTIAL FREE VEG

### Reduce the perception of herbaceous characters.

- Essential Free Veg can be used to fine white, rosé and red wines. It provides a strong anti-oxidant action and helps to mask vegetative notes in wines made from unripe grapes.
- Composition: Proanthocyanidin tannin (mimosa).
- Application: Masks vegetative aromas; masks astringent sensations; enhance varietal character.
- Dosage: 5 - 10 g/hL (white and rosé wine) or 10 - 20 g/hL (red wine).
- SKU: 500 g

# ENHANCE SENSORY CHARACTERS

Ellagic tannins, extracted from oak, holds the property of influencing the redox potential of the wine. Adding them during ageing or just before bottling will help to open up the wine's bouquet and its aromatic purity by correcting organoleptic deficiencies associated with reduction (sulphur off-odours) or oxidation (notes of ethanal, odour of fresh apples). With its specific aromatic character, each formulation contributes to complexity, mouthfeel and brings a sensation of smoother, softer and more integrated tannins.

## | IOC ESSENTIAL OAK SWEET

### Sweetness, balance and aromatic intensity.

- Essential Oak Sweet combines the effect of three tannins to enhance complexity on the palate and strengthen body to provide length.
- Composition: Ellagic tannins (oak).
- Application: Increased softness and sweetness; increased balance in barrel-aged wines; increased aroma intensity with honey and cocoa notes.
- Dosage: 1 - 15 g/hL
- SKU: 500 g

## | IOC ESSENTIAL OAK BARREL

### Aromatic complexity and structure.

- Essential Oak Barrel combines the effect of two tannins to enhance aromatic complexity on the palate.
- Composition: Ellagic tannins (oak).
- Application: Improved sweetness and aromatic intensity; improve the fullness of the wine; strengthen the structure and balance; optimises the colour depth in red wines.
- Dosage: 1 - 10 g/hL
- SKU: 500 g

## | IOC ESSENTIAL OAK STRONG

### Structure and aromatic complexity.

- Essential Oak Strong combines the effects of three tannins. It reinforces the structure of the wine and adds to the aromatic complexity.
- Composition: Ellagic tannins (oak).
- Application: Structure; optimise general balance; intensifies the length; reveals complexity; liquorice and tobacco notes.
- Dosage: 1 - 10 g/hL
- SKU: 250 g



## | IOC PRIVILÈGE BLEU

### **Smoothness, body and aromatic intensity.**

- Privilège Bleu adds American oak characters, adding a sensation of smoothness and full-bodiedness.
- Composition: Ellagic tannin (American oak).
- Application: Anti-oxidant; contributes to the structure and body; strengthen aromatic intensity; coconut, chocolate and coffee notes.
- Dosage: 1 - 15 g/hL
- SKU: 250 g

## | IOC PRIVILÈGE NOIR

### **Structure, fullness and aromatic balance.**

- Privilège Noir combines the impact of two tannins, adding structure and body.
- Composition: Ellagic and proanthocyanidin tannins (French oak and cherry tree).
- Application: Anti-oxidant; contributes to the structure; emphasises red and ripe fruit aromas; increase balance; fullness; aromatic finesse.
- Dosage: 1 - 10 g/hL
- SKU: 250 g

# PRODUCT SUMMARY

APPLICATION	TANNINS	WHEN TO ADD:				IMPACT:						APPLICATION:			
		Pre-fermentation	Fermentation	Ageing	Pre-bottling	Aroma	Colour	Anti-oxidant	Structure	Freshness	Complexity	White wine	Rosé wine	Red wine	Sparkling wine
ANTI-OXIDANT	IOC ESSENTIAL ANTIOXIDANT	■	■	■		■		■		■	■	■	■	■	■
	IOC TANIN CRISTALLIN	■	■	■		■		■		■	■	■	■	■	■
PROTECT & STABILISE COLOUR	IOC TANIN BOUQUET R36		■			■	■	■	■	■	■		■	■	
	IOC TANIN SR		■				■	■						■	
	IOC FULLCOLOR		■			■	■	■	■	■	■		■	■	
	IOC ESSENTIAL PEP		■	■	■		■	■	■		■	■	■	■	■
	IOC ESSENTIAL PEL			■	■	■	■	■		■	■	■	■	■	■
	IOC TANIFASE ELEVAGE			■		■	■	■	■				■	■	
	IOC ESSENTIAL PASSION				■	■	■	■		■	■	■	■	■	■
RESTORE FRESHNESS & MASK VEGETAL NOTES	IOC ESSENTIAL FREE VEG				■	■			■		■	■	■	■	■
ENHANCE SENSORY CHARACTERISTICS	IOC ESSENTIAL OAK SWEET				■	■			■		■	■	■	■	■
	IOC ESSENTIAL OAK BARREL				■	■			■		■	■	■	■	
	IOC ESSENTIAL OAK STRONG				■	■			■		■	■	■	■	
	IOC PRIVILÈGE BLEU				■	■			■		■	■	■	■	■
	IOC PRIVILÈGE NOIR				■	■			■		■	■	■	■	■

8

PRODUCTS  
TO FINE WINE



# INTRODUCTION

Fining can be described as the addition of a reactive or an adsorptive substance to must or wine, in order to remove (or reduce the concentration of) one or more undesirable constituents.

Fining is a widely used practice that involves adding a substance or mixture in order to clarify, stabilise or modify the organoleptic characteristics of the must or wine. Usually the fining agents bind to the target compound(s) to form insoluble aggregates that are subsequently removed. Fining agents may be composed of animal, mineral and vegetable/plant particles or macromolecules. It can also include the likes of yeast hulls, inactivated yeast, yeast protein extracts and activated charcoal, as well as animal-derived products, like casein and gelatine. In general, fining agents based on yeast derivatives have resulted in wine improvements including decreased turbidity, reduction in astringency and potential stabilisation.

The use of fining agents in wine can assist with:

- Clarification.
- Improvement of filterability.
- Preventing haze and sediment formation.
- Improve organoleptic profile and wine colour.
- Removal of undesirable elements.

Fining is not just carried out in wines for previously mentioned purposes but can also allow for cost optimisation when preparing wines for bottling. Over and above improving clarity, as well as physicochemical and microbiological stability, fining has many applications, including refining to achieve a given product target:

- Marketing a wine that is stable at a colloidal level.
- Fulfilling customer tastes by offering a wine with no excessive bitterness or astringency. In general, fining enhances taste and sensory characteristics.

Choosing the fining agent should be carried out on a case-by-case basis, as a single fining agent cannot be suitable across all applications and wines, since each matrix reacts differently. Fining agents free from allergen and animal proteins, suitable for vegetarian and vegan wines, as alternatives to egg albumin, casein, isinglass and gelatine, are also available.

It is imperative that carefully controlled laboratory fining trials must be performed before any fining agent is added to wines in the cellar. It is very important that prepara-

tion methods, temperature, mixing and timing of addition are kept the same between laboratory fining trials and the winery application, in order to ensure/achieve consistent results.

Contact your Technical Sales Manager for access to our brand new fining kit.

## CATALOGUE

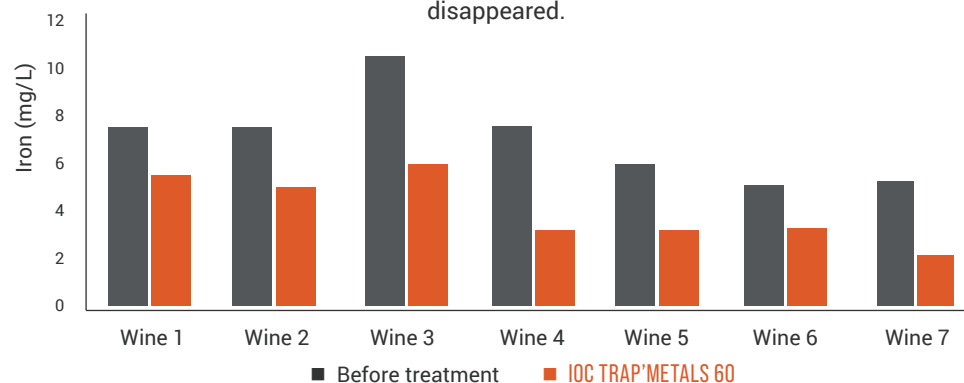
### REMOVE HEAVY METALS

#### IOC TRAP'METALS

Reduce metals in must and wine.

- A complex preparation combining PVI, PVP, yeast hulls and chitosan that limit oxidation by removing catalysts.
- Application: Binds heavy metals like copper, iron and lead which are catalysts of oxidation; it limits the risk of ferric haze; can be used on must during the settling process to reduce levels of copper which disrupts alcoholic fermentation and impairs thiol production; efficient in reducing the sensitivity of white wines to pinking.
- Dosage: 20 - 80 g/hL (trials are recommended to determine the optimum dosage; contact your Technical Sales Manager).
- SKU: 1 kg

**IOC TRAP'METALS (60 mg/L)** was used as a curative treatment in Grenache rosé wines from the Languedoc region in France. This product was able to reduce the iron concentration in the wines by between 25 and 50%. After treatment, the wines are highly clarified with an attractive pale pink colour. The wines are fruitier and the metallic finish on the palate has disappeared.



# ORGANOLEPTIC CORRECTORS

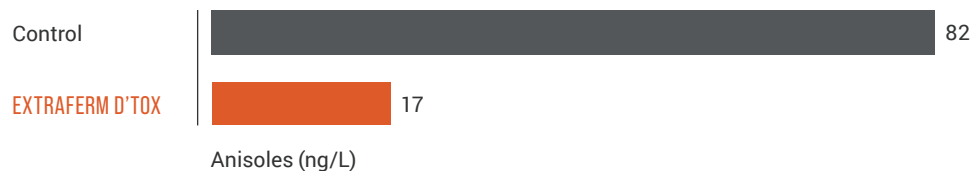
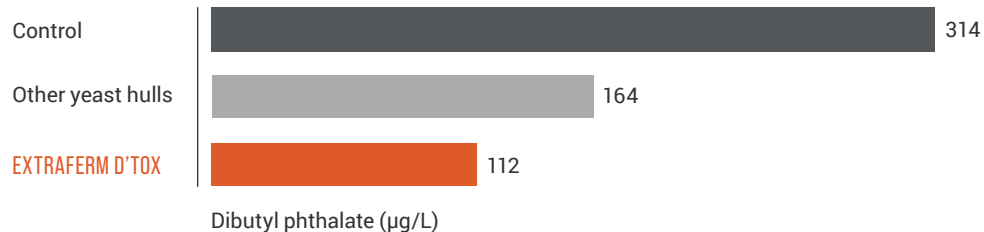
## Correcting colour and/or taste

### EXTRAFERM D'TOX

#### Detoxification and quality improvement.

- Consists of pure yeast hulls to improve wine quality by adsorbing toxic compounds and off-flavours from wine.
- Application: Removal of toxic compounds like Ochratoxin A (OTA); removal of anisoles (TCA, TBA and PCA) and dibutyl phthalates; reduce the concentration of compounds subject to legal limits.
- Dosage: 20 - 40 g/hL
- SKU: 1 kg

**EXTRAFERM D'TOX** has the ability to remove unwanted and potentially hazardous molecules from finished wines. In these trials a treatment with this product (at 2 x 20 g/hL) was able to reduce the dibutyl phthalate concentration (legal limits apply) by more than 60% and the anisole concentration (mouldy aroma associated with cork taint) to below its odour threshold value.

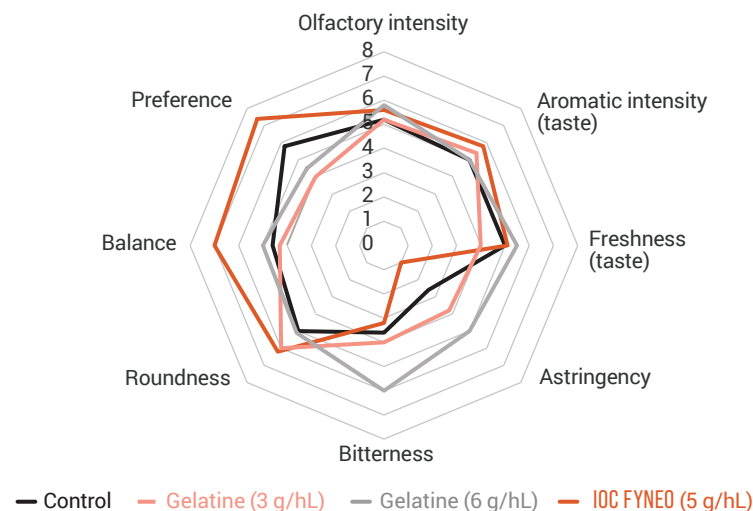


### IOC FYNEO

#### Reduce bitterness and astringency.

- An innovative, granulated yeast protein extract for fining white, rosé and red wines. Can be used as an alternative to isinglass, gelatine and albumin.
- Application: Refine wines by eliminating harsh and bitter back palate notes; reduce astringency and bitterness; preserve aromatic profile.
- Dosage: 1 - 15 g/hL
- SKU: 1 kg

The sensory impact of **IOC FYNEO** was evaluated in a red wine from the Côtes de Rhône region in France by means of a sensory panel. In comparison with a control (no fining treatment) and gelatine treatments, the wine fined with this product showed the best balance and roundness, as well as being the most preferred wine.



### IOC COLORPROTECT V

#### [VEGAN WINES]

#### Treat oxidation defects.

- A blend of bentonite, PVPP and vegetable proteins (pea) that has been developed to be used on wine for treating oxidation and pinking.
- Application: Prevents atypical ageing in white wines; reduces brown colouring in oxidised wines; significant reduction of pinking phenomena.
- Dosage: 20 - 50 g/hL (white and rosé wine).
- SKU: 1 kg

## IOC QI FINE

[VEGAN WINES]

### Improve colloidal stability.

- A natural, biodegradable, non-allergenic product for fining wine. Qi Fine is a blend of chitosan and pea protein, specifically selected for its strong reactivity to phenolic compounds.
- Application: Correct colour and reduce bitterness and astringency; improve filterability and colloidal stability.
- Dosage: 10 - 30 g/hL
- SKU: 1 kg

## IOC ACTICARBONE

### Remove discoloured compounds.

- This active vegetal charcoal is a product created for the treatment of discolouration in white wines.
- Application: Correct the colour of white wines while respecting the sensory characteristics; eliminate phenolic compounds responsible for oxidation defects and correct yellow/orange colour defects.
- Dosage: To determine dosage, contact your Technical Sales Manager (authorised legal dosage: 100 g/hL).
- SKU: 15 kg

## IOC CARBION ENO NEW

### Removing colour from stained musts and white wines.

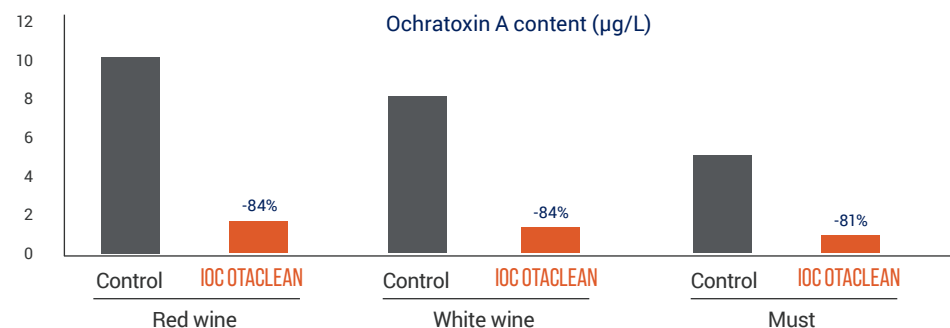
- Activated, vegan carbon.
- Application: An inert, highly absorbent active charcoal, with considerable internal surface area, which gives it a high capacity to remove colour from stained musts and wines. It has been specially designed to ensure that the bouquet of the wine is not affected.
- Dosage: Contact your Technical Sales Manager (legally allowed maximum dosage of 100 g/hL)
- SKU: 1 kg

## IOC OTACLEAN

### Remove unwanted spoilage compounds.

- Otaclean is a granular vegetal charcoal adapted to deodorise must and wine and is particularly active in eliminating OTA.
- Application: Adsorb wine defects including mould and vegetative aromas; remove OTA; low capacity for discolouration and avoids removing qualitative compounds.
- Dosage: 5 - 20 g/hL (organoleptic defects) or 20 - 40 g/hL (remove OTA).
- SKU: 1 kg

A treatment of **20 g/hL IOC OTACLEAN** is sufficient to reduce the Ochratoxin A content in both juice and wine by more than 80%. There is a limit to the amount of Ochratoxin A allowed in wines.



## IOC FLAVOCLEAN NEW

### A vegan charcoal, adapted to deodorising musts and wines.

- An active charcoal, adapted to removing unwanted aromas from must and wine. It is especially active against certain taints, like mould and vegetal characters. It is an inert, active charcoal with a high adsorbing capacity in regard to certain wine taints. It shows a relatively low capacity for discolouring.
- Dosage: Contact your Technical Sales Manager (legally allowed maximum dosage of 100 g/hL).
- SKU: 1 kg

## Treat reduction

### | IOC NETAROM

#### Remove reductive aromas.

- Derived from inactivated yeast selected for their capacity to adsorb compounds responsible for reductive notes caused by sulphur compounds.
- Application: Short-term contact; adsorption of various sulphur compounds (hydrogen sulphide, methanethiol, etc.); improves volume, complexity and roundness while preserving sensory characteristics, unlike treatments like copper.
- Dosage: 20 - 40 g/hL
- SKU: 1 kg

## Treat oxidation

### | IOC QI NO[OX]

#### [VEGAN WINES]

#### Treat oxidised wines and improve the sensory profile.

- Consists of pea protein, chitosan and bentonite that assists with rapid sedimentation. It is an alternative to casein. It has been developed for its anti-oxidative properties, to be used in wine.
- Application: Efficient removal of oxidised compounds while preserving the intrinsic qualities; restore freshness and fruitiness, as well as reviving the colour of oxidised wines; lessen organoleptic defects by eliminating bitter notes and oxidative aromas, while preserving aroma and taste properties.
- Dosage: 20 - 60 g/hL (white and rosé wine).
- SKU: 1 kg

# 9

PRODUCTS  
TO STABILISE WINE





# INTRODUCTION

## COLLOIDAL STABILISATION

### HOW ARABIC GUMS WORK IN WINE

Arabic gum essentially acts as a protective colloid that counters precipitation of suspended particles. It fosters dispersion and suspension of colloidal substances by creating a lattice around them which prevents them from agglomerating.

Unstable colloids are initially positively charged:

- Due to their natural instability, they lose their charge and start to agglomerate. As this agglomerate increases in size, they form a colloidal cloudiness that can either form a haze or precipitate.
- In contrast, arabic gum can offer colloidal protection by stabilising the negative charge. As such, these colloids repel one another and cannot agglomerate and thus the wine remains clear.

### THE IMPACT OF ARABIC GUMS IN WINE

There are two main families of arabic gums: those that stabilise and ones that impact the sensory profile, each possessing unique properties.

#### *Stabilising*

Protect against:

- Precipitations of colouring material.
- Metal precipitations (ferric and cupric).
- Tartrate precipitations, thus preserving metatartaric acid.

Maintaining molecules liable to flocculate in suspension (including after disgorging for sparkling wines).

#### *Sensory impact*

- Reduce astringency.
- Heighten body, roundness and palate weight.
- Enhance the sensory profile of the wine.

When the wine is ready for bottling, arabic gum, a natural product from Acacia tree, is used as a stabilising product against colloidal instability. It also improves the aroma and taste profile of the wine.

As a protective colloid, arabic gum counters precipitation of particles in suspension and must be used on wines prior to bottling i.e. wines on which fining has been carried out, wines that are stabilised and clear. Arabic gum is added the day before final filtration prior to bottling or after the filtration stage.

## CATALOGUE

### STABILISING/PROTECTIVE ARABIC GUMS

#### | IOC INOGUM MF

##### **Stabilise phenol compounds.**

- An arabic gum liquid solution, selected and purified, from Verec acacia, compatible with microfiltration. It is formulated from high quality arabic gum, selected for its stabilising and organoleptic properties.
- Application: Acts as a protective colloid with regards to various forms of physical or chemical instability: precipitations of colouring substances, unstable colloid particles and metallic precipitations (iron and copper); prevents unstable particles from linking and thus forming larger colloids liable to provoke problems of instability; particularly well-suited for treating white, rosé, red and fortified wines to avoid flocculation and precipitation of colouring material after bottling; little blocking effect and is compatible with all stages of filtration.
- Dosage: 150 - 400 mL/hL (avoid precipitation of colour material) or 200 - 500 mL/hL (sensory impact).
- SKU: 1 & 10 L

# QUALITY-IMPROVING ARABIC GUMS

## | IOC FLASHGUM R MF

**Improve mouthfeel, volume and fullness.**

- A micro-filtered arabic gum in liquid solution, from Seyal acacia. It is a solution of 20% arabic gum, filtered, sulfured at 0.5% and selected for its stabilising and organoleptic properties
- Application: Harmonise the structure of thinner wines and increase the impression of volume and fullness in the mouth; in young red wines marked by excessive astringency, it masks the excessive tannin sensation and increases the balance; provides wines with protection against various forms of chemical and physical instability; it is used as protective colloid to stabilise phenol compounds; a solution with a high level of clarity and stability and therefore recommended for treating wines whenever it is necessary to avoid clogging, flocculation or precipitation after bottling.
- Dosage: 20 - 50 mL/hL (white and rosé wines) or 40 - 80 mL/hL (red wines) or 50 - 90 mL/hL (fortified wines).
- SKU: 1 & 10 L

# BENTONITES

## | IOC BENT'UP

[VEGAN WINE]

**Bentonite for protein stabilisation.**

- High-performance, active sodium bentonite granules for stabilisation.
- Application: Clarification and improved stability; protein elimination in white wines prevent potential cloudiness; removal of reactive polyphenolic fractions reduce the precipitation of colour in the bottle; reduce percentage loss.
- When sending your wine samples to Vinlab to determine protein stability, you can request the analysis to be performed with IOC Bent'Up. This ensures true, reliable and accurate results when determining the correct product dosage.
- Dosage: 30 - 80 g/hL
- SKU: 15 kg

# 10



**MANNOPROTEINS**

**TO IMPROVE WINE QUALITY**

# INTRODUCTION

Mannoproteins are a naturally occurring group of proteins found in the cell walls of yeast, including that of *Saccharomyces cerevisiae*. The *S. cerevisiae* cell wall mainly consists of polysaccharides (glucans and mannans), but also contains proteins, particularly mannoproteins. Mannoproteins are large molecules, with molecular weights as high as 800 000 Daltons. They can have very diverse structures, which results in a diversity of properties.

Mannoproteins consist of a polypeptide (protein) backbone chain, with highly branched mannose (naturally occurring sugar similar to glucose in structure) side chains that are linked by glycosidic bonds. Mannoproteins usually consist of approximately 20% protein and 80% mannose.

Mannoproteins are released during fermentation and then later during autolysis. Different fractions of mannoproteins are released depending on the timing: mannoproteins of exocellular origin are released during fermentation, whilst cellular ones are released upon autolysis (end of alcoholic fermentation). The amounts that are released depend on: the yeast strain, degree of must clarification and post-fermentation storage conditions.

It is possible to increase the mannoprotein content in wine via: ageing on lees, the use of enzymes, use of yeast hulls and the addition of commercial mannoprotein preparations.

## Mannoproteins can influence:

- Protein and tartrate stability.
- Mouthfeel (volume, bitterness and herbaceousness).
- Sweetness and roundness.
- Polyphenols.
- Complexity.
- Aromatic persistence.
- Colour.
- Foam stability.

The production process of commercial mannoproteins involves various steps of heat and/or acid treatments and filtrations and ultra-filtrations. It is possible to obtain different fractions of mannoproteins by using different yeast strains as source material, different types of extraction methods and different conditions of ultra-filtration.

The protective colloid role played by mannoproteins is influenced by the mannose chain: it prevents the aggregation and precipitation of potassium bitartrate crystals and reacts with polyphenols avoiding oxidation. The impact of mannoproteins on the

sensory properties of the wine is influenced by the peptide backbone: the higher the protein fraction, the more interactive the mannoprotein is with aroma compounds.

Commercial mannoproteins can be used to supplement the naturally occurring mannoprotein fractions present in wine and enhance their positive effect.

# CATALOGUE

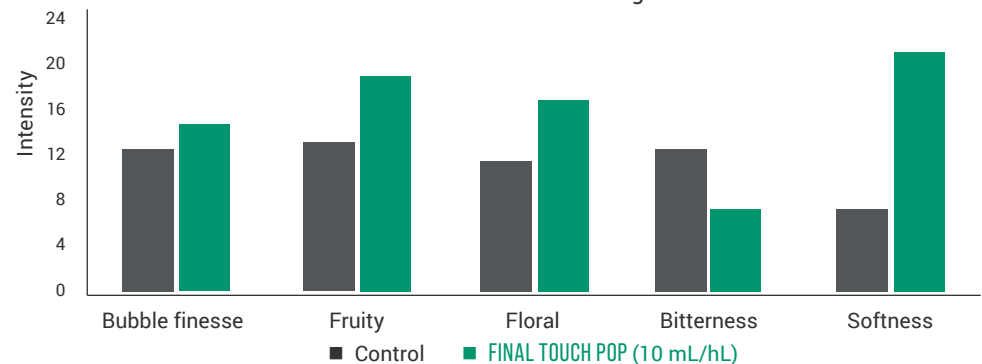
## PRE-BOTTLING AND FINISHING

### FINAL TOUCH POP

Improve the quality of sparkling wines.

- This is a unique mannoprotein-based solution that enhances the organoleptic qualities of sparkling wines, while also preserving their elegance, freshness and balance. The fermentation aromas and minerality of wines treated with Final touch Pop remain predominant during ageing and storage. The development of oxidative aromas (hints of ripe fruit, nuts and honey) is reduced and tannins are less astringent.
- Application: Improve the wine's structure and bubble quality; provide a refined aromatic profile and persistence; aids in elegance, freshness and balance; provide smooth and round mouthfeel; limit oxidation to increase longevity; reduce astringency of rosé and tannic sparkling wines; can also refresh base wines.
- Dosage: 20 - 40 mL/hL
- SKU: 1 L

The improved quality of Pinot noir/Chardonnay Spumante, tasted 9 months after treatment and bottling.

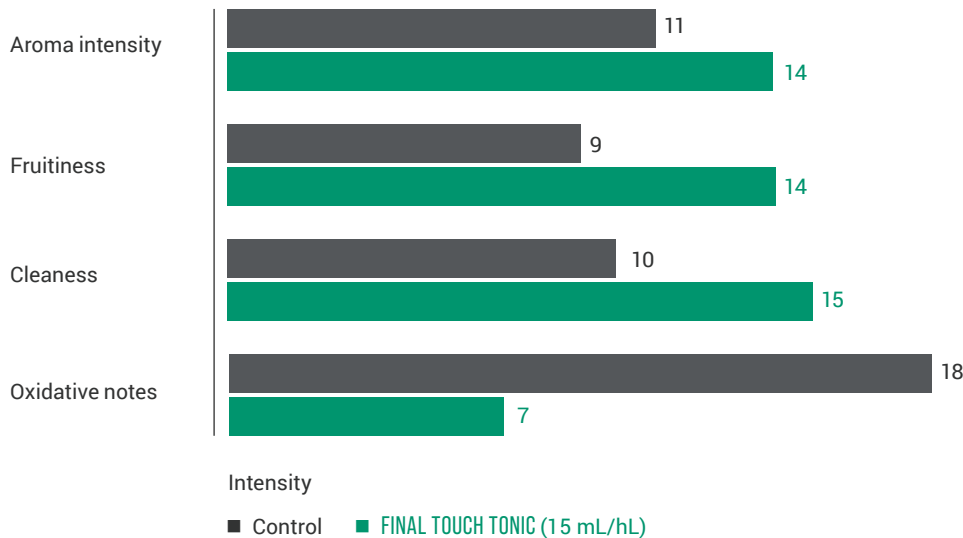


## FINAL TOUCH TONIC

Enhance quality and prevent premature ageing of white and rosé wines.

- Mannoproteins selected for their powerful reducing and protective colloid properties. Final touch Tonic preserves the initial aromatic freshness of white and rosé wines as they age.
- Application: Improve and preserve the freshness; protect from oxidation over time; promote aromatic expression and persistence; contribute to the wine's colloidal balance helping to improve its structure; add to the continuity of the wine, a lower perception of acidity and more balance overall.
- Dosage: 20 - 40 mL/hL
- SKU: 1 L

The improved quality of a white wine (Viognier, Vermentino, Marsanne and Rousanne) from the southern Rhone Valley, France, tasted 10 months after treatment and bottling.

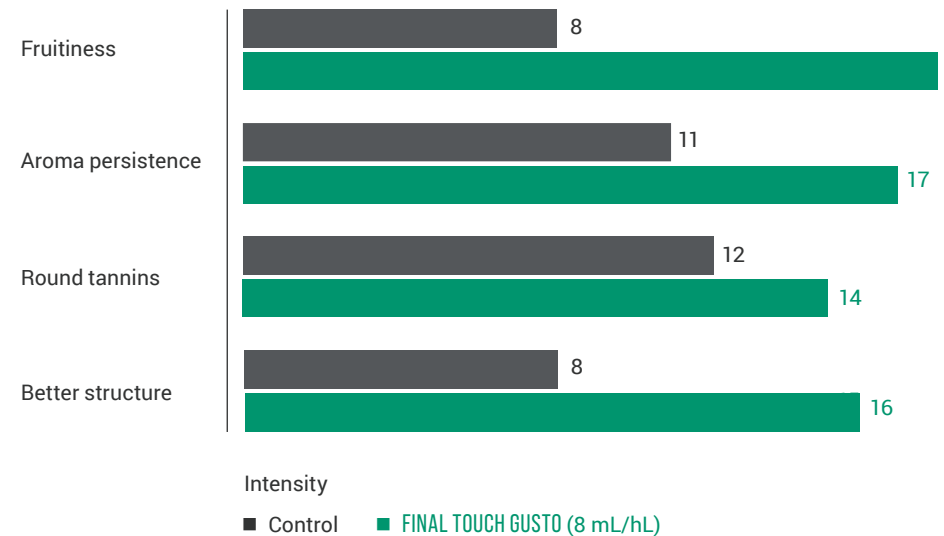


## FINAL TOUCH GUSTO

Enhancing the organoleptic and sensory properties of red wines.

- When used in red wines, this mannoprotein noticeably enhances the aroma intensity, fineness and freshness, as well as reducing the astringency of tannins.
- Application: Improve the aromatic intensity; promote freshness and fruitiness; reduce astringency, more significantly at lower dosages; contribute to a rounder wine structure.
- Dosage: 10 - 40 mL/hL
- SKU: 1 L

The improved quality of a red wine (Grenache and Shiraz) from the Languedoc, France, tasted 8 months after treatment and bottling.



# 11



SULPHUR  
PRODUCTS TO PROTECT WINE

# INTRODUCTION

Wine quality can be preserved with sulphur dioxide (SO<sub>2</sub>). Sulphur dioxide is used in wine for its anti-oxidant and anti-microbial properties. The effectiveness of SO<sub>2</sub> as an antimicrobial agent is dependent upon the pH, as well as the presence of other SO<sub>2</sub> binding compounds. As the pH increases, the portion of SO<sub>2</sub> that is active against microorganisms decrease. Therefore, an increase in the pH requires the addition of more SO<sub>2</sub> to maintain adequate antimicrobial activity.

There are three common forms of sulphur in wine: sulphur, sulphides and sulphites.

- **Sulphur (S):** Elemental sulphur is present in proteins and used on grapes to prevent rot.
- **Sulphides (H<sub>2</sub>S and mercaptans):** Rotten egg smell produced by yeast and bacteria (reduced sulphur).
- **Sulphites (SO<sub>2</sub> and all its forms):** Oxidised sulphur.

There are also three forms of sulphite: molecular sulphur dioxide (SO<sub>2</sub>), bisulphite ion (HSO<sub>3</sub><sup>2-</sup>) and sulphite ion (SO<sub>3</sub><sup>2-</sup>). These three forms can be bound to various compounds such as phenols, acetaldehyde and sugar, whilst the free forms exist in an equilibrium that is highly pH dependent (bound plus free equals total SO):



## ANTI-OXIDANT ACTION OF SO<sub>2</sub>

- Prevents enzymatic degradation by inhibiting the enzyme polyphenol oxidase and slows down oxidation.
- Mechanism: Denaturation of the enzyme so it loses functionality.
- It combines with products of wine oxidation, such as acetaldehyde, quinones and peroxide which limit their damaging impacts in wine.

## ANTI-MICROBIAL ACTION OF SO<sub>2</sub>

Effective against bacteria and non-*Saccharomyces* (*Saccharomyces* species are generally more tolerant).

The yeast cell membrane allows molecular SO<sub>2</sub> to enter the cell. The higher internal pH causes dissociation and the resultant sulphites bind with proteins and enzymes to

eventually kill the cell. Ions cannot enter the cell, hence only the molecular SO<sub>2</sub> generally present in smaller quantities, play an anti-microbial role. Since a lower pH results in more SO<sub>2</sub> present in the molecular fraction, pH management is key.

# CATALOGUE

## IOC SULFITANIN

### Sulphur adjustment.

- Sulfitanin is a solution of ammonium bisulphate and tara tannin at 100 g/L of pure SO<sub>2</sub> and is used to adjust sulphur levels in must. In the must tank for white wine production, Sulfitanin prevents oxidation and microbiological alterations. For red wines in the maceration tank, red colour is extracted and stabilised with the use of the product.
- Application: Antiseptic action prevents the growth of indigenous undesirable yeast and bacteria; prevents oxidation; helps to extract colour; tannins reinforce the anti-oxidant mechanism of SO<sub>2</sub> and gives better structure and ageing ability, without increasing the astringency in white wines; stabilise the colour in red wines.
- Dosage: 50 - 80 mL/hL (white and rosé wine) or 50 - 100 mL/hL (red wine during maceration).
- SKU: 5 & 10 L

## IOC INODOSE 5

### Sulphur adjustment in barrels.

- Inodose 5 contains effervescent potassium metabisulphite tablets that release sulphur dioxide when added to must or wine.
- Application: For the easy adjustment of the sulphur in wines being aged in barrel; useful when low dosages of sulphur dioxide is required; allow gradual, uniform release of the required dosage of SO<sub>2</sub>.
- Dosage: One tablet of Inodose 5 releases 5 g of SO<sub>2</sub>.
- SKU: 42 tablets

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## CATALOGUE SUMMARY





## PRODUCTS TO IMPROVE FERMENTATION

### Glutathione solutions

IOC Glutarom

### Yeast rehydration

Anchorferm  
Anchor Revive

### Nutrition

Natuferm Pure  
Natuferm Bright  
Natuferm Intense  
Natuferm Fruity  
Anchor Nourish  
Anchor Conquer

### Detoxification & protection

Extraferm D'tox  
Extraferm D'fend

## YEAST FOR ALCOHOLIC FERMENTATION

### Bioprotection and bio-acidification

IOC Gaïa  
IOC Calypso  
IOC BoreAL

### Non-Saccharomyces

Fermivin VINEAE

### White & rosé wine

Exotics Mosaic  
Exotics Novello  
Alchemy I  
Alchemy II  
Alchemy IV  
Legacy VIN 2000  
Legacy VIN 13  
Legacy VIN 7  
Legacy NT 116  
Legacy WE 14  
Legacy N 96

Fermivin 4F9<sup>ILR</sup>  
Fermivin XL  
Fermivin 3C<sup>NEW</sup>  
Fermivin IT61<sup>NEW; ILR</sup>  
Fermivin TS28<sup>NEW; ILR</sup>  
Fermivin PDM<sup>ILR</sup>  
IOC 18-2007  
IOC B 2000  
IOC TwICE  
IOC Infini' TwICE<sup>NEW</sup>  
IOC Dynamix<sup>NEW</sup>  
IOC Fresh Rosé  
IOC Be Thiols

### Red wine

Exotics Mosaic  
Exotics Novello  
Alchemy III  
Alchemy IV  
Legacy NT 202  
Legacy NT 50  
Legacy NT 116  
Legacy NT 112  
Legacy WE 372  
Legacy WE 14  
Fermivin VR5<sup>ILR</sup>  
Fermivin MT48  
Fermivin A33  
Fermivin XL  
Fermivin E73<sup>NEW; ILR</sup>  
IOC R 9008  
IOC Révélation Terroir  
IOC Smoozberry<sup>NEW</sup>

### Restart fermentation

Fermivin Champion

## BACTERIA FOR MALOLACTIC FERMENTATION

### Co-inoculation

Anchor Duet Arom  
Anchor Duet Soft  
Anchor Duet Mature

### Sequential inoculation

Anchor Solo Select  
IOC Inobacter

## ENZYMES TO IMPROVE PROCESSING & QUALITY

### Clarification

Rapidase Clear  
Rapidase Clear Extreme

### Extraction & maceration

Rapidase Extra Press  
Rapidase Extra Color

### Process improvement

Rapidase Flotation  
Rapidase Filtration  
Rapidase Fast Color

### Aroma extraction

Rapidase Expression Aroma  
Rapidase Extra Fruit

### Ageing & microbial control

Rapidase Batonnage  
Delvozyme

## PRODUCTS FOR FERMENTATION & CLARIFICATION

### Clarification

IOC Qi'UP XC  
IOC Colorprotect V  
IOC Inofine V  
IOC Bent'Up  
IOC Acticarbone

### Fining

IOC Qi Fine  
IOC Qi No[Ox]

## TANNINS TO ENHANCE WINE QUALITY

### Anti-oxidant

IOC Essential Antioxidant  
IOC Tanin Cristallin

### Protect & stabilise colour

IOC Tanin Bouquet R36  
IOC Tanin SR  
IOC Fullcolor  
IOC Essential PEP  
IOC Essential PEL  
IOC Tanifase Elevage

### Restore freshness & mask vegetal notes

IOC Essential Passion  
IOC Essential Free Veg

### Enhance sensory characters

IOC Essential Oak Sweet  
IOC Essential Oak Barrel  
IOC Essential Oak Strong  
IOC Privilège Bleu  
IOC Privilège Noir

## PRODUCTS TO FINE WINE

### Remove heavy metals

IOC Trap'Metals

### Organoleptic correctors

Extraferm D'tox  
IOC Fyneo  
IOC Colorprotect V  
IOC Qi Fine  
IOC Acticarbone  
IOC Carbion Eno<sup>NEW</sup>  
IOC Otaclean  
IOC Flavoclean<sup>NEW</sup>  
IOC Netarom  
IOC Qi No[Ox]

## PRODUCTS TO STABILISE WINE

### Stabilising/protective arabic gums

IOC Inogum MF

### Quality-improving arabic gums

IOC Flashgum R MF

### Bentonites

IOC Bent'Up

## MANNOPROTEINS TO IMPROVE WINE QUALITY

### Pre-bottling & finishing

Final touch Pop  
Final touch Tonic  
Final touch Gusto

## SULPHUR PRODUCTS TO PROTECT WINE

IOC Sulfitanin  
IOC Inodose 5