Diligent care has been taken to ensure that the information provided here is accurate. Since the user’s specific conditions of use and application are beyond our control, we give no warranty and make no representation regarding the results which may be obtained by the user. The user is responsible for determining the suitability and legal status of the use intended for our products.
OENOBOK N°7

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ABOUT US

OENOBRANDS
ADVANCED WINEMAKING SOLUTIONS

OUR MISSION

Oenobrands designs and markets oenological products. Its permanent innovation strategy allows the creation of solutions that provide an integrated answer for the ambitions and desires of winemakers, wine traders and consumers.

It is with a strong belief in the future of the industry and dealing with continous change that Oenobrands, supported by its world renowned parent companies (DSM Food Specialties and Anchor BioTechnologies) develops a range of oenological products including enzymes, yeasts, yeast-derived products and bacteria. With a highly qualified team, experts in many fields, Oenobrands strives to offer winemakers novel and scientifically sound solutions. Oenobrands distributes on five continents through a specialized distribution network its famous brands:

OENOBRANDS’®
ADVANCED WINEMAKING SOLUTIONS

OUR PARENT COMPANIES

Anchor BioTechnologies

Anchor BioTechnologies is a division of Anchor Yeast which has been South Africa’s premier yeast company since 1923. Anchor Yeast has remained the leader in the supply of yeast, dough raising and fermentation technology to the consumer, bakery, wine and alcohol industries in Southern Africa. The company has a talented workforce of 400 people, state-of-the-art production facilities and its own network of national distribution. Anchor Yeast has built its leadership position through a strong, competent management team that has maintained market focused Business Units, an ongoing commitment to: building brands, application of technology and high levels of customer service. More information on www.anchor.co.za.

DSM Food Specialties

DSM Food Specialties is a leading producer of value-added ingredient solutions for the international food and beverage industries, contributing in a major way to the success of the world’s favorite dairy, processed food, fruit juice, alcoholic beverage and functional food brands. DSM Food Specialties’ commitment to reliable and traceable products which meet today’s stringent safety and sustainability requirements is represented by its mark of excellence in nutrition: Quality for Life™. With 1,400 employees active in 25 locations worldwide, DSM Food Specialties is a true global player. More information about DSM Food Specialties can be found at www.dsm-foodspecialties.com and www.qualityforlife.com.
OUR PRODUCTION SITES AND LOGISTICS CENTER

FRANCE
RAPIDASE
- ISO 9001: 2008
- ISO 22000: 2005
- FSSC 22000

THE NETHERLANDS
NATUFERM
- ISO 9001: 2008
- FSSC 22000

ESTONIA
MAXAFERM

FRANCE
OUR LOGISTICS CENTER
- ISO 9001: 2008

FRANCE
ANCHOR CO-INOCULANT MALOFERM
- ISO 9001: 2008
- BRC

SOUTH AFRICA
ANCHOR WINE YEAST
- ISO 9001: 2008
- FSSC 22000

DENMARK
FERMIVIN, EXTRAFERM, CLARISTAR, FINAL TOUCH
- ISO 9001: 2008
- GFSI: FSSC 22000 / BRC / IFS
OUR SCIENTIFIC PARTNERSHIP NETWORK
BY PURCHASING OENOBRANDS PRODUCTS, YOU ARE HELPING TO FUND OENOLOGICAL RESEARCH CONDUCTED BY OUR SCIENTIFIC PARTNERS SUCH AS:

**FRANCE**

- INRA (INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE)
- INTER RHÔNE
- IFV (INSTITUT FRANÇAIS DE LA Vigne ET DU VIN)

**SOUTH AFRICA**

- UNIVERSITEIT STELLENBOSCH UNIVERSITY
- ARC - LNR

**AUSTRALIA**

- AWRI

**ITALY**

- CREA (CENTRO RICERCA E DEVELOPPMENTI AGRARI)
- FONDAZIONE EDUARD MAKH

**CHILE**

- UNIVERSIDAD DE CHILE

**GERMANY**

- WBI (STAATLICHES WEINBAUINSTITUT FREIBURG)

**SPAIN**

- VITEC (PARC TECNOLÒGIC DEL VI)
Antonio Álamo Aroca  
Area and Brand Manager  
+34 630 220 973  
antonio.alamo@oenobrands.com

Aurélien Bastiani  
Area and Brand Manager  
+33 6 45 15 45 24  
aurelien.bastiani@oenobrands.com

Annabelle Cottet  
Area and Brand Manager  
+33 4 67 72 77 40  
anabelle.cottet@oenobrands.com

Praisyl Dlamini  
Technical Consultant  
+27 82 907 0171  
pdlamini@anchor.co.za

Margaret Fundira - M.Sc MBA  
Director Bio-Technologies  
+27 82 883 4439  
mfundira@anchor.co.za

Agathe Garcia  
Sales and Marketing Assistant  
+33 4 67 72 77 46  
agathe.garcia@oenobrands.com

Sophie Grousset  
Supply and Customer Service Manager  
+33 4 67 72 77 47  
sophie.grousset@oenobrands.com
KATHY KEDZIOR
Administrative Officer
+27 21 534 1351
kkedziar@anchor.co.za

BLANDINE LEFOL
Area and Brand Manager
+33 4 67 72 77 43
blandine.lefol@oenobrands.com

ELDA LERM - M.SC
International Product Manager
+27 82 903 0694
elerm@anchor.co.za

MMULE MASALES - B.SC.
Technical Consultant
+27 82 882 3539
mmasales@anchor.co.za

DR. DONATELLA PETEGOLLI - PH.D.
Technical Sales and Brand Manager
+39 335 6044181
donatella.petegolli@oenobrands.com

DR. RÉMI SCHNEIDER
Product & Application Manager
+ 33 4 67 72 77 42
remi.schneider@oenobrands.com

TATIANA SOTNIKOVA
Administration & Accounting Manager
+33 4 67 72 77 45
tatiana.sotnikova@oenobrands.com

ISABELLE VAN ROLLEGHEM
Managing Director
+33 4 67 72 77 41
isabelle.van роллегем@oenobrands.com
RAPIDASE® WINEMAKING ENZYMES

Rapidase enzymes specific to winemaking, are produced by DSM Food Specialties, a leading global manufacturer of food enzymes. The enzymes in our range are produced in Seclin, in the north of France.

RAPIDASE ENZYMES FOR WINEMAKING REPRESENTS:

ACCELERATORS OF WINEMAKING PROCESSES
✓ results and time saving

TESTED & VALIDATED PRODUCTS
✓ partnerships with important research institutes

ONE ENZYME, ONE APPLICATION
✓ ease of choice and specific actions

A DSM PRODUCT
✓ traceability, quality, reproducibility

A HISTORICAL BRAND
✓ proud to be a pioneer

DSM SECLIN, OVER 100 YEARS OF EXPERIENCE!
DSM IN SECLIN: MORE THAN 100 YEARS OF EXPERIENCE

For many years, on an annual basis, Oenobrands has been organizing a visit of the plant in Seclin. This unique experience allows Oenobrands customers access to one of the biggest and most modern enzyme production plants in the world.

THE ENZYME PRODUCTION, IN STEPS:

OUR MANUFACTURING PROCESS

STAGE 1
- PRODUCTION STRAIN
- PRECULTURE PHASE 1
- PRECULTURE PHASE 2

STAGE 2
- INOCULUM FERMENTATION
- MAIN FERMENTATION
- BROTH FERMENTATION STORAGE

STAGE 3
- AUTOLYSIS KILLING (if needed)
- SEPARATION
- SOLID LIQUID MEMBRANE FILTERS
- FILTRATION ON PLATE 1
- FILTRATE STORAGE
- CONCENTRATION
- ULTRA-FILTRATION
- CHROMATOGRAPHY

STAGE 4
- FORMULATION
- FILTRATION ON PLATE 2
- FOOD SAFETY CERTIFICATION PERIMETER

STAGE 5
- FINAL PRODUCT STORAGE
- LIQUID WAY
- PACKAGING OF LIQUID ENZYME
- SPRAY DRYING GRANULATION
- MIXING STANDARDISATION
- SOLID WAY
- PACKAGING OF SOLID ENZYME

OUR SECLIN FACTORY, ONE CENTURY OF HISTORY

Auguste Boidin, the founder of Rapidase
Created in 1922 in the city of Seclin, in the North of France, Rapidase® has since proved its usefulness in speeding up industrial processes. Rapidase was the first and is today the most recognized brand of enzyme for winemaking applications.

To offer the best efficiency in application, each Rapidase formulation is developed and tested with the world’s most renowned wine research institutes and validated in wineries at production scale. Our technical and sales staff is available to provide you with tests results, as well as assist you in evaluating the product’s premium performances in your specific conditions.

<table>
<thead>
<tr>
<th>Rapidase®</th>
<th>Application</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expression Aroma</strong></td>
<td>Aroma precursor extraction in white grapes</td>
<td>Skin and pulp cell wall degradation</td>
</tr>
<tr>
<td><strong>Extra Press</strong></td>
<td>Efficient grape pressing</td>
<td>Pectin and insoluble protopectin degradation</td>
</tr>
<tr>
<td><strong>Clear</strong></td>
<td>Clarification of grape must</td>
<td>Pectin degradation</td>
</tr>
<tr>
<td><strong>Clear Extreme</strong></td>
<td>Complete clarification in difficult conditions</td>
<td>Pectin main and side chains degradation down to 6 °C</td>
</tr>
<tr>
<td><strong>Flotation</strong></td>
<td>Grape must flotation</td>
<td>Soluble pectin degradation</td>
</tr>
<tr>
<td><strong>Thermoflash</strong></td>
<td>Depectinization of thermo treated grape musts</td>
<td>Advanced pectin degradation up to 70 °C</td>
</tr>
<tr>
<td><strong>Fast Color</strong></td>
<td>Fast color and polyphenol extraction in short maceration processes</td>
<td>Loosening of grape skin cell walls</td>
</tr>
<tr>
<td><strong>Extra Fruit</strong></td>
<td>Aroma precursor extraction in red grapes</td>
<td>Skin and pulp cell degradation</td>
</tr>
<tr>
<td><strong>Extra Color</strong></td>
<td>Color and polyphenol extraction in quality maceration</td>
<td>Grape skin cell wall degradation</td>
</tr>
<tr>
<td><strong>Batonnage</strong></td>
<td>Release of molecules contributing to mouthfeel</td>
<td>Yeast cell wall degradation</td>
</tr>
<tr>
<td><strong>Revelation Aroma</strong></td>
<td>Varietal aroma revelation</td>
<td>Hydrolysis of glycosylated precursors</td>
</tr>
</tbody>
</table>
**Peace of mind comes with DSM enzymes**

Rapidase enzymes are made by DSM, one of the very few global market leaders in food enzymes. DSM enjoys the longest history in producing winemaking enzymes and commits to its reliability through its **Quality for life™** program. This commitment assures you that any DSM ingredient you buy is safe in terms of quality, reliability, reproducibility and traceability but also is manufactured in a safe and sustainable way. Any product specification, Material Safety Data Sheet, allergen and non-GMO, manufacturer certificates are available upon request.

<table>
<thead>
<tr>
<th>Liquid/granulate</th>
<th>Packaging</th>
<th>Principal activities</th>
<th>Secondary activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pectinases (main chain)</td>
<td>β-glucanase</td>
</tr>
<tr>
<td>G</td>
<td>100 g</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>L</td>
<td>20 kg</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>G/L</td>
<td>100 g</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>L</td>
<td>20 kg</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>L/L</td>
<td>100 g</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>L/L</td>
<td>5 kg</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>L</td>
<td>20 kg</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>L</td>
<td>5 kg</td>
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<td>G</td>
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<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
RAPIDASE® ENZYMES FOR RED GRAPE MACERATION: CLEAR, WINNING SOLUTIONS

Over the years, Oenobrands has partnered with several research institutes worldwide in numerous trials aimed at highlighting the crucial role played by Rapidase enzymes in red grape maceration. New data forthcoming from the 2016 harvest, once again confirmed the key role of enzymes and provided additional elements that discern the different behavior of maceration enzymes in the Rapidase range: Fast Color, Extra Color, and Extra Fruit.

When launched in 2016, this innovative liquid enzyme showed it could live up to even the most ambitious expectations. Users describe it as:

- It allows a faster rotation of maceration tanks, with a better management of the winery, particularly useful in the rush moment
- Is the ideal enzyme for short macerations (max 3 days) of young reds
- Is the solution for the maceration of red aromatic grapes
- Is easy to use, perfect for large volume tanks.

Analytical data also support this enzyme. Figures 1 and 2 show a comparison of musts from Croatina (a variety native to Northern Italy) after one day of maceration. The control sample (no enzyme added) is compared with a similar must added by with 15 g/t of Rapidase Fast Color. Rapidase Fast Color is most advantageous for short maceration.

**Figure 1.** Total anthocyanin content (mg/l) after one day of maceration. Croatina grapes, traditional maceration with pumping over, in 70 t vats, at a cooperative winery in Northern Italy.

**Figure 2.** Total polyphenol content (mg/l) after one day of maceration. Croatina grapes, traditional maceration with pumping over, in 70 t vats, at a cooperative winery in Northern Italy.
A classical Rapidase micro-granulated enzyme used for many years by thousand of winemakers and still a world famous icon of efficacy and quality.

A trial conducted by Vitec, a private research institute based in Priorat (Spain), highlighted the role of Rapidase Extra Color for enhanced anthocyanin and polyphenol extraction during 6-10 days of maceration. The trial was conducted under standard mini-vinification conditions with a control (no enzyme added).

The use of Rapidase Extra Color showed a positive effect on both color and polyphenols of the wine (Figure 3).

Figure 3. Color intensity and TPI values of Cabernet Sauvignon in mini-vinification conditions at the end of malolactic fermentation.

A unique micro-granulated enzyme with activities making it an alternative for maceration focusing on combined extraction of color and aromas.

Winemakers using Rapidase Extra Fruit reported that:
- This enzyme differs from all others, as lets us bring out the grape fruitiness
- In a week-long maceration, it helps to get wines with intense, bright color, while keeping the varietal aromas
- A reliable tool that helps in vintages when grapes don’t achieve full aromatic expression, respecting the delicate aroma compounds and enhancing the extraction

Rapidase Extra Fruit has a decisive impact on the extraction of grape aromatic compounds and also for color quality. Figure 4 shows the comparison of color intensity in Tempranillo wines, after maceration, without enzyme (control) and with 30 g/t of Rapidase Extra Fruit (trials at Vitec).

Figure 4. Absorbance at 420, 520 and 620 nm, (sum is color intensity). Tempranillo at 12 days of maceration.
EFFECTS AND INTERACTIONS OF ENZYME AND TANNIN ADDITIONS IN RED GRAPE MACERATION

With the scope of exploring the interaction between exogenous tannins and its maceration enzymes, Oenobrands commissioned a study at the Institute for Wine Biotechnology at Stellenbosch University (South Africa). The aim of this research was to evaluate the impact of two enzymes – Rapidase Extra Color and Rapidase Extra Fruit – in combination with two commercial tannins – proanthocyanidin (a mixture of grape skin and seed tannins) and ellagitannins (a mixture of chestnut and exotic wood tannins) – on wine quality in general and more specifically on color parameters.

Trials were carried out using mini-vinification of Cabernet Sauvignon grapes: sugar 255 g/l, pH 3.25, and total acidity 10 g/l (tartaric acid eq.). Figure 1 shows the winemaking protocol used.

Fermentation kinetics were regular and similar for all samples and took nine days to complete. The wines were analyzed:
- Two weeks after bottling
- Five months after bottling

The first observation obtained from the processed data, presented in Figures 2 and 3, is that the samples with added enzymes always show a better extraction of tannins (measured as a total polyphenol index using the Sarneckis Method, IP Trev) than in the control sample without added enzymes. A comparison of the two enzymes shows a difference in behavior with respect to the addition of tannins.

Figure 1. Summary diagram of the test performed by Institute for Wine Biotechnology, Stellenbosch University. Maceration enzymes were added at 50 g/ton upon inoculation. Tannin additions were done 24 h after that of the enzymes.

BOTTLENG

ALL THE TREATMENTS PERFORMED IN TRIPLECTES
Inoculation for each fermentation tank 20 g/l Anchor Vin 13

Cabernet Sauvignon Destemming, crushing

RAPIDASE EXTRA COLOR

RAPIDASE EXTRA FRUIT

NO ENZYMES

At the end of AF ➞ pressing ➞ 50 mg/l SO₂ ➞ 24 h at 15 °C ➞ wines racked off ➞ at 4 °C x 7 days ➞ free SO₂ adjusted to 40 mg/l
Figures 2 and 3. Total polyphenol index expressed in IPTrev of wines made with and without Rapidase Extra Color and Rapidase Extra Fruit, alone and combined with proanthocyanidin tannins (PT) and ellagic tannins (ET). Average of the three replicates.

**TREATMENT WITH RAPIDASE EXTRA COLOR:**
- Positive effect on wine polyphenolic content for both tested tannins and both ageing times
- Grape tannins work synergistically, resulting in wines with higher polyphenol levels that are more constant over time
- The ellagittannins also show a positive effect, although to a lesser extent

**TREATMENT WITH RAPIDASE EXTRA FRUIT:**
- Positive effect of the enzyme after two weeks and five months
- The tannins do not appear to have a synergistic effect
- The differences brought about by the type of tannin are modest

Figures 4 and 5 show color intensity in the different conditions.

**CONCLUSIONS**

The use of enzymes in red wine production was once again proved crucial, both for increased extraction of tannins and color, and for the quality of the color. Indeed, anthocyanins are seen to be more stable over time, thanks to their higher polymerization. The combined addition of Rapidase Extra Color and oenological tannins had a very positive synergistic effect with higher polyphenol content, more intense color, and more stability over time.
# Anchor yeast positioning for red wines

## Red Wine Yeast Strains

<table>
<thead>
<tr>
<th>Positioning</th>
<th>Icon wines</th>
<th>Complex wines</th>
<th>Intense fruit red wines</th>
<th>Production of structured wines</th>
</tr>
</thead>
</table>
| Attributes  | • Intense aromas for complex wines - red and black fruits, cocoa, floral (violets)  
• Partially consumes malic acid, very malolactic friendly  
• Higher the potential alcohol, the better the possibility to lower alcohol and produce glycerol  
• Has pectinolytic activity which contributes to wine clarification  
• Fructophilic  

• Scientifically formulated for complex aroma profiles  
• Stable fruity esters with significant aroma contribution  
• Big producer of phenylethanol - rose aroma and complexity  
• Good structure and body  

• Scientifically formulated for intense aromatic profiles  
• Longevity of esters - wines to be aged  
• Red fruit  
• Significant aroma intensity  

• Fructophilic  
• Stimulates MLF  
• Very high alcohol tolerance  
• Blackberry, blackcurrant, tobacco and prune aromas  
• Red berries in Merlot and Cabernet  |
| Type        | Interspecies hybrid  
Yeast blend  
Yeast blend  
Intraspecies hybrid  |
| Cold Tolerance | 18 °C  
16 °C  
16 °C  
18 °C  |
| Cold Soaking | no  
no  
no  
no  |
| Optimum Temp. | 18 - 28 °C  
16 - 28 °C  
16 - 28 °C  
20 - 28 °C  |
| Alcohol Tolerance | 15.5 %  
15.5 %  
15.5 %  
16.0 %  |
| Fructose Utilisation | very good  
good  
good  
very good  |
| Glycerol | 9 - 13 g/l  
8 - 11 g/l  
8 - 11 g/l  
9 - 12 g/l  |
| VA | < 0.4 g/l  
< 0.5 g/l  
< 0.5 g/l  
< 0.3 g/l  |
| SO₂ Production | none to very low  
none to very low  
none to very low  
none to very low  |
| MLF Compatibility | very good  
good  
good  
very good  |
| Nitrogen Demand | average  
average  
average  
average  |
| POF (HCDC %) | promotes pyranoanthocyanins  
promotes pyranoanthocyanins  
promotes pyranoanthocyanins  
25  |
# RED WINE YEAST STRAINS

<table>
<thead>
<tr>
<th></th>
<th>NT 50</th>
<th>NT 116</th>
<th>NT 112</th>
<th>WE 372</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positioning</strong></td>
<td>Fruit forward, easy drinking, early release wines</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Attributes** | • Enhances strawberry, raspberry, cherry, blackberries, blackcurrant and spicy aromas  
• Floral aromas in Merlot  
• Red berry and chocolate in Pinot noir  
• Cold tolerant, good for cold soaking  
• Good for both wooded and unwooded wines  
• Masks green characters  
• Glycerol producer that softens the tannins and confers good mouthfeel | • Cold tolerant, good for cold soaking  
• Blackberry and blackcurrant in Cabernet Sauvignon and Shiraz  
• Red berries in Merlot | • Winses with firm tannin structure, good for ageing  
• Blackberry and blackcurrant in Cabernet Sauvignon and Shiraz  
• High alcohol tolerance  
• Fructophilic  
• For wines where delayed MLF is desired for micro-oxygenation  
• Can produce SO₂ under stress conditions which can affect MLF | • Enhances red berry and floral aromas  
• Suitable for most red grape varieties  
• Suitable for semi-sweet wines (slows down with low temperature) |
| **Type** | Intraspaces hybrid | Intraspaces hybrid | Intraspaces hybrid | Nature isolate |
| **Cold Tolerance** | 13 °C | 11 °C | 20 °C | 16 °C |
| **Cold Soaking** | yes | yes | no | no |
| **Optimum Temp.** | 14 - 28 °C | 12 - 28 °C | 24 - 28 °C | 18 - 28 °C |
| **Alcohol Tolerance** | 16.5 % | 16.0 % | 16.0 % | 15.0 % |
| **Fructose Utilisation** | average | average | very good | average |
| **Glycerol** | 11 - 13 g/l | 5 - 12 g/l | 9 - 11 g/l | 10 - 12 g/l |
| **VA** | < 0.3 g/l | < 0.3 g/l | < 0.4 g/l | < 0.3 g/l |
| **SO₂ Production** | low | very low | average to high | none |
| **MLF Compatibility** | good | good | average to poor | good |
| **Nitrogen Demand** | high | low | average | average |
| **POF (HCDC %)** | 30 | 25 | 12 | promotes pyranoanthocyanins |
# Anchor yeast positioning for white wines

## White Wine Yeast Strains

<table>
<thead>
<tr>
<th>Positioning</th>
<th>Icon white wines</th>
<th>Very high ester producer</th>
<th>Thiol releaser and converter</th>
<th>Barrel fermented, complex and aromatic white wines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
<td>• Produces exotic fruit notes - stone fruit (peach, apricot), thiols, floral and lychee&lt;br&gt;• Good for barrel fermentations, temperature sensitive&lt;br&gt;• Good mouthfeel&lt;br&gt;• Suitable for Chardonnay, Chenin blanc and Viognier&lt;br&gt;• Fructophilic&lt;br&gt;</td>
<td>• Fruity and floral esters&lt;br&gt; • To a lesser extent thiols (granadilla, gooseberry and grapefruit) - adds to complexity&lt;br&gt; • Chenin blanc and Chardonnay (rich and ripe style)&lt;br&gt; • Very high alcohol tolerance&lt;br&gt; • Cold fermentation&lt;br&gt; • Complex white wines&lt;br&gt; • Scientifically formulated for optimum aromatic profiles&lt;br&gt;</td>
<td>• Thiol releaser and converter - granadilla and guava&lt;br&gt; • All thiol varieties - Chenin blanc, Colombard and Verdelho&lt;br&gt; • High alcohol tolerance&lt;br&gt; • Cold fermentation&lt;br&gt; • Scientifically formulated for optimum aromatic profiles&lt;br&gt;</td>
<td>• Floral and citrus - Viognier&lt;br&gt; • Tropical and citrus notes - Chardonnay&lt;br&gt; • Rich and ripe style&lt;br&gt; • Chenin blanc - pineapple, papaya and citrus&lt;br&gt; • Very fructophilic (good for Chardonnay) - reliable fermentation&lt;br&gt; • Good mouthfeel</td>
</tr>
<tr>
<td>Type</td>
<td>Interspecies hybrid</td>
<td>Yeast blend</td>
<td>Yeast blend</td>
<td>Intraspecies hybrid</td>
</tr>
<tr>
<td>Cold Tolerance</td>
<td>18 °C</td>
<td>12 °C</td>
<td>12 °C</td>
<td>12 °C</td>
</tr>
<tr>
<td>Optimum Temp.</td>
<td>18 - 28 °C</td>
<td>13 - 16 °C</td>
<td>13 - 16 °C</td>
<td>13 - 16 °C</td>
</tr>
<tr>
<td>Alcohol Tolerance</td>
<td>15.5 %</td>
<td>15.5 %</td>
<td>15.5 %</td>
<td>15.5 %</td>
</tr>
<tr>
<td>Fructose Utilisation</td>
<td>good</td>
<td>good</td>
<td>good</td>
<td>very good</td>
</tr>
<tr>
<td>Glycerol</td>
<td>9 - 13 g/l</td>
<td>5 - 7 g/l</td>
<td>5 - 7 g/l</td>
<td>9 - 10 g/l</td>
</tr>
<tr>
<td>VA</td>
<td>&lt; 0.4 g/l</td>
<td>&lt; 0.5 g/l</td>
<td>&lt; 0.5 g/l</td>
<td>&lt; 0.4 g/l</td>
</tr>
<tr>
<td>SO₂ Production</td>
<td>none to very low</td>
<td>none to very low</td>
<td>none to very low</td>
<td>none to very low</td>
</tr>
<tr>
<td>Nitrogen Demand</td>
<td>average</td>
<td>average to low</td>
<td>average</td>
<td>low</td>
</tr>
<tr>
<td>POF (HCDC %)</td>
<td>80</td>
<td>&lt; 20</td>
<td>&lt; 20</td>
<td>13</td>
</tr>
</tbody>
</table>
### WHITE WINE YEAST STRAINS

<table>
<thead>
<tr>
<th></th>
<th>Fresh and fruity, white and rosé wines</th>
<th>Thiol releaser and converter</th>
<th>Produces aromatic, crisp white wines</th>
<th>Suitable for sparkling wines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POSITIONING</strong></td>
<td>High ester producer, releaser and converter of thioles, floral and muscat notes</td>
<td>Most effective yeast for thiol liberation, with intense aromatics</td>
<td>Producer of acetate esters (tropical fruit salad), zesty citrus and volatile thioles</td>
<td>Primary and secondary fermentations</td>
</tr>
<tr>
<td></td>
<td>No volatile phenols, very clean aroma profile</td>
<td>Grapefruit, guava, passion fruit and gooseberry</td>
<td>Cold tolerant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extremely alcohol tolerant</td>
<td>Cold tolerant</td>
<td>Adds aromas to neutral varietals and enhances all other white varietals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very cold tolerant</td>
<td>All thiol varieties - Sauvignon blanc, Chenin blanc and Colombard</td>
<td>Good for early release white wines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very fast fermentation</td>
<td>VA producer - follow Anchor guidelines to minimise VA formation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rosé wines (strawberry and raspberry aromas) from all red grape varieties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ATTributes</strong></td>
<td>• High ester producer, releaser and converter of thioles, floral and muscat notes</td>
<td>• Most effective yeast for thiol liberation, with intense aromatics</td>
<td>• Producer of acetate esters (tropical fruit salad), zesty citrus and volatile thioles</td>
<td>• Primary and secondary fermentations</td>
</tr>
<tr>
<td></td>
<td>• No volatile phenols, very clean aroma profile</td>
<td>• Grapefruit, guava, passion fruit and gooseberry</td>
<td>• Cold tolerant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Extremely alcohol tolerant</td>
<td>• Cold tolerant</td>
<td>• Adds aromas to neutral varietals and enhances all other white varietals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Very cold tolerant</td>
<td>• All thiol varieties - Sauvignon blanc, Chenin blanc and Colombard</td>
<td>• Good for early release white wines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Very fast fermentation</td>
<td>• VA producer - follow Anchor guidelines to minimise VA formation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rosé wines (strawberry and raspberry aromas) from all red grape varieties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>type</strong></td>
<td>Intraspecies hybrid</td>
<td>Nature isolate</td>
<td>Intraspecies hybrid</td>
<td>Nature isolate</td>
</tr>
<tr>
<td><strong>Cold Tolerance</strong></td>
<td>10 °C</td>
<td>13 °C</td>
<td>11 °C</td>
<td>11 °C</td>
</tr>
<tr>
<td><strong>optimum Temp.</strong></td>
<td>12 - 16 °C</td>
<td>13 - 16 °C</td>
<td>12 - 28 °C</td>
<td>12 - 28 °C</td>
</tr>
<tr>
<td><strong>Alcohol Tolerance</strong></td>
<td>17.0 %</td>
<td>14.5 %</td>
<td>16.0 %</td>
<td>16.5 %</td>
</tr>
<tr>
<td><strong>Fructose Utilisation</strong></td>
<td>good</td>
<td>good</td>
<td>average</td>
<td>poor</td>
</tr>
<tr>
<td><strong>Glycerol</strong></td>
<td>5 - 7 g/l</td>
<td>5 - 7 g/l</td>
<td>5 - 12 g/l</td>
<td>5 - 7 g/l</td>
</tr>
<tr>
<td><strong>VA</strong></td>
<td>&lt; 0.3 g/l</td>
<td>0.4 - 1.8 g/l</td>
<td>&lt; 0.3 g/l</td>
<td>&lt; 0.3 g/l</td>
</tr>
<tr>
<td><strong>so₂ Production</strong></td>
<td>none to very low</td>
<td>none</td>
<td>very low</td>
<td>average</td>
</tr>
<tr>
<td><strong>Nitrogen Demand</strong></td>
<td>low</td>
<td>complex nutrient</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td><strong>POF (HCDC %)</strong></td>
<td>12</td>
<td>18</td>
<td>25</td>
<td>positive</td>
</tr>
</tbody>
</table>
A leader in innovation

IF YOU ARE NOT FIRST, YOU ARE LAST!

Anchor Yeast is the leading new world wine yeast brand. We underpin this statement by constantly being a leader when it comes to innovation, world firsts and pioneering inventions. As a result of this rich history, Anchor Yeast has 93 years of experience in the manufacturing of yeast, initially for the baking industry and later the wine industry.

We created the world’s first commercialized hybrid wine yeast in 1991: Anchor VIN 13. The pioneering of a hybrid wine yeast, together with our unique ball-shaped yeast, making a bold statement, a strain that till this day remains the benchmark for all hybrid strains. Our hybrid yeast strain count now stands at nine, even including a natural hybrid, Anchor VIN 7, isolated from nature.

In order to ensure we deliver reliability, repeatability and the purest product, we introduced routine DNA fingerprinting of all our commercial yeast strains in 1993. We wanted to share the South African success story of Anchor Yeast with you, the world, and started exporting active dried wine yeast in 1997.

Our innovative spirit also extends to other products. The year 2008 saw us be the first company in the world to launch yeast blends to enhance wine aroma based on the metabolic interactions between specific yeast strains. Alchemy I for ester production and Alchemy II for thiol release in white wines were launched with great success and acclaim.

Being the leading authority on hybridization, we expanded our successful portfolio with the creation of the world’s first Saccharomyces paradoxus hybrid when we launched Anchor Exotics SPH in 2010: a commercial strain providing all the benefits of aroma and complexity of a spontaneous fermentation, with none of the risks. The year 2010 also saw us increase our international footprint with the creation of Oenobrands, a joint venture between Anchor Biotechnologies and DSM Food Specialties.

Based on the success of the yeast blends, we stepped into the malolactic bacteria arena, launching first the Anchor Co-Inoculant Bacteria in 2010 and the Anchor Co-Inoculant Bacteria 3.2 in 2016. Both cultures are based on what we do best: providing wine quality and aroma enhancing tools for winemaking. These two bacteria products are the world’s first blends of bacteria developed specifically for co-inoculation and aroma enhancement.

2016 was a busy year, as we also answered the demand from you, the world wide wine industry, and very successfully launched Anchor Alchemy III and IV, providing you with carefully selected blends of yeast strains to enhance wine complexity and the intense fruit aroma in red wines.

As we celebrated 40 years of supplying the South African industry with wine yeast in 2015, today we celebrate the distribution of Anchor wine yeast to five continents and 40 countries!

‘Innovation distinguishes between a leader and a follower.’ – Steve Jobs
First hybrid wine yeast

Routine DNA fingerprinting of yeast

Yeast blends for thiols and esters

Established social media presence

Interspecies S. paradoxus hybrid

New blend of O. oeni and L. plantarum bacteria for co-inoculation and aroma

Yeast blends for complex and intense fruit in red wines

New blend of O. oeni and L. plantarum for co-inoculation in red and white wines

www.anchorwinyeast.com
Anchor Alchemy: The success story of the yeast blends

ALCHEMY: A MAGICAL PROCESS OF CREATION

Anchor Alchemy yeast blends have been developed specifically for the production of New World style aromatic white and red wines: ester and thiol enriched white wines and complex and intense fruit-driven red wines. Anchor Yeast is the first wine yeast brand in the world to launch commercial yeast blends to enhance wine aroma based on the metabolic interaction between specific yeast strains present in the blend, rather than the cumulative effect of the individual strains.

Based on this research, Anchor Yeast has developed, in collaboration with the Australian Wine Research Institute (AWRI), four yeast blends for the increased aromatic intensity, flavor and complexity of white and red wines. They consist of a blend of wine yeasts in scientifically formulated ratios to enhance their synergistic effect. For the production of white wines: Anchor Alchemy I and Anchor Alchemy II launched in 2008. For the production of red wines: Anchor Alchemy III and Anchor Alchemy IV launched in 2016. These yeast blends are also highly robust strains that can withstand the rigors and challenges of modern winemaking, including temperature, alcohol and sugar tolerance.

For the creation of Anchor Alchemy I and II, the first step was to identify the commercial strains with the highest aromatic potential, followed by evaluation of the yeast blends and concluded with the evaluation of the blends containing specific ratios of the various yeast strains.
When comparing the production of some of the most important volatile compounds (esters and volatile thiols), commercial Anchor Yeast strains compared to other commercial strain consistently produced the highest concentrations of the highly aromatic volatile aroma compounds (Table 1). These include the volatile thiols 3-mercaptohexan-1-ol (3Mh), 3-mercaptophexylacetate (3MHA) and 4-methyl-4-mercaptopentan-2-one (4MMP) and the esters isoamyl acetate, 2-phenylethyl acetate, and 2-methyl butyl acetate.

### TABLE 1. VOLATILE AROMA COMPOUNDS ENHANCED WITH ALCHEMY I AND II:

<table>
<thead>
<tr>
<th>ESTERS</th>
<th>VOLATILE THIOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoamyl acetate</td>
<td>3Mh</td>
</tr>
<tr>
<td>Phenylethyl acetate</td>
<td>3MHA</td>
</tr>
<tr>
<td>2-Methylbutyl acetate</td>
<td>4MMP</td>
</tr>
<tr>
<td>Banana, pear, fruity, sweet</td>
<td>Grapefruit, passion fruit, guava</td>
</tr>
<tr>
<td>Floral, rose, honey</td>
<td>3MHP, Blackcurrant, box tree</td>
</tr>
<tr>
<td>Fruity, banana, candy</td>
<td>Passion fruit, box tree, guava</td>
</tr>
</tbody>
</table>

In 2007, commercial trials with yeast blends containing three yeast strains in specific ratios, resulted in the creation of Anchor Alchemy I and II, launched as commercial products in 2008 (Figure 1). Anchor Alchemy I is developed specifically for the enhancement of the ester profile in a variety of white wine cultivars. On the other hand, Anchor Alchemy II is used to enhance the volatile thiol profile of white wines.

![Figure 1. Comparison between Anchor Alchemy I and Anchor Alchemy II and other yeast blends (A, B, C and D) with different ratios of yeast strains.](image-url)
Based on the success of Anchor Alchemy I and II, we immediately started concentrating on applying this highly successful concept to red wines. As a result, we once again collaborated with the AWRI to create Alchemy blends for the production of high quality, aromatic and complex red wines. The project commenced in 2008, with the use of non-GMO techniques to create mutants of an existing Anchor Yeast strain. The most promising blend was selected and trialled in various ratios. These blends (as seen in Figure 2), results in two different styles of wine (evaluated on Cabernet Sauvignon and Tempranillo).

![Figure 2](image)

**Figure 2.** Aromatic profile of Alchemy III and IV (intensity score: from 0 to 5).

Following trials in 2015 in 6 countries, 48 cellars, 16 cultivars, 15,000 hl fermented must and 450 kg of each product used, Anchor Alchemy III and IV were successfully launched in 2016. Anchor Alchemy III for the production of complex red wines and Anchor Alchemy IV for the production of intense, fruit-driven red wines. The clear enhancement in the complexity and/or fruit profile of the wine is as a direct result of the increased production of aromatic compounds (Table 2). In conjunction, a decrease in methoxypyrazines masks green characters.

### TABLE 2. VOLATILE AROMA COMPOUNDS ENHANCED WITH ALCHEMY III AND IV:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Phenylethanol</td>
<td>Rose</td>
</tr>
<tr>
<td>2-Phenylethyl acetate</td>
<td>Floral and fruity</td>
</tr>
<tr>
<td>Ethyl hexanoate</td>
<td>Fruity</td>
</tr>
<tr>
<td>β-Ionone</td>
<td>Raspberry</td>
</tr>
<tr>
<td>β-Damascenone</td>
<td>Violets</td>
</tr>
</tbody>
</table>
Based on the successful launch of Anchor Alchemy III and IV in 2016 in the Northern Hemisphere, we have asked you, the winemakers, to share your experience with the two new products and the wines you have produced.

SO WHAT DID YOU HAVE TO SAY ABOUT THESE NEW AMAZING YEAST BLENDS?

ALCHEMY IV gave me fast fermentation kinetics, a lot of fruit and even more floral aromas.

I trialled the new strains in 2015 and based on my experience, I decided to buy the product when it was launched in 2016.

When I used ALCHEMY IV, I found that it did not necessarily change, but rather enhanced the varietal character and complexity.

ALCHEMY IV really created wines with a large amount of mouthfeel, structure and complexity.

When I used ALCHEMY IV on Cabernet Sauvignon and Petit Verdot, I definitely noticed a reduction in the pyrazines.

With ALCHEMY IV, we got really clean wines, a lighter mouthfeel compared to ALCHEMY III, with loads of fruit intensity.

ALCHEMY III gave us excellent results in slightly greener or less ripe wines and reduced the methoxypyrazines and green characteristics.

It is so easy to understand the difference between the two products: the complexity you get with ALCHEMY III and the fruit aroma intensity you get with ALCHEMY IV.

It is so easy to understand the difference between the two products: the complexity you get with ALCHEMY III and the fruit aroma intensity you get with ALCHEMY IV.

I trialled the new strains in 2015 and based on my experience, I decided to buy the product when it was launched in 2016.

When I used ALCHEMY IV, I found that it did not necessarily change, but rather enhanced the varietal character and complexity.

ALCHEMY III really created wines with a large amount of mouthfeel, structure and complexity.

When I used ALCHEMY IV on Cabernet Sauvignon and Petit Verdot, I definitely noticed a reduction in the pyrazines.

With ALCHEMY IV, we got really clean wines, a lighter mouthfeel compared to ALCHEMY III, with loads of fruit intensity.

ALCHEMY III gave us excellent results in slightly greener or less ripe wines and reduced the methoxypyrazines and green characteristics.

It is so easy to understand the difference between the two products: the complexity you get with ALCHEMY III and the fruit aroma intensity you get with ALCHEMY IV.

The results speak for themselves. In fact, you, the winemakers, have confirmed the success of our blends year after year. Besides the aromatic and quality benefits, these yeast blends are robust and created to provide a secure fermentation in a wide range of conditions. If you are interested in creating magic, then we have the solution for you: Anchor Alchemy.
Last year, Oenobrands launched the world’s second blend of bacteria in the form of the Anchor Co-Inoculant Bacteria 3.2 for conducting malolactic fermentation in red and white wines, whilst enhancing wine complexity. In 2016 we collaborated with our research partner VITEC in Spain, to investigate the impact of tannin usage during co-inoculation on the quality of Cabernet Sauvignon and the impact of using French oak chips during co-inoculation on the quality of Chardonnay.

THE IMPACT OF TANNIN USAGE DURING CO-INOCULATION WITH THE ANCHOR BACTERIA

In Cabernet Sauvignon (22 °Brix, pH 3.45, malic acid 1.76 g/l), Anchor Yeast NT 202 was co-inoculated with either the Anchor Co-Inoculant Bacteria or the Anchor Co-Inoculant Bacteria 3.2, with the presence or absence of commercial fermentation tannins (1 g/l). Fermentations, conducted at 22 °C, received a macro-oxygenation treatment and micro-oxygenation as needed. The finished wines underwent sensory analysis by a trained panel, as well as aroma compound analysis. All treatments completed alcoholic fermentation (AF) within 7 days after inoculation. Malolactic fermentation (MLF) completed within 9 days. The average maximum acetic acid concentration reached 0.3 g/L after the completion of AF and MLF.

The presence or absence of tannins had no impact on the fermentation performance of the yeast or the bacteria. The addition of the tannin however did have a positive impact on the wine sensory profile. All the wines were subjected to sensory analysis by the VITEC sensory panel. Figure 1 clearly shows the increased overall sensory quality, color intensity, fruitiness and spicy notes of the wine that was treated with tannins, whilst reducing the green characteristics and bitterness.

The same effect is present when the Anchor Co-Inoculant 3.2 was used in the co-inoculation. The tannin treatment resulted in wines with increased volume/mouthfeel, spicy notes, finish and persistence, as well as overall sensory quality (Figure 2).

![Figure 1. Sensory evaluation of the Anchor Co-Inoculant Bacteria with and without a commercial tannin addition.](image1)

![Figure 2. Evaluation of the Anchor Co-Inoculant Bacteria 3.2 with and without commercial tannin addition.](image2)
The different effect on the wine style becomes clear when you compare the two bacteria on the basis of the sensory evaluation (Figure 3). The new Anchor Yeast Co-Inoculant Bacteria 3.2 provides more intense, volume-driven wines, whereas the fruit profile is enhanced with the original Anchor Co-Inoculant Bacteria. Whilst the addition of fermentation tannins during co-inoculation of the yeast and bacteria have no negative impact on the alcoholic or malolactic fermentation, the use of tannins has an impact by significantly increasing the concentration of total esters measured after the completion of fermentation (Figure 4).

![Figure 3. A comparison of the Anchor Co-Inoculant Bacteria and the Anchor Co-Inoculant Bacteria 3.2 (both with tannin additions) and their impact on the aroma profile.](image)

![Figure 4. Total ester concentration (µg/l).](image)

Both the Anchor Co-Inoculant Bacteria and the Anchor Co-Inoculant Bacteria 3.2 are two excellent tools at the disposal of the discerning winemaker who is not just interested in the completion of the malolactic fermentation, but using the process to also enhance the aromatic and sensory profile of the wine and increasing the final quality.
The Fermivin® range includes yeast strains selected for many applications: to achieve rapid and complete fermentations; for red, white, rosé or sparkling wines; for the revelation of thiols, terpenes, fruity, floral and mineral aromas; for the production of wines for early release or to be aged; or to restart stuck fermentations.

<table>
<thead>
<tr>
<th>FERMIVIN</th>
<th>WHITE</th>
<th>ROSE</th>
<th>RED</th>
<th>SPARKLING</th>
<th>WINE STYLE &amp; TASTING NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS2</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
<td>Classical sparklings&lt;br&gt;Very clean and subtle aroma</td>
</tr>
<tr>
<td>SM102 (FERMIBLANC AROM)</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
<td>Delicate, light and aromatic wines&lt;br&gt;Floral, fruity, good mouthfeel</td>
</tr>
<tr>
<td>VB1</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td>Dry whites (Riesling, Grüner Veltliner, ...)&lt;br&gt;Floral, musc, lime, apple, minerality</td>
</tr>
<tr>
<td>3C</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td>Round fruity, barrel fermented&lt;br&gt;Citrus, acacia, well balanced</td>
</tr>
<tr>
<td>TS28</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td>Aromatic and crisp thiol types&lt;br&gt;Boxwood, gooseberry, mineral (stone flint)</td>
</tr>
<tr>
<td>JB3 (FERMIFLOR)</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>Aromatic lights&lt;br&gt;White flowers, rose, pineapple</td>
</tr>
<tr>
<td>AR2</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>Intensely aromatic wines&lt;br&gt;Very fruity, candy, banana</td>
</tr>
<tr>
<td>4F9</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>Fruity wines with a long finish&lt;br&gt;Grapefruit, stone fruits, tropical fruits, volume</td>
</tr>
<tr>
<td>LVCB</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
<td>Trendy fresh aromatic and mineral wines&lt;br&gt;Citrus, pear, apricot, minerality</td>
</tr>
<tr>
<td>E73 (FERMBLEU)</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td>Early release fruity reds&lt;br&gt;Red berries, stone fruits, freshness</td>
</tr>
<tr>
<td>PF6</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td>Fruity and elegant reds&lt;br&gt;Bright red fruits, subtle earthy notes, spices, smooth tannins</td>
</tr>
<tr>
<td>XL</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>Fruity smooth&lt;br&gt;Soft tannins, harmonious, red fruits</td>
</tr>
<tr>
<td>MT48</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>Fruity spicy&lt;br&gt;Red fruits, plum, spices and smooth mouthfeel</td>
</tr>
<tr>
<td>VR5</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>Structured wines to be aged&lt;br&gt;Red and black fruits, jam, full-bodied</td>
</tr>
<tr>
<td>A33</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>Structured and complex wines&lt;br&gt;Complex aromas of fruits, chocolate, tobacco, well-balanced</td>
</tr>
<tr>
<td>7013 (FERMIVIN)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>All types of still wines, fruit wines and base wines for distillation&lt;br&gt;Varietal and terroir typicities</td>
</tr>
<tr>
<td>PDM</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Multipurpose yeast for safe fermentations&lt;br&gt;Varietal and terroir typicities</td>
</tr>
<tr>
<td>CHAMPION (FERMICHAMP)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>To insure complete fermentation in difficult conditions and to restart stuck fermentations Varietal and terroir typicities</td>
</tr>
</tbody>
</table>

Available in formulation In-Line Ready
« For each strain, one performance »: all the strains have been selected to answer a specific need from the wine industry. Oenobrands evaluated, tested and validated the yeasts with its partner institutes to highlight the unique feature of each strain and to provide winemakers with well defined solutions to their needs. Thus, each yeast strain is promoted for a unique characteristic (cryophilic, revealing thiol aromas, producing high esters, releasing polysaccharides, etc.).

We have reviewed our application data sheets to make this characteristic much more visible and complete, with the aim of giving clear direct information to winemakers and to help them in the production of a specific type of wine.

In the following table, we summarize the main feature specific to each Fermivin strain, the type of winemaking and aroma profiles they produce.

<table>
<thead>
<tr>
<th>FERMIVIN</th>
<th>FEATURES OF THE YEAST STRAIN</th>
<th>LARGE PACKAGING AVAILABLE IN 500 GRAMS AND ALSO IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10 kg 15 kg LR 10 kg</td>
</tr>
<tr>
<td>LS2</td>
<td>Primary and secondary fermentation</td>
<td>✔</td>
</tr>
<tr>
<td>SM102</td>
<td>Synthesis of ethyl esters of fatty acids</td>
<td>✔</td>
</tr>
<tr>
<td>VB1</td>
<td>Preserves the aromatic freshness</td>
<td>✔</td>
</tr>
<tr>
<td>3C</td>
<td>High production of polysaccharides and β-damascenone</td>
<td>✔</td>
</tr>
<tr>
<td>TS28</td>
<td>Important release of thiols and production of ethyl esters</td>
<td>✔</td>
</tr>
<tr>
<td>JB3</td>
<td>High production of higher alcohol acetate esters</td>
<td>✔</td>
</tr>
<tr>
<td>AR2</td>
<td>High production of ethyl and acetate esters</td>
<td>✔</td>
</tr>
<tr>
<td>4F9</td>
<td>Thiol converter Important release of polysaccharides</td>
<td>✔</td>
</tr>
<tr>
<td>LVCB</td>
<td>Important production of ethyl esters</td>
<td>✔</td>
</tr>
<tr>
<td>E73</td>
<td>Cryophilic Good production of fermentation esters</td>
<td>✔</td>
</tr>
<tr>
<td>PF6</td>
<td>High production of polysaccharides and glycerol Release of aromatic C13 compounds</td>
<td>✔</td>
</tr>
<tr>
<td>XL</td>
<td>High adsorption of astringent tannins</td>
<td>✔</td>
</tr>
<tr>
<td>MT48</td>
<td>High production of glycerol Soft tannins and complex aromatic hints</td>
<td>✔</td>
</tr>
<tr>
<td>VR5</td>
<td>High extraction of polyphenols, favors color stability</td>
<td>✔</td>
</tr>
<tr>
<td>A33</td>
<td>Enhance polyphenols content and complex aromas</td>
<td>✔</td>
</tr>
<tr>
<td>7013</td>
<td>Fast and complete fermentation, high ethanol conversion</td>
<td>✔</td>
</tr>
<tr>
<td>PDM</td>
<td>Secure fermentations</td>
<td>✔</td>
</tr>
<tr>
<td>CHAMPION</td>
<td>Fructophilic High alcohol tolerance</td>
<td>✔</td>
</tr>
</tbody>
</table>

*LaRge PaCkaging*

lArge PaCkaging

avAlaible in 500 grAmS and also in:

<table>
<thead>
<tr>
<th></th>
<th>10 kg</th>
<th>15 kg</th>
<th>LR 10 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
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</table>

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Fermivin® Strains for Thiol-Type Wines

Fermivin TS28 strongly optimizes the clivage of thiol aroma precursors, giving very intense wines with hints of boxwood, gooseberry and minerality (stone flint). The aroma profile has shown a strong release of thiol aromas (3MH and 4MMP), and also esters (in particular 2-phenylethanol), giving very intense, fresh and modern wines.

Fermivin 4F9 is an excellent releaser of thiols and converter of 3MH into its acetate 3MHA, giving intense and stable guava and passion fruit aromas in wines produced from grape varieties containing thiol precursors. Releasing large quantities of polysaccharides, Fermivin 4F9 gives wines with volume, roundness and very well-balanced.

Figure 1. Thiol content in wines.
Figure 2. Ethyl ester and higher alcohol content in wines.
Figure 3. Thiol content in wines.
Figure 4. Volatile thiol release and conversion.
**FERMIVIN® STRAINS FOR RED WINES**

**Figure.** Positioning of Fermivin strains for red wines depending on the winemaking process and the type of wine obtained.

**EARLY RELEASE FRUITY WINES**
Fermivin E73, as a cryophilic yeast strain, is especially suitable for fermenting must that undergoes cold prefermentation maceration. It is a high fermentation esters producer, especially wished in thermovinification.

**FRUITY SPICY WINES**
Fermivin MT48 is suitable for maceration (short, long or following a flash détente). Producing high concentrations of glycerol, resulting in finished wine that is rounder on the palate. It gives round, expressive wines with soft tannins and complex aromatic hints. It is suitable for wines matured for short periods (6-12 months).

**FRUITY SMOOTH WINES**
Fermivin XL has a great ability to adsorb the most astringent tannins and thus reduces wine astringency. It produces fruity red wines with soft tannins. It is suitable for short maceration and use of flash détente.

**FRUITY AND ELEGANT WINES**
Fermivin PF6 promotes the release of C13-compounds (especially β-ionone), which typify the aroma of fruity red wines. It produces very little astringency. It ferments well at low temperatures and is therefore suitable for cold soaking or flash détente.

**WINES TO BE AGED**
Fermivin VR5 promotes optimum polyphenol extraction and stabilization over time, pyrano-anthocyanin formation and polysaccharide release. This gives a more robust structure and stable color to wines destined for ageing over extended periods.

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Fermivin VR5 promotes optimum polyphenol extraction and stabilization over time, pyrano-anthocyanin formation and polysaccharide release. This gives a more robust structure and stable color to wines destined for ageing over extended periods.

**FRUITY AND ELEGANT WINES**
Fermivin PF6 promotes the release of C13-compounds (especially β-ionone), which typify the aroma of fruity red wines. It produces very little astringency. It ferments well at low temperatures and is therefore suitable for cold soaking or flash détente.

**STRUCURED WINES**
Fermivin A33, highly alcohol resistant strain, gives structured wines with well defined aroma of blackcurrant, chocolate and fresh tobacco. The phenolic structure and low volatile acidity of the wines obtained are ideal for a cellaring with wood and provide ageing potential.
FERMIVIN AND MALOFERM PLUS: THE PERFECT MATCH

With the launch of Maloferm PLUS in 2016, Oenobrands brought you a highly efficient malolactic starter culture for completing malolactic fermentation under challenging conditions. This highly robust *Oenococcus oeni* culture successfully handles low pH, high alcohol and high sulphur dioxide and low temperature conditions. All this whilst preserving the varietal characters and freshness of the wine with very little diacetyl and no biogenic amine production.

The next step was to investigate the compatibility of the Fermivin yeast strains for alcoholic fermentation (AF) with Maloferm PLUS. A project was launched in 2016, with the Centro di Ricerca per l’Enologia (CREA) in Asti, Italy. These trials were performed in white (Arneis; 22 °Brix, pH 3.60) and red (Barbera; 22 °Brix, pH 3.26) wines with a variety of Fermivin yeast strains (Table 1). After the completion of the AF, Maloferm PLUS was inoculated (sequential) at 1 g/hl.

Two control treatments were included: T1 received no bacteria inoculation and T2 was inoculated with Fermivin LS2 for AF and another commercial *O. oeni* culture.

**TABLE 1. TREATMENTS IN ARNEIS AND BARBERA MUST AND/OR WINE**

<table>
<thead>
<tr>
<th>WHITE MUST (ARNEIS) TREATMENTS</th>
<th>RED MUST (BARBERA) TREATMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fermivin LS2 (T1)</td>
<td>Fermivin LS2 (T1)</td>
</tr>
<tr>
<td>Fermivin LS2 with commercial <em>O. oeni</em> culture (T2)</td>
<td>Fermivin LS2 with commercial <em>O. oeni</em> culture (T2)</td>
</tr>
<tr>
<td>Fermivin LS2 with Maloferm PLUS</td>
<td>Fermivin PF6 with Maloferm PLUS</td>
</tr>
<tr>
<td>Fermivin LVCB with Maloferm PLUS</td>
<td>Fermivin MT48 with Maloferm PLUS</td>
</tr>
<tr>
<td>Fermivin 3C with Maloferm PLUS</td>
<td>Fermivin VR5 with Maloferm PLUS</td>
</tr>
<tr>
<td></td>
<td>Fermivin A33 with Maloferm PLUS</td>
</tr>
</tbody>
</table>

In Arneis, all the treatments completed AF successfully with a total duration of between 15 and 22 days. For the MLF conducted with Maloferm PLUS (Figure 1), there was a difference in the duration of the fermentation between the treatments. T1 did not complete MLF. The treatments completed MLF in 6 to 9 days after inoculation. The average VA concentration across the treatments at the end of MLF, measured 0.39 g/l in a wine with 12.7 % vol. alcohol. From these results, it is clear that the Fermivin yeast strains evaluated are compatible with Maloferm PLUS.

In Barbera, all the treatments completed AF successfully with a total duration of approximately 22 days. For the MLF conducted with Maloferm PLUS (Figure 2), there was a difference in the duration of the fermentation between the treatments. T1 did not complete MLF. The rest of the treatments completed MLF in 17 to 23 days after inoculation. The average VA concentration at the end of MLF, measured 0.27 g/l in a wine with 12.9 % vol. alcohol.
The wines underwent a preference tasting. In both wines, the Fermivin yeast with Maloferm PLUS treatments were preferred to the treatment with no MLF (T1) and/or the treatment where MLF was conducted with another bacteria culture (T2). In Figure 3 it is clear that the Fermivin/Maloferm PLUS treatments rank the highest in aroma, taste and overall preference.

From these results, it is clear that the Fermivin yeast strains evaluated in white and red wines are compatible with Maloferm PLUS, a robust and effective bacteria culture that completed MLF in a short period of time.
Yeast addition has never been so simple with In-Line Ready®: a tested, proven and now PATENTED technology!

An advanced winemaking solution from Oenobrands and Silverson

Based on the observation that a simple error during the yeast addition phase may be significantly detrimental to winery productivity and wine quality, our technical team pursued solutions to modernize this stage of the process. Three years of research and testing enabled Oenobrands and Silverson to launch In-Line Ready® in 2013: this dual technology for the yeast addition phase consists of a high-shear solid-liquid mixer and dry yeasts whose formulation and production method have been adapted to the direct-addition conditions applied by the machine.

The yeasts produced with the innovative In-Line Ready technology are subjected to high shear forces through the Silverson FMY45 mixer, resulting in their instant dispersal, hydration and consequent activation.

The range is growing with the addition of 3 new strains:
In-Line Ready technology enables the production of high-quality aromatic wines

Aroma analysis has been carried out through many comparative tests with the same yeast strain, applied in the traditional way and with **In-Line Ready** technology. The analytical data have shown slightly higher production of esters from fermentation with **In-Line Ready** yeasts.

**Must oxygenation**

In trials conducted in 2015 using the Silverson FMY45 equipment, oxygenation of must was carried out prior to yeast addition, resulting in increased cellular multiplication with greater viability and consequently shorter lag phases compared with the control tanks.

**Testimonial**

“During the 2014 and 2015 harvests, we carried out different tests using the **ILR FMY45** machine, in conjunction with **ILR Fermivin PDM** yeasts, on musts of the Palomino grape – a noble variety that is not excessively aromatic. We were looking to improve the process of adding yeast, as well as other oenological products, to must, so as to improve the resulting wine. As a conclusion to the good results obtained, we decided to purchase an ILR machine, and thus made almost the entire 2016 harvest using **In-Line Ready** technology.

The results have been very satisfactory: from a practical and economic perspective, preparation time has been significantly reduced, and from an oenological perspective, the wines produced are fresher and more fragrant than those made using the traditional method. The quality of these wines has been recognised by the Regulatory Council of Denomination of Origin (DO) Jerez-Xérèz-Sherry.

We also tested the oxygenation of musts before the start of fermentation – with very good results – by opening the addition valve slightly to allow the entry of air while the must was recirculated. Given the good results obtained, **ILR technology** has been used for the same purpose by other companies within the González Byass Group, in other wine regions in Spain, with equally satisfactory results.”

**RAFAEL ARNEDO, Enologist and Head of the Microbiology and Control Laboratory, Bodegas González Byass, Jerez, Spain.**
DEDICATED WINEMAKING SUPPORT

OENOBRANDS’ AIM IS THAT YOU FEEL SAFE! WHILE YOU ARE FERMENTING YOUR MUSTS BY USING THE RIGHT Yeast AND NUTRITION.

Our nutrients are like bees - specifically formulated for a dedicated performance - and together they support life by bringing food to yeast.

**THE NUTRIENT BOOSTER FOR ESTER AROMA**

**Natuferm®** is a yeast nutrient made from 100% autolyzed yeast rich in organic nitrogen. Its high concentration of free amino acid promotes the production of aromatic fermentation esters and increases yeast viability towards the end of alcoholic fermentation.

Recommended dosage: 20 to 30 g/hl to be added during the first third of alcoholic fermentation (when density < 1060).

**THE NUTRIENT DESIGNED FOR FEEDING YOUR Yeast THE BEST**

**Maxaferm®** is a complete yeast nutrient based on yeast hulls, diammonium phosphate and thiamine. It provides the nutrients required for yeast multiplication, improves yeast alcohol tolerance and also yeast viability in the final phase of fermentation.

Recommended dosage: sequential addition of 20 g/hl at the start of fermentation (12-24 hr after yeast addition), followed by 20 to 40 g/hl at mid-fermentation to optimize the product effectiveness.

**THE CELL WALL FOR DETOXIFICATION**

**Extraferm®** consists 100% of highly adsorbant and odorless yeast hulls. It improves fermentation conditions by removing toxic compounds from must and wine, such as fatty acids, ochratoxin (OTA) and dibutyl phtalate. By adsorbing wine contaminants such as anisoles (TCA, TBA, PCA, TecA etc.), **Extraferm** binds unpleasant smells and tastes, thereby restoring wine quality.

Recommended dosage: 20 to 40 g/hl.

Extraferm® stands out for its high efficiency in the adsorption of wine contaminants, while retaining all the organoleptic qualities and the flavor of the treated wine. This ability is due to the exclusive HALO (High Adsorption Low Odor) process used to produce Extraferm yeast hulls. This unique production process allows Extraferm to be highly specific in adhering to undesirable contaminants without affecting wine aroma. This makes Extraferm the best solution for eliminating undesirable compounds without adulterating the organoleptic qualities of the treated wine or introducing yeast-like odors.

Oenobrands formulates its products with primary grown yeast, dried with selected technologies. Special care is taken to produce micro-granulated products that do not clump. Their complete suspension is obtained within a few seconds.

Oenobrands nutrition products are designed to provide specific fermentation support and their composition is then adapted to provide the desired effect.

All products are based on highly technical yeast fractions produced with the strictest quality standards.
Nitrogen Management in Fermentation

Yeast nitrogen requirements depend on the yeast strain and increase with:
- High sugar content
- Turbidity below 60 NTU
- Temperature below 16 °C
- Infection of grapes by fungi such as *Botrytis cinerea*

Also when Yeast Assimilable Nitrogen (YAN) is below 150 mg/l, there is an increased risk of reduction and stuck fermentation.

YAN is the sum of free amino acids and inorganic (ammonia and ammonium) nitrogen that can be assimilated by yeasts during alcoholic fermentation. FAN (Free Assimilable Nitrogen) corresponds to the sum of free amino acids. FAN calculation excludes proline and hydroxyproline, as they are not metabolized by yeast under anaerobic conditions.

### Product Selection Table

<table>
<thead>
<tr>
<th>NEED TO...</th>
<th>NATU ferm</th>
<th>MAXA ferm</th>
<th>EXTRA ferm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support yeast growth</td>
<td>★★</td>
<td>★★★</td>
<td></td>
</tr>
<tr>
<td>Reduce lag phase</td>
<td>★★★</td>
<td>★★★</td>
<td></td>
</tr>
<tr>
<td>Enhance yeast viability</td>
<td>★★★</td>
<td>★★★</td>
<td>★★</td>
</tr>
<tr>
<td>Promote ester aroma production</td>
<td>★★★</td>
<td></td>
<td>★★★</td>
</tr>
<tr>
<td>Avoid H₂S production</td>
<td>★★★</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adsorb undesirable compounds</td>
<td>★★★</td>
<td></td>
<td>★★★</td>
</tr>
</tbody>
</table>

*Yan is the sum of free amino acids and inorganic (ammonia and ammonium) nitrogen that can be assimilated by yeasts during alcoholic fermentation.*

*FAN (Free Assimilable Nitrogen) corresponds to the sum of free amino acids. FAN calculation excludes proline and hydroxyproline, as they are not metabolized by yeast under anaerobic conditions.*
Oenobrands is able to provide qualitative selected mannoprotein-based solutions because of its knowledge of yeast/mannoprotein biochemistry, its expertise in extraction and production, as well as its know-how on the enological applications of mannoproteins.

**Production Process**

1. **Cream of Yeast**
   - Different yeast strains can be used as starting material

2. **Extraction of Mannoproteins**
   - Different types of Extraction can be applied

3. **Soluble Mannoprotein Fraction**

4. **Micro & Ultra Filtration**
   - Different conditions of Ultrafiltration can be used

5. **Stabilization**

6. **Formulation of Mannoprotein Solution**

**Future Mannoprotein Solutions**

---

**What Makes Our Mannoprotein Products Unique?**

- The mannan chains can be of different lengths.
- The relative proportions of peptide and mannan fractions can vary.
- The peptide part can be of different sizes.

Oenobrands expertise on Mannoprotein structure and their possible applications.
NOT ONLY A TARTRATE STABILIZER, BUT ALSO AN IMPROVER OF WINES

Claristar® is an inhibitor of potassium hydrogenotartrate crystallization for white, rosé and even red wines, with long-lasting effects.

Users describe it best and 98% of them described Claristar as easy-to-use, fast, precise and gentle on wines. The reason is that the liquid formulation facilitates an instant stabilizing effect allowing a perfect homogenization and filtration close to the addition.

Oenobrands, expert in oenological applications of mannoproteins, has worked closely with laboratories and partners in order to supply an analytical method accompanying Claristar (Würgig-Montagnani test based on Checkstab equipment).

This method is based on successive conductivity tests informing you whether the wine is suitable for Claristar addition, as well as the correct dosage at which you will achieve tartrate stability of your specific red, white or rosé wine.

Many winemakers worldwide already benefit from the use of Claristar and can testify to its added value. This innovative liquid ingredient is easily used by following the simple application recommendations. Today we estimate that more than 65% of Claristar customers have been using the product for more than 4-5 years.

STABILIZE + IMPROVE
How to make your sparkling wines perfect

**Final touch® POP** is a unique mannoprotein-based solution, specially formulated to improve the quality of sparkling wines. **Final touch POP** noticeably enhances the organoleptic qualities and preserves the elegance, freshness and balance of the wine over time.

The immediate and lasting effects found on sparkling wines are:
- Softness
- Best expression and aromatic persistence
- Greater freshness, elegance and organoleptic balance
- Better effervescence

Moreover, the use of **Final touch POP** can extend the potential commercial shelf life.

The positive effects of **Final touch POP** are noticeable at a dose rate of 10 to 40 ml/hl, with its addition after the second fermentation: immediately before bottling (Charmat method), or to the dosage of liqueur added after disgorging (Traditional method).

---

Users talk about it!

"We've been using **Final touch POP** now in the cellar for six months and we are very pleased with the results. It works especially well with our older vintages of Method Cap Classique (traditional). **Final touch POP** gives a refined aromatic profile, aids in freshness and gives a smooth and round mouthfeel. What I love most about the product is that I just add it directly to the liqueur at disgorgement; it is easy and straightforward to use. It definitely gives our wines an extra sparkle!"

Winemaker in South Africa

---

Comparison of 2 Pinot noir/Pinot meunier sparkling wines (6 bars pressure - 10 g/l residual sugars) after 12 months respectively with and without **Final touch POP** at 20 ml/hl.
How to make your white and rosé wines perfect

**Final touch** TONIC is a selected mannoprotein-based solution, extracted from a specific strain of *Saccharomyces cerevisiae* to protect the aromatic freshness of white and rosé wines.

**Final touch TONIC** preserves the quality of white and rosé wines while they age as it does contain mannoproteins selected for their powerful reducing and protective colloid properties.

The immediate and lasting effects found on white and rosé wines are:
- Greater freshness and less oxidative aroma
- Better aromatic intensity and punchier taste
- More finesse and organoleptic qualities

Moreover, the use of **Final touch TONIC** prevents premature ageing of the wine aromas and can extend the potential commercial shelf life of the wines.

The positive effects of **Final touch TONIC** are noticeable at a dose rate of 20 to 50 ml/hl, with its addition immediately before bottling.

**Users talk about it!**

"**Final touch TONIC** is the first mannoprotein you can taste with the nose. I add 20ml/hl in my terpenic wines and 30 to 40 ml/hl for thiol-containing wines. **Final touch TONIC** does immediately increase the freshness, clean the wine profiles and is very easy to use."

Winemaker in Italy

Comparison of 2 Chardonnay still wines from 2014 vintage after 8 months respectively with and without **Final touch TONIC** at 30 ml/hl.
OENOBRANDS IS PROUD TO PRESENT YOU
THE FUTURE INNOVATIONS IN ITS BRAND PORTFOLIO

1. **Rapidase Protease**: this totally new protease will be used for the protein stabilization of white musts and wines. As soon as the OIV approves the use of protease, we will be ready to offer another innovative solution to improve the quality of wine.

2. **Rapidase Filtration**: this revolutionary enzyme formulation will help winemakers to improve the filterability of their wines whatever the filtration technique used.

3. **New Anchor Exotics** strain (in addition to the existing one): among other unique features, this new Interspecies hybrid will bring extraordinary flavor contribution to red wines.

4. **Final touch solution for the red wines**: These mannoprotein product will contribute to the colloidal stability and quality of red wines.
Short and efficient maceration

RAPIDASE
FAST COLOR

Liquid enzyme for fast color and polyphenol extraction in short maceration processes

Peace of Mind comes with DSM enzymes

Rapidase enzymes are made by DSM, one of the very few global market leaders in food enzymes. DSM enjoys the longest history in producing winemaking enzymes and commits to its reliability through its Quality for Life® program. This commitment assures you that any DSM ingredients you are buying is safe in terms of quality, reliability, reproducibility and traceability but also is manufactured in a safe and sustainable way. Any product specification, Material Safety Data Sheet, allergen and non GM, manufacturer certificates is available upon request.

OENOBRANDS SAS
Parc Agropolis II - Bât 5
296 Boulevard de la Lironde
CS 54001 - 34197 Montpellier Cedex 5
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- TANK VOLUME

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- Extrapolates instantly volumes used for tasting with volumes available in the cellar
- Instantly calculates likely analytical parameters of wine batches created during the blending session
- Calculates the remaining available volume of each wine batch, and the volume of the blend created
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B R I L L I A N T  W I N E S  M A D E  W I T H  R E N O W N E D  Y E A S T S!

**PF6**
FOR FRUITY AND ELEGANT RED WINES
SUITABLE FOR COLD SOAKING

**MT48**
FOR FRUITY SPICY RED WINES
WITH SOFT TANNINS

**A33**
FOR STRUCTURED RED WINES WITH
OPTIMIZED POLYPHENOL EXTRACTION

**TS28**
FOR AROMATIC AND CRISP
THIOL RICH WINES

**3C**
FOR ROUND & FRUITY WINES RICH IN
β-DAMASCÈNONE AND POLYSACCHARIDES

OENOBRANDS SAS
Parc Agropôle II - Bât S
2756, Boulevard de la Lorraine
34400 Montpellier Cedex 5
RCS Montpellier - SIREN 331265304
info@oenobrands.com
www.oenobrands.com

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