



# WELCOME



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## 2013: A YEAR IN WHICH WE HONOR CONTINUITY AND CELEBRATE CHANGE

On the continuity side, 2013 is a big anniversary year. It was 80 years ago that our predecessor firm, Berkeley Yeast Laboratory, was founded at the close of Prohibition by Julius Fessler. Mr. Fessler was a key industry figure during the next 30 years. Notably, he was the ASE (now American Society of Enology and Viticulture, ASEV) "Person of the Year" in 1958. We believe he is the only industry supplier to have ever been so honored. It is also now 50 years since Robert Scott purchased Berkeley Yeast Laboratory from Mr. Fessler. Several years later the company moved from Berkeley and was renamed Scott Laboratories, Inc.

2013 also marks 40 years at the Scott companies for both Martin Vagners and Tom Anders. Together they are the longest tenured persons at Scott. Martin joined Scott Laboratories, Ltd. (Canada) as General Manager in the early 1970's. He can truly be called a "founding father" of that company. Tom Anders began at Scott USA at roughly the same time. Though he initially worked in our lab, Tom quickly moved to our outside sales team. Since the 1980's he has also served as Vice President. Both Tom and Martin are deeply valued for their extensive knowledge, hard work and friendship. Undoubtedly, many of you have also had the pleasure of working with them over the last four decades. It is an honor to have them as colleagues.

Finally, this year also marks another important anniversary—the 40th harvest in which we have offered yeast produced by Lallemand. In that first year the offering consisted of two strains. Obviously, a lot has changed over time, with this year being no exception.

In addition to 14 new products in this year's Handbook, we have also added a completely new section—Stability. This category includes **Claristar**, an innovative new product approach to tartrate stability. In addition, after several years of waiting, **No Brett Inside** has now been approved by the TTB and is available for continual use. We feel that this is a revolutionary new tool for the control of *Brettanomyces*, an issue that continues to plague the industry at all levels. Next, as part of our ongoing efforts to bring you the most innovative value-added products, we are excited to showcase a new supplier, AiRD Innovations in Chemistry®. AiRD specializes in environmentally sound cellar cleaning and sanitation products. Since it is our belief that a clean cellar is an important key to maintaining wine quality, these products are a logical addition to our portfolio. Please take the time to review the New Products page for a complete listing of this year's new offerings, which also includes new malolactic nutrients, a new yeast strain, new tannins in our proprietary Scott'Tan line, and more.

As always, we wish you a great harvest and look forward to speaking with you soon!

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## VENDOR NOTICE

The information in this booklet is, to the best of our knowledge, true and accurate. The data and information, however, are not to be considered as a guarantee, expressed or implied, or as a condition of sale of our products. Furthermore, it is understood by both buyer and vendor that wine is a natural product. Circumstances such as fruit qualities and cellar conditions are infinitely variable. It is the responsibility of the buyer to adapt the use of our products to such circumstances. There is no substitute for good winemaking practices or ongoing vigilance.

## Please Note:

Trade of wine between the United States, Canada and other nations and/or trade blocs (such as the European Community) may involve restrictions. In particular these may involve proscription or limitation on the allowable levels of certain ingredients in fermentation aids, fining agents or stabilization products. To the best of our knowledge, all products described in this Handbook when used as described herein are legal for use in wine made in the United States and sold in the United States and Canada. To the best of our knowledge, all products (other than lysozyme products and Velcorin) described in this Handbook are also legal for wine made in Canada for sale in either Canada or the United States. Conditions of trade with other nations and trade blocs are subject to ongoing change beyond the control of Scott Laboratories, Inc. or of Scott Laboratories, Ltd. It is the responsibility of users of our products to be informed of current restrictions of other countries or trade blocs to which they wish export and to use only products and product levels which conform to those restrictions.

# NEW PRODUCTS

## LALVIN RBS 133

 New premium yeast strain from Lallemand for use with Hybrid varietals, Sangiovese and Rosé.

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## BIODIVA

 *Torulaspota delbrueckii* isolate for use with select *S. cerevisiae* strains

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## BETA CO-INOC

 *Oenococcus oeni* for use in co-inoculation

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## ML RED BOOST

 Malolactic nutrient for red wines

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## OPTI'ML BLANC

 Malolactic nutrient for white wines

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## SCOTT'TAN BOLD

 Part of new OTT (Over the Top) Tannin range, developed for final stylistic touches to wine

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## SCOTT'TAN FINESSE

 Part of new OTT (Over the Top) Tannin range, developed for final stylistic touches to wine

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## CLARISTAR

 Specialty mannoprotein product for potassium tartrate stabilization of wines

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## ULTIMA FRESH

 Mannoprotein and gum arabic blend for volume enhancing effects

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 Mannoprotein and gum arabic blend for softening effects

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 Chitosan product for the control of *Brettanomyces*

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## CLEANSKIN-K

 Stainless steel cleaner and tartrate removal

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## DESTAINEX-LF

 Multi-purpose surface cleaner

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## OAK RESTORER-CWF

 Oak cleaner and restorer

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# SUPPLIERS

## LALLEMAND

lallemandwine.com



Beginning in the 1920's, **Lallemand** supplied fresh baker's yeast for the local market in Quebec, Canada. In 1974, over 50 years later, Lallemand was looking for new opportunities at the same time that Scott Laboratories was looking for a partner to produce dry forms of wine yeast from strains from Scott's library. After some discussion, Lallemand agreed to try. Two strains were produced that first year. This relationship is now in its 40th vintage. Scott currently offers nearly one hundred Lallemand products including yeast, yeast derivatives, bacteria and nutrients.

From this modest introduction in 1974, Lallemand has evolved into a world leader in the development of products for winemakers. Lallemand's focus has always been "value added". Its team of researchers in Toulouse, France emphasize fermentation research. Their solutions to winemaking problems are both cutting edge and practical. The "Fermaid" and "Go-Ferm" product families are illustrations of this. At Lallemand's Montreal facilities, the emphasis is upon new strain development, production procedures and fundamental research. Scientific papers and ongoing collaborations also link Lallemand with enological institutions on five continents. Taken together, they all reflect Lallemand's commitment to the wine industry, here and around the world.

## ANCHOR

newworldwinemaker.com



**Anchor** Yeast began in 1923 when Daniel Mills and Sons started the first yeast factory in Cape Town, South Africa. Yeast is now produced in an ISO 9001:2000 certified plant in Johannesburg. They produce wine yeast, baker's yeast, distilling yeast and whiskey yeast sold throughout the world.

The Anchor yeast strains can be divided into natural isolates and hybrid strains. The hybrid strains include isolates hybridized by nature and isolates hybridized by Anchor. Hybridization is a natural process involv-

ing the sexual life cycle of *Saccharomyces cerevisiae cerevisiae* and *S. cerevisiae bayanus*. The process is natural and the strains are not genetically modified. The results are yeast hybrids chosen with the best characteristics from both parents. This is a scientific vs. traditional approach that Anchor feels gives the winemaker a competitive edge. Anchor Yeast positions itself as the leading New World wine yeast producer, placing a premium on the ideas and innovation required to make successful New World wines.

## BIOSEUTICA

bioseutica.com



**Bioseutica Group's** experience with egg-derived proteins extends back to the 1940's and they are now the world's largest producer of egg-derived proteins. In the early 1990's Bioseutica researchers discovered that Lysozyme had potential winemaking uses. It was shown to naturally degrade the cell walls of gram positive bacteria such as *Oenococcus*, *Lactobacillus* and *Pediococcus*.

In 1994, Bioseutica received approval from French and Italian authorities to run industrial trials using lysozyme in winemaking. The next year the BATF (now the TTB) gave preliminary approval in the USA. In the decade and a half to follow Bioseutica's lysozyme, Lysovin, has become an accepted component in American winemakers' toolkits.

## LANXESS

velcorin.com



**LANXESS** is a leader in specialty chemicals and operates in all important global markets. Though its components were originally part of the Bayer Group, it is now a wholly independent entity.

Lanxess develops, manufactures and sells a wide range of products including speciality chemicals such as Velcorin®.

In addition, it supports its customers in developing and implementing made-to-measure system solutions. A principal aim is to generate added value for their customers.

Scott Laboratories Inc. began offering Velcorin from Lanxess for United States winemakers beginning in 1988.

## IOC

institut-oenologique.com



In 2010 we developed a new alliance with the **Institut Oenologique de Champagne** (IOC) in Epernay, France. This relationship allowed us to expand and improve the range of specialty fining agents in our portfolio.

The origins of the IOC can be traced back to the founding of the Entrepôt Général de la Champagne in 1890. In 1905 a laboratory (which became the IOC) was established to carry out the work of yeast selection and preparation. Over the years their pro-

duct lines expanded together with the territory covered. Although the IOC has maintained its roots in Champagne (with locations in Epernay, Bar-sur-Seine and Reims), it now also has two facilities in Burgundy (including Nuits St. Georges), two in Provence (including Châteauneuf-du-Pape) and one each in Chablis, Tain l'Hermitage, Savoie and Languedoc. The IOC offers a variety of wine processing products including gelatins, caseinates and a range of other items.

## PROENOL



**Proenol** traces its beginning to 1986 in Vila Nova de Gaia, Portugal, the mother city of Port wine. The objective of Proenol's founders was simple: to use their biotechnological expertise to develop innovative natural solutions.

Since Portugal joined the European Community in 1986, the country's culture has changed. Traditions have been challenged. Proenol prospered in this environment. Collaborative efforts, for example, led to

Proenol's selection of two Portuguese yeast strains that are now popular worldwide, BA11 and QA23.

Most interestingly, Proenol scientists also perfected a new technology to use encapsulated yeast in winemaking. Using this technology, Proenol has created a variety of innovative products that provide winemakers new options when dealing with issues such as excess malic acid, stuck fermentations and the secondary fermentation of sparkling wine.

## OENOBANDS

www.oenobands.com



Though **Oenobands** is new to the Scott portfolio, it comes with a distinguished pedigree. Supported by its world renowned parent companies (DSM Food Specialties and Anchor BioTechnologies), Oenobands is commissioned to provide winemakers with innovative and scientifically sound solutions to real life issues.

With a highly qualified team from new and old world wine regions, Oenobands seeks to take the best from both. Thinking "outside the box" is encouraged. The result is revolutionary products such as Claristar (see page 71).

## AIRD® INNOVATIONS IN CHEMISTRY

www.airdchemistry.com



Located outside Adelaide in South Australia, **AiRD® Innovations in Chemistry** grew up near the vineyards. Founded over two decades ago, AiRD specializes in hygiene maintenance for the food and beverage industry. Early on the founder Barry Astley-Turner saw the need to offer customers safe and effective alternatives to caustics to clean stainless steel and other surfaces.

Scott Laboratories Ltd. has distributed AiRD products for many years. 2013 marks the first year for Scott Laboratories, Inc. The ingredients in AiRD products are all sourced from suppliers with traceability and high quality assurance. It is our belief that a clean cellar is a key to maintaining wine quality. We are happy to bring you products that accomplish this in a safe, convenient, and environmentally sound fashion.

# PREMIUM YEAST

Yeast has been an important part of our portfolio ever since our predecessor company (Berkeley Yeast Laboratory) was founded in 1933. Our first commercial yeast offerings consisted of strains given to us from the collection of the University of California. The College of Agriculture at Berkeley had safeguarded them throughout the dark years of Prohibition. In each of the 79 subsequent harvests, we have learned and evolved. We are uniquely positioned to assist winemakers in meeting each year's new challenges.

## BASICS

Each harvest presents new and different challenges. Even if grapes are sourced from the same vineyard each year, the fruit will arrive with different sugar, nitrogen and acidity levels. It is very important to know the status of the must/juice prior to inoculating with yeast. Analyze the wine for Brix, pH, TA, and nitrogen levels. Before using any yeast strain, consider the factors that are outlined below.

## BRIX

What is the Brix of the juice? The yeast strain chosen should be able to tolerate the alcohol produced from this Brix level. (See yeast strain selection charts on pages 8-11.)

## pH AND SO<sub>2</sub>

The effectiveness of SO<sub>2</sub> is directly related to the pH. SO<sub>2</sub> additions should never be standardized. They must ALWAYS be adjusted according to the pH and conditions of the fruit. Additional SO<sub>2</sub> may be necessary if the fruit is overripe, underripe, or compromised.

## YAN

What is the YAN (Yeast Assimilable Nitrogen) of the juice? The correct nutrient additions can be decided once the YAN and Brix have been determined. The nutrient needs of the specific yeast strain being used must be considered.

## TEMPERATURE

What will the fermentation temperature be? Choose a yeast strain that fits within the determined temperature range. Do not stress your yeast by keeping it at the lowest or highest end of its temperature tolerance range.

## YSEO

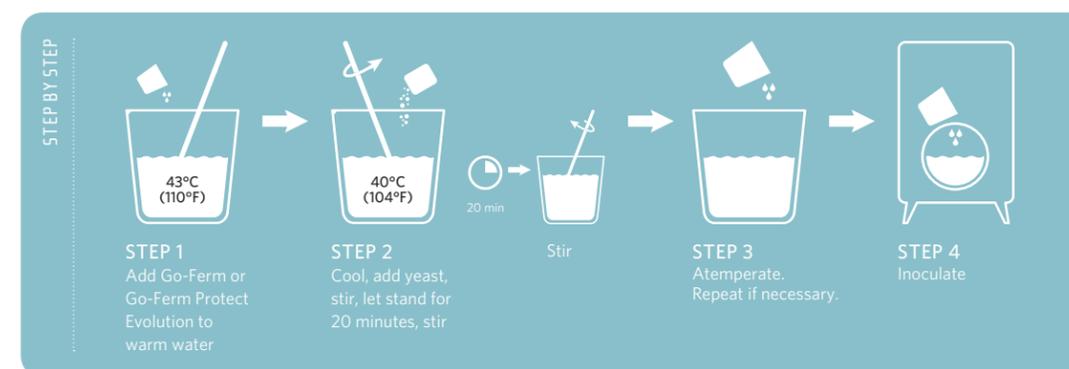
YSEO is a unique and innovative process for yeast developed by Lallemand. The benefits compared with the same strain prepared not using the YSEO process are:

-  Reduced lag phase
- Better adaptation to stressful conditions
- Optimized fermentation
- Reduced potential for VA

## PROTOCOL EASY STEPS FOR OPTIMAL YEAST REHYDRATION

Proper yeast rehydration is one of the most important steps to help ensure a strong and healthy fermentation. Normal inoculation for wine active dried yeast is 2 lb/1000 gal (25 g/hL). When added properly, a 2 lb/1000 gal (25 g/hL) addition of wine active dried yeast results in an initial cell concentration of 3-4 million viable cells per milliliter of must/juice. Under favorable conditions, the initial cell population may increase up to 100-150 million viable cells per milliliter of must/juice before growth stops and

alcoholic fermentation begins. This biomass increase is critical for healthy fermentations. When harvesting grapes at high maturity levels, increased inoculation rates are recommended. When using higher rates, be sure to maintain a ratio of 1 part yeast to 1.25 parts yeast rehydration nutrient. Careful rehydration, atemperature and inoculation are all important to help prevent sluggish or stuck fermentations.



## USAGE

1. Suspend 2.5 lb/1000 gal (30 g/hL) of Go-Ferm or Go-Ferm Protect Evolution in 20 times its weight of clean, chlorine free, 43°C(110°F) water. (For example: 2.5 lb rehydration nutrient x 20 = 50 ÷ 8.33 lb/gal water = 6 gal water.) If the water temperature is not high enough, the yeast rehydration nutrient may not go entirely into solution. Please see page 33 for information on yeast rehydration nutrients.

## IMPORTANT

If not using a yeast rehydration nutrient, water temperature should begin at 40°C(104°F) to avoid harming the yeast.

2. Once the temperature of the yeast rehydration nutrient solution has dropped to 40°C(104°F), add 2 lb/1000 gal (25 g/hL)\* of active dried yeast. Stir gently to break up any clumps. Let suspension stand for 20 minutes, then stir gently again. Live yeast populations decline when allowed to stand for more than 30 minutes.

Note: Foaming is not an indicator of yeast viability.

3. Slowly (over a period of 5 minutes) combine an equal amount of the must/juice to be fermented with the yeast suspension. This will help the yeast adjust to the cooler temperature of the must/juice and will help avoid cold shock caused by a rapid temperature drop exceeding 10°C(18°F). This atemperature step may need repeating for very low temperature must/juice. Each atemperature step should last about 15-20 minutes. For every 10°C(18°F) temperature difference between the must/juice and the yeast slurry, an atemperature step must be performed. For example, for a must/juice temperature of 20°C(68°F) and yeast slurry temperature of 40°C(104°F), two atemperature steps are required.

4. Add the yeast slurry to the bottom of the fermentation vessel just as you begin filling the vessel with must/juice. This is especially important for large tanks with long filling times or when inoculating with strains that are sensitive to the competitive factor (refer to pages 8-11). This will allow the yeast a head start over indigenous organisms.

Note: Copies of "Easy Steps for Optimal Yeast Rehydration" may be downloaded in Spanish, French and English from our website: [www.scottlab.com](http://www.scottlab.com).

\*The yeast dosage can vary depending on the initial Brix, manufacturer's recommendations and the sanitary state of the grapes or winery.

# WHITE, ROSÉ & SPARKLING WINE YEAST STRAINS (VINIFERA)

	Yeast Strain Type																		
	43	58W3	71B	ALCHEMY I	ALCHEMY II	ASSMANSHAUSEN (AMH)	BA11	BC (BAYANUS)	BM45	BM 4X4	BRG	CROSS EVOLUTION	CY3079	ICV D21	ICV D47	ICV D254	DV10	EC1118	ELIXIR
PAGE	12	12	12	12	13	13	13	13	13	14	14	14	15	15	15	15	16	16	16
<i>S. cerevisiae cerevisiae</i>		○	○			○	○	○					○	○	○	○			
<i>S. cerevisiae bayanus</i>	○							○									○	○	
Yeast hybrid											○								○
Yeast blend				○	○				○										
Chardonnay				●					●	●	●	●	●	●	●	●	●	●	●
Chenin Blanc				●	●												●		
Gewürztraminer		●				○	●					●			○		●		
Pinot Blanc							●					●					●		
Pinot Gris		●	●	●			●										●		○
Riesling		●	●	●		●	●					●							
Sauvignon Blanc				●	●		●					●							●
Sémillon		●			●										●				
Viognier		●		○			●								○				○
Dry Whites		●	○		●	○	●		○	○	●	●	○	●	●	●	●	●	
Rosé			●				●						○	●	○				○
Late Harvest	●																○	○	
Icewine	●																○	○	
Sparkling Base							○										●	●	
Restart Stuck	●							●									●	○	
Secondary Ferm								○									●	●	
Alcohol Tolerance <sup>1</sup>	18%+	14%	14%	15.5%	15.5%	15%	16%	17%	15%	15%	15%	15%	16%	16%	14%	16%	17%	18%	15%
Relative Nitrogen Needs <sup>2</sup>	LOW	MED	LOW	MED	MED	LOW	HIGH	LOW	HIGH	HIGH	MED	LOW	HIGH	MED	LOW	MED	LOW	LOW	MED
Temp. Range (°F) <sup>3</sup>	55-95	54-77	59-85	56-61	56-61	68-86	50-77	59-86	64-82	64-82	64-88	58-68	59-80	61-82	59-68	54-82	50-95	50-86	57-77
Fermentation Speed	FAST	MOD	MOD	FAST	FAST	SLOW	MOD	FAST	MOD	MOD	MOD	MOD	MOD	MOD	MOD	MOD	FAST	FAST	SLOW
Competitive Factor	NTRL	YES	SNSTV	YES	YES	SNSTV	SNSTV	SNSTV	YES	YES	NTRL	YES	SNSTV	YES	YES	NTRL	YES	YES	SNSTV
Sensory Effect	NTRL	EVC ESTERS M	ESTERS	EVC ESTERS	EVC ESTERS	EVC	ESTERS M	NTRL	EVC M	EVC M	EVC	EVC M	EVC M	EVC M	EVC M	EVC M	NTRL	NTRL	EVC ESTERS
MLF Compatibility	GOOD	AVERAGE	VERY GOOD	—	—	VERY GOOD	BELOW AVERAGE	GOOD	BELOW AVERAGE	BELOW AVERAGE	AVERAGE	AVERAGE	GOOD	AVERAGE	GOOD	VERY GOOD	GOOD	AVERAGE	—

<sup>1</sup> The alcohol tolerance column indicates performance possibilities in good circumstances and conditions. Alcohol tolerance may vary as circumstances and conditions vary.

<sup>2</sup> Relative nitrogen needs refer to how much nitrogen one strain requires relative to the other strains on this chart.

<sup>3</sup> The temperature column indicates general performance possibilities. It is not a substitute for sound winemaking. Yeast may be stressed or die if temperatures are sustained at extremes of their tolerance. Keep in mind that a yeast's ability to ferment within the given range also depends on alcohol and other antagonistic conditions.

Temperature should be measured directly under the cap in red must/wine. When working with high sugar fermentations, lower temperatures are recommended. Good cap management is required to assure homogenous temperatures in red wine fermentations. Increasing dosage of yeast may help prevent a sluggish or stuck fermentation.

	Yeast Strain Type																			
	EXOTICS SPH	ICV GRE	K1 (V1116)	M2	M69	NT 116	ICV OPALE	QA23	R2	RHÔNE 4600	R-HST	STEINBERGER (DGI 228)	SVG	VIN 13	VIN 2000	WI5	WE 372			
PAGE	22	16	16	17	17	18	18	18	18	19	19	19	20	20	20	21	21			
<i>S. cerevisiae cerevisiae</i>		○	○	○	○		○			○	○	○	○			○	○			
<i>S. cerevisiae bayanus</i>								○	○											
Yeast hybrid	○					○								○	○					
Yeast blend																				
Chardonnay	●			●	●	○	●	●		●				●	●					
Chenin Blanc	●	●	●			●								●	●					
Gewürztraminer					●			●	●	●	●	●		○		●	●			
Pinot Blanc						●														
Pinot Gris						●								○	○		●			
Riesling		●						○	●	●	●	●	●	●	●	●	●			
Sauvignon Blanc			●	●	●	○	●	●	●	○	●		●	●	●					
Sémillon		●	●			●		●												
Viognier	●				●	○		○	○	●	●			●	●					
Dry Whites		●	●	●	●	●	●	●	●	○	●		●	●	●	●	○			
Rosé		●		●				○	●					○	●	●				
Late Harvest			○							●	○			○						
Icewine			○							●	●			○						
Sparkling Base			○					●		○				○						
Restart Stuck			●											●						
Secondary Ferm																	●			
Alcohol Tolerance <sup>1</sup>	15%	15%	18%	15%	15%	15.5%	14%	16%	16%	15%	15%	13%	15%	16.5%	15.5%	16%	15%			
Relative Nitrogen Needs <sup>2</sup>	MED	HIGH	LOW	HIGH	MED	MED	LOW	HIGH	LOW	HIGH	LOW	—	MED	LOW	LOW	HIGH	MED			
Temp. Range (°F) <sup>3</sup>	61-68	59-82	50-95	59-86	59-77	56-83	59-86	59-90	41-90	56-72	50-86	59-77	61-79	54-61	55-61	50-81	64-86			
Fermentation Speed	MOD	MOD	FAST	MOD	FAST	FAST	MOD	FAST	MOD	MOD	MOD	SLOW	MOD	FAST	MOD	MOD	MOD			
Competitive Factor	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	—	YES	YES	YES	YES	YES			
Sensory Effect	EVC M	EVC M	ESTERS	ESTERS M	ESTERS M	ESTERS	EVC ESTERS	EVC	ESTERS	ESTERS	NTRL M	NTRL	EVC	EVC ESTERS	EVC ESTERS	EVC M	EVC			
MLF Compatibility	VERY GOOD	GOOD	POOR	GOOD	BELOW AVERAGE	GOOD	POOR	VERY GOOD	GOOD	GOOD	AVERAGE	AVERAGE	GOOD	GOOD	GOOD	VERY GOOD	GOOD			

### IMPORTANT NOTES

This chart is only useful as a quick reference guide. For more information on selected yeast strains, please refer to the yeast section of this handbook.

Please see pages 90-91 for more information on yeast choices for hybrid and non-*vinifera* grapes.

Please see pages 93-94 for more information on yeast choices for fruit wine, hard cider and mead.

# RED WINE YEAST STRAINS (VINIFERA)

	Yeast Strain Type																
	43	3001	71B	ASSMANSHAUSEN (AMH)	BC (BAYANUS)	BDX	BM45	BM 4X4	BRG	BRL97	CLOS	CSM	ICV D21	ICV D80	ICV D254	ICV GRE	L2056
PAGE	12	12	12	13	13	13	13	14	14	14	14	14	15	15	15	16	16
<i>S. cerevisiae cerevisiae</i>		○	○	○		○	○		○	○	○	○	○	○	○	○	○
<i>S. cerevisiae bayanus</i>	○				○												
<b>Yeast blend</b>								○									
Barbera						⦿	⦿	⦿		⦿	⦿		⦿	⦿	⦿	⦿	⦿
Cabernet Franc							⦿			⦿		⦿	⦿	⦿	⦿	⦿	
Cabernet Sauvignon						⦿	⦿	⦿		⦿		⦿	⦿	⦿	⦿	⦿	⦿
Carignane			⦿			⦿					⦿						
Grenache			⦿				⦿	⦿		⦿	⦿		⦿		⦿	⦿	⦿
Malbec										⦿	⦿				⦿		
Merlot						⦿	⦿	⦿		⦿		⦿	⦿	⦿	⦿	⦿	⦿
Mourvedre										⦿	⦿		⦿		⦿	⦿	⦿
Nebbiolo							⦿	⦿		⦿	⦿		⦿	⦿	⦿	⦿	⦿
Petite Sirah				⦿				⦿		⦿				⦿			
Pinot Noir		⦿		⦿			⦿		⦿	⦿					⦿	⦿	
Sangiovese	⦿						⦿	⦿					⦿		⦿	⦿	⦿
Syrah	⦿				⦿	⦿		⦿		⦿	⦿		⦿	⦿	⦿	⦿	⦿
Tempranillo							⦿				⦿		⦿	⦿	⦿	⦿	⦿
Zinfandel	⦿			⦿	⦿	⦿	⦿	⦿		⦿	⦿		⦿	⦿	⦿		⦿
Nouveau			⦿			⦿				⦿		⦿			⦿	⦿	⦿
Young Reds			⦿	⦿		⦿				⦿	⦿		⦿	⦿	⦿	⦿	⦿
Aged Reds	⦿			⦿	⦿	⦿	⦿	⦿		⦿	⦿		⦿	⦿	⦿	⦿	⦿
Restart Stuck	⦿				⦿												
Alcohol Tolerance <sup>1</sup>	18%+	15%	14%	15%	17%	16%	15%	15%	15%	16%	17%	14%	16%	16%	16%	15%	16%
Relative Nitrogen Needs <sup>2</sup>	LOW	MED	LOW	LOW	LOW	MED	HIGH	HIGH	MED	MED	MED	HIGH	MED	HIGH	MED	HIGH	MED
Temp. Range (°F) <sup>3</sup>	55-95	54-90	59-85	68-86	59-86	64-86	64-82	64-82	64-88	62-85	57-90	59-90	61-82	59-82	54-82	59-82	59-82
Fermentation Speed	FAST	MOD	MOD	SLOW	FAST	MOD	MOD	MOD	MOD	MOD	MOD	FAST	MOD	MOD	MOD	MOD	MOD
Competitive Factor	NTRL	YES	SNSTV	SNSTV	SNSTV	SNSTV	YES	YES	NTRL	YES	YES	YES	YES	YES	NTRL	YES	YES
Sensory Effect	NTRL	EVC	ESTERS	EVC	NTRL	EVC M	EVC M	EVC M	EVC M	EVC	EVC M	EVC	EVC M	EVC M	EVC M	EVC M	ESTERS
MLF Compatibility	GOOD	AVERAGE	VERY GOOD	—	—	AVERAGE	BELOW AVERAGE	BELOW AVERAGE	AVERAGE	AVERAGE	VERY GOOD	AVERAGE	AVERAGE	AVERAGE	VERY GOOD	GOOD	GOOD

<sup>1</sup> The alcohol tolerance column indicates performance possibilities in good circumstances and conditions. Alcohol tolerance may vary as circumstances and conditions vary.

<sup>2</sup> Relative nitrogen needs refer to how much nitrogen one strain requires relative to the other strains on this chart.

<sup>3</sup> The temperature column indicates general performance possibilities. It is not a substitute for sound winemaking. Yeast may be stressed or die if temperatures are sustained at extremes of their tolerance. Keep in mind that a yeast's ability to ferment within the given range also depends on alcohol and other antagonistic conditions.

Temperature should be measured directly under the cap in red must/wine. When working with high sugar fermentations, lower temperatures are recommended. Good cap management is required to assure homogenous temperatures in red wine fermentations. Increasing dosage of yeast may help prevent a sluggish or stuck fermentation.

	Yeast Strain Type																
	L2226	M2	MT	NT 50	NT 112	NT 116	NT 202	RA17	RBS 133	RC212	RHÔNE 4600	RP15	SYRAH	T73	VRB	W15	WE 372
PAGE	17	17	17	17	17	18	18	18	19	19	19	19	20	20	21	21	21
<i>S. cerevisiae cerevisiae</i>	○	○	○						○	○	○	○	○				
<i>S. cerevisiae bayanus</i>														○			
<b>Yeast hybrid</b>				○	○	○	○										
Barbera	⦿			⦿											⦿		
Cabernet Franc	⦿		⦿	⦿	⦿	⦿	⦿			⦿			⦿				⦿
Cabernet Sauvignon	⦿	⦿	⦿	⦿	⦿	⦿	⦿			⦿			⦿				⦿
Carignane		⦿	⦿	⦿		⦿								⦿			⦿
Grenache	⦿			⦿					⦿	⦿	⦿		⦿		⦿		
Malbec											⦿				⦿		
Merlot	⦿		⦿	⦿	⦿	⦿	⦿						⦿	⦿	⦿		⦿
Mourvedre										⦿	⦿		⦿		⦿		
Nebbiolo			⦿	⦿										⦿	⦿		
Petite Sirah	⦿			⦿	⦿	⦿							⦿	⦿	⦿		
Pinot Noir				⦿	⦿	⦿							⦿	⦿		⦿	⦿
Sangiovese	⦿			⦿									⦿		⦿	⦿	
Syrah		⦿		⦿	⦿	⦿							⦿	⦿	⦿		⦿
Tempranillo			⦿	⦿											⦿	⦿	
Zinfandel	⦿			⦿	⦿	⦿	⦿			⦿	⦿		⦿	⦿	⦿		⦿
Nouveau	⦿	⦿	⦿	⦿	⦿	⦿				⦿			⦿	⦿	⦿	⦿	⦿
Young Reds	⦿	⦿	⦿	⦿	⦿	⦿				⦿	⦿		⦿	⦿	⦿	⦿	⦿
Aged Reds	⦿	⦿	⦿	⦿	⦿	⦿				⦿	⦿		⦿	⦿	⦿	⦿	⦿
Restart Stuck	⦿	⦿															⦿
Alcohol Tolerance <sup>1</sup>	17%	15%	15%	15.5%	16%	15.5%	15%	15%	16%	16%	16%	15%	17%	16%	16%	17%	16%
Relative Nitrogen Needs <sup>2</sup>	HIGH	HIGH	MED	MED	MED	MED	MED	HIGH	MED	MED	LOW	MED	MED	LOW	MED	HIGH	MED
Temp. Range (°F) <sup>3</sup>	59-82	59-86	59-90	57-83	76-83	56-83	68-83	61-84	61-82	68-90	56-72	68-86	59-90	65-95	58-80	50-81	64-86
Fermentation Speed	FAST	MOD	MOD	FAST	FAST	FAST	FAST	MOD	MOD	MOD	MOD	MOD	MOD	MOD	MOD	MOD	MOD
Competitive Factor	YES	YES	YES	YES	YES	YES	YES	SNSTV	YES	NTRL	YES	YES	YES	YES	NTRL	YES	YES
Sensory Effect	EVC M	ESTERS M	EVC M	EVC ESTERS	EVC	EVC	EVC ESTERS	EVC	EVC	EVC	ESTERS	EVC	EVC	ESTERS M	EVC M	EVC M	EVC
MLF Compatibility	BELOW AVERAGE	GOOD	AVERAGE	GOOD	BELOW AVERAGE	GOOD	VERY GOOD	BELOW AVERAGE	GOOD	GOOD	GOOD	GOOD	AVERAGE	AVERAGE	BELOW AVERAGE	GOOD	VERY GOOD

### IMPORTANT NOTES

This chart is only useful as a quick reference guide. For more information on selected yeast strains, please refer to the yeast section of this handbook.

Please see pages 90-91 for more information on yeast choices for hybrid and non-*vinifera* grapes.

Please see pages 93-94 for more information on yeast choices for fruit wine, hard cider and mead.

## PREMIUM YEAST STRAINS

43

	<i>S. cerevisiae</i> • <i>bayanus</i>
	Restart Stuck Fermentations, Zinfandel, Sangiovese, Syrah, Late Harvest, Icewine
#15134	500 g
#15140	10 kg

Isolated by Lallemand in collaboration with the research center of Inter Rhône in France.

Notable for its powerful ability to restart stuck or sluggish fermentations. Has been known to ferment up to 18% (v/v) and has low relative nitrogen needs.

Uvaferm 43® gives high-quality sensory results in high Brix red fermentations and helps maintain color, red fruit and cherry characteristics.

58W3

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Pinot Gris, Gewürztraminer, Riesling, Viognier, Sémillon
#15630	500 g
#15631	10 kg

Isolated during a five-year study by the INRA (National Agricultural Research Institute) in Alsace, France.

Due to its fermentation kinetics, especially in high potential alcohol juices, a balanced nutrient strategy and good fermentation practices should be followed.

Vitilevure 58W3™ contributes an overall well-balanced mouthfeel with floral and fruity aromas.

Allows for the release of bound terpenes in aromatic varieties due to the beta-glucosidase activity. This enhances classic varietal characteristics.

71B

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Pinot Gris, Riesling, Grenache, Rosé, Red French Hybrids, American Cultivars, Fruit Wines
#15059	500 g
#15078	10 kg

Isolated and selected by the INRA in Narbonne, France.

Known for fermenting fruity rosé wines and semi-sweet whites because it produces long-lived aromas that result from the synthesis of relatively stable esters and higher alcohols.

Softens high acid musts by partially metabolizing malic acid.

Sensitive to competitive factors and may have difficulty competing with wild flora. Careful rehydration with Go-Ferm or Go-Ferm Protect Evolution and early inoculation will help Lalvin 71B® dominate in competitive conditions.

3001

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Pinot Noir, Chambourcin
#15682	500 g

Isolated, studied and selected from the prestigious Côte de Nuits terroir in Burgundy during a three-year research project by Laboratory Burgundia Oenologie in Beaune, France. The goal of this selection program was to find a dominant natural yeast strain from a traditional "cold soak" that would elaborate intense, complex and balanced Pinot Noir varietal character. The 3001 strain stood out from other strains. Wines made with it were noted for fruit and varietal characters that were both elegant and complex.

Moderate nitrogen demand but will benefit from proper nutrition and aeration, especially when the potential alcohol exceeds 13% (v/v).

Tolerant to standard SO<sub>2</sub> additions and low temperatures (12°C/54°F) for a steady and reliable alcoholic fermentation following cold soak.

Vitilevure 3001® is recommended for cold soak protocols for intense Pinot Noir wines with aging potential.

### ALCHEMY I

	<i>S. cerevisiae</i> • blend
	Sauvignon Blanc, Chardonnay, Chenin Blanc, Riesling, Pinot Gris, Seyval Blanc
#15174	1 kg

Scientifically formulated blend of wine yeast strains developed in collaboration with the Australian Wine Research Institute (AWRI) in South Australia.

Alchemy I is a strong aroma producer with fast fermentation kinetics. It is low foaming and has low to medium nitrogen requirements.

Barrel fermentation is not recommended and temperature control is advised.

The ratio of the yeast in the blend has been formulated to provide an optimal aromatic profile. Alchemy I enhances esters (fruity, floral) and volatile thiols (boxwood, passion fruit, grapefruit and guava aromas).

### ALCHEMY II

	<i>S. cerevisiae</i> • blend
	Sauvignon Blanc, Colombard, Chenin Blanc
#15177	1 kg

Scientifically formulated blend of wine yeast strains developed in collaboration with the AWRI in South Australia for optimal aromatic profile.

Alchemy II enhances mostly volatile thiols such as: boxwood, passion fruit, grapefruit, kiwi fruit and guava aromas. It is highly recommended for cool tank fermentations of Sauvignon Blanc (New Zealand, South African or Chilean style).

Under difficult conditions (pH<3.2, turbidity under 80 NTU, low YAN, temperatures below 15°C/59°F, immediately after inoculation), Alchemy II can be stressed and produce VA.

Fast fermentation kinetics mean temperature management is crucial. It is a low SO<sub>2</sub> producer with medium nitrogen requirements.

### ASSMANSHAUSEN (AMH)

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Pinot Noir, Zinfandel, Riesling, Petite Sirah
#15632	500 g
#15633	10 kg

Originated from the Geisenheim Research Institute in Germany.

Enoferm AMH™ has a long lag phase with a slow to medium fermentation rate. A well-managed nutrient program during rehydration and fermentation is essential.

Enhances spicy (clove, nutmeg) and fruit flavors and aromas while adding overall complexity.

Fermentation potential is enhanced with AMH if the culture is allowed to develop in about 10% of the total must volume for eight hours prior to final inoculation.

BA11

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Riesling, Viognier, Sauvignon Blanc, Pinot Blanc, Pinot Gris, Gewürztraminer, Sparkling Base, Rosé
#15117	500 g

Selected in 1997 near the Estação Vitivinícola de Barraida in Portugal.

Promotes clean aromatic characteristics and intensifies mouthfeel and lingering flavors in white or sparkling base wines.

Lalvin BA11™ can encourage the fresh aromas of tropical fruit, cream, vanilla and spice in relatively neutral white grape varieties.

### BC (BAYANUS)

	<i>S. cerevisiae</i> • <i>bayanus</i>
	Restart Stuck Fermentations, Secondary Fermentations, Syrah, Zinfandel,
#15234	500 g
#15235	10 kg

Selected from the collection of the Pasteur Institut in Paris, France.

Uvaferm BC™ (Bayanus) has a high sugar and alcohol tolerance. It has been known to ferment up to 17% (v/v) and is therefore a good choice for high Brix fermentations (e.g. late season Zinfandel or Syrah).

Ferments cleanly with excellent fermentation kinetics. It is often chosen for sparkling base wines.

BC (Bayanus) has low nitrogen requirements and is a low SO<sub>2</sub> and VA producer. It is fructophilic and often used to restart stuck or sluggish fermentations.

BDX

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Merlot, Cabernet Sauvignon, Zinfandel, Syrah, Carignane
#15634	500 g
#15635	10 kg

Selected from the Pasteur Institut strain collection in Paris, France.

Enoferm BDX™ is a vigorous fermenter. Alcohol tolerance can be up to 16% (v/v).

Optimizes color and structure with soft tannin extraction and increased mouthfeel.

Does not generate a lot of heat during fermentation.

BM45

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Sangiovese, Cabernet Sauvignon, Grenache, Zinfandel, Nebbiolo, Chardonnay, Syrah, Aged Reds
#15064	500 g
#15066	10 kg

Isolated in the early 1990s in collaboration with the Consorzio del Vino Brunello di Montalcino and the University of Siena in Italy.

Produces high levels of polyphenol reactive polysaccharides, resulting in wines with increased mouthfeel and improved color stability.

Has high nitrogen requirements and can produce H<sub>2</sub>S under poor nutrient conditions.

In Italian red varietals, Lalvin BM45™ has sensory descriptors that include fruit jam, rose and cherry liqueurs, sweet spice, licorice, cedar and earthy elements.

## BM 4X4

 <i>S. cerevisiae</i> • blend
Sangiovese, Cabernet Sauvignon, Grenache, Zinfandel, Nebbiolo, Chardonnay
#15176    500 g
#15200    10 kg

Lalvin BM 4X4® is a blend of BM45 and a complementary strain chosen by Lallemand to provide all the advantages of BM45 with even greater reliability under difficult conditions.

Positive interaction between strains means a more dependable fermentation together with increased aromatic intensity, color intensity and length of finish.

## BRG

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Chardonnay, Pinot Noir
#15669    500 g
#15670    10 kg

Isolated in Burgundy at the IUVV (Institut Universitaire de la Vigne et du Vin) laboratory in Dijon, France. Reference strain for Burgundian winemakers.

A fast fermenter with a high nutrient requirement. Alcohol tolerance can be up to 15% v/v.

Levuline BRG™ was isolated for its ability to contribute significant amounts of polysaccharides during fermentation which enhance mouthfeel and body.

Sensory notes include increased minerality in whites such as Chardonnay and spice characters in reds like Pinot Noir.

## BRL97

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
Pinot Noir, Zinfandel, Barbera, Merlot, Nebbiolo, Malbec, Mourvedre, Norton
#15102    500 g
#15205    10 kg

Isolated at the University of Torino in Italy from a Nebbiolo fermentation.

Fast starter and a moderate speed fermenter, demonstrating good MLF compatibility and high alcohol tolerance.

Helps retain both the color and the varietal character in grapes sensitive to color loss.

Lalvin BRL97™ may be blended with wines fermented with RA17, RC212 or W15 to enhance complexity.

## CLOS

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Syrah, Grenache, Carignane, Tempranillo, Zinfandel, Petite Sirah, Barbera, Norton
#15201    500 g
#15204    10 kg

Isolated by the University of Rovira i Virgili in Spain from the Priorat region.

Notable for its high alcohol tolerance (up to 17% v/v) with a very good implantation rate in difficult conditions. Ferments over a wide range of temperatures (14-32°C/58-90°F).

Lalvin Clos® was selected for its ability to enhance aromatic complexity, structure and mouthfeel.

Good compatibility with malolactic bacteria.

## CROSS EVOLUTION

 <i>S. cerevisiae</i> • hybrid
Chardonnay, Gewürztraminer, Pinot Blanc, Riesling, Sauvignon Blanc, Rosé
#15640    500 g

Hybrid yeast from a unique breeding program of the Institute for Wine Biotechnology at the University of Stellenbosch in South Africa.

Ideal for aromatic white and rosé wines with high alcohol potential (15% v/v) and low fermentation temperatures (14°C/58°F). This strain has reasonably low nitrogen requirements.

Cross Evolution® contributes an increased mouthfeel component resulting in aromatic wines with a balanced mouthfeel.

Chardonnay wines have shown increased fresh fruit and floral aromas.

## CSM

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Cabernet Sauvignon, Cabernet Franc, Merlot, Mourvedre
#15638    500 g
#15639    10 kg

Selected by the ITV (Institut Technique du Vin) Bordeaux in France in cooperation with the Conseil Interprofessionnel du Vin de Bordeaux (CIVB).

Enoferm CSM™ can ferment up to 14% (v/v) and benefits from balanced nutrient additions.

Wines fermented with CSM have shown intense aromatic profiles of berries, spice and licorice. It has been known to reduce vegetal aromas.

CSM adds complexity with a balanced, round mouthfeel and promotes malolactic fermentation.

## CY3079

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Chardonnay, Pinot Blanc, Chardonnay
#15061    500 g
#15082    10 kg

Isolated by the Bureau Interprofessionnel des Vins de Bourgogne (BIVB) in France.

It is a steady, slow fermenter even at cooler temperatures (15°C/59°F). Lalvin Bourgoblanc CY3079® demonstrates good alcohol tolerance and low production of VA and H<sub>2</sub>S when properly fed.

Highly recommended for barrel-fermented and sur lie aged Chardonnay.

Autolyzes quickly at the end of fermentation. It is thought to enhance aromas such as fresh butter, honey, flowers and pineapple.

## ICV D21

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Merlot, Syrah, Zinfandel, Cabernet Sauvignon, Chardonnay, Mourvedre
#15143    500 g
#15163    10 kg

Isolated from one of the best Languedoc terroirs during a special regional program run by the Institut Coopératif du Vin's (ICV) Natural Micro-Flora Observatory and Conservatory in France.

Noted for its good fermentation performance. Produces very few sulfide compounds during fermentation.

Selected for fermenting red wines with stable color, intense fore-mouth volume, mid-palate tannin structure and fresh aftertaste.

Lalvin ICV D21® can also be used with very ripe white grapes that are barrel fermented to develop fresh fruit aromas, volume and acidity. In highly clarified juices, maintain fermentation temperatures greater than 16°C(61°F) and supplement with proper nutrition.

## ICV D47

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Chardonnay, Semillion, Pinot Blanc
#15642    500 g
#15643    10 kg

Lalvin ICV D47™ is an isolate from Suze-la-Rousse in the Côtes du Rhône in France. It was selected for the production of full-bodied, barrel-fermented Chardonnay and other white varieties.

Fermentations are characterized by a short lag phase followed by a regular fermentation. Will tolerate a fermentation temperature range of 15-20°C(59-68°F).

It is a high polysaccharide producer and wines made with it are known for their accentuated fruit and volume.

Excellent results are obtained for barrel-fermented Chardonnay, especially when blended with wines made with Lalvin ICV D21.

## ICV D80

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Cabernet Sauvignon, Merlot, Syrah, Zinfandel, Petite Sirah
#15125    500 g
#15133    10 kg

Isolated by the ICV in 1992 from the Côte Rôtie area of the Rhône Valley in France for its ability to ferment musts high in sugar and polyphenols.

Given proper nutrition, Lalvin ICV D80® is a rapid starter with moderate fermentation rates. It has been known to have an alcohol tolerance of up to 16% (v/v) when the fermentation is aerated and the temperature is maintained below 28°C(82°F).

On the palate it creates high fore-mouth volume, big mid-palate mouthfeel, an intense, fine-grain tannin sensation and a long lasting licorice finish.

Selected for its ability to bring out differentiated varietal aromas by reinforcing the rich concentrated flavors found in varieties such as Zinfandel and Syrah.

## ICV D254

 <i>S. cerevisiae</i> • <i>cerevisiae</i>
 Cabernet Sauvignon, Syrah, Zinfandel, Sangiovese, Chardonnay, Norton
#15094    500 g
#15021    10 kg

Isolated by the ICV from a Rhône Valley Syrah fermentation.

It has been known to have an alcohol tolerance of up to 16% (v/v) when the fermentation is aerated and the temperature is maintained below 28°C(82°F).

In red wines, Lalvin ICV D254® develops ripe fruit, jam and cedar aromas together with mild spiciness. On the palate it contributes high fore-mouth volume, big mid-palate mouthfeel and intense fruit concentration.

When used for white wines (particularly Chardonnay), sensory descriptors include butterscotch, hazelnut and almond aromas.

## DV10

	<i>S. cerevisiae</i> • <i>bayanus</i>
Chardonnay, Sparkling Base, Gewürztraminer, Pinot Gris, Late Harvest, Fruit Wine, Pinot Blanc, Secondary Fermentations	
#15062	500 g
#15106	10 kg

Selected in Epernay, France.

Strong fermentation kinetics. Recognized for low foaming, low VA production and very low H<sub>2</sub>S and SO<sub>2</sub> production.

Lalvin DV10™ is well known for clean fermentations that respect varietal character while avoiding bitter sensory contributions associated with other more one-dimensional 'workhorse' strains such as PM.

Can be used to restart stuck fermentations and has been known to ferment up to 17% (v/v) alcohol.

## EC1118 (PRISE DE MOUSSE)

	<i>S. cerevisiae</i> • <i>bayanus</i>
Sparkling Base, Late Harvest, Icewine, Fruit Wine, Secondary Fermentations	
#15053	500 g
#15076	10 kg

Selected by the Institut Oenologique de Champagne (IOC) in Epernay, France. Reference strain for sparkling wine.

Is the original, steady low foamer, and is popular for barrel fermentations. It is an excellent choice for secondary fermentations of sparkling wine.

Ferments well at low temperatures and flocculates with compact lees.

Under low nutrient conditions Lalvin EC1118™ can produce high amounts of SO<sub>2</sub> (up to 50 ppm) and, as a result, may inhibit malolactic fermentation.

## ELIXIR

	<i>S. cerevisiae</i> • hybrid
Sauvignon Blanc, Chardonnay, Viognier, Rosé	
#15214	500g

Product of the yeast hybridization program of the Institute for Wine Biotechnology at the University of Stellenbosch in South Africa.

Good implantation in clarified juices and requires good nutrition and proper temperature control. Elixir has moderate nitrogen requirements and should ferment between 14-25°C (57-77°F) for a slow and steady fermentation. It is a low SO<sub>2</sub>, H<sub>2</sub>S and VA producer with alcohol tolerance to 15% (v/v).

Vitilevure Elixir™ expresses terpenes, norisoprenoids and thiols (e.g. in Sauvignon Blanc) adding complexity to aromatic varieties.

Recommended for aromatic whites and rosés to enhance floral and fruity aromas with greater complexity.

## ICV GRE

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Cabernet Franc, Grenache, Cabernet Sauvignon, Merlot, Syrah, Chenin Blanc, Riesling, Rosé, Marsanne, Roussanne	
#15101	500 g
#15142	10 kg

Selected in the Cornas area of the Rhône Valley in France in 1992.

A rapid starter, it can ferment up to 15% (v/v) alcohol with low volatile acidity.

In reds, it does well with fresh Rhône style wines with up-front fruit. With short skin contact (three to five days), Lalvin ICV GRE™ minimizes the risks of vegetal and undesirable sulfur components.

In fruit-focused whites, such as Chenin Blanc, Riesling and Rhône whites, ICV GRE fermentations result in stable, fresh fruit characteristics such as melon and apricot while improving fore-mouth impact.

## K1 (V1116)

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Restart Stuck Fermentations, Sauvignon Blanc, Sémillon, Chenin Blanc, White French Hybrids, American Cultivars, Sparkling Base, Fruit Wine	
#15063	500 g
#15077	10 kg

Selected by the ICV in Montpellier, France, among numerous killer strains isolated and studied by Pierre Barre at INRA.

When fermented at low temperatures (16°C/61°F) with proper nutrition, it is a strong floral ester producer, especially in neutral or high-yield varieties.

Among the high ester production strains, Lalvin V1116™ is the most tolerant of difficult fermentation conditions such as extreme temperatures, high alcohol (18% v/v) and low turbidity.

Ferments well under stressed conditions and is useful in restarting stuck fermentations, especially when relative fructose levels remain high.

## L2056

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Syrah, Grenache, Barbera, Zinfandel, Red French Hybrids, Mourvedre
#15072	500 g
#15180	10 kg

Isolated and selected in the northern Côtes du Rhône by the University of Nantes (ITV) in France in collaboration with the research center of Inter Rhône.

Low producer of SO<sub>2</sub> and VA over a wide temperature range and can tolerate alcohol up to 16% (v/v). Has relatively high nutrient requirements.

Expresses varietal character, retains good color and is excellent for fruit forward styles.

Wines made with Lalvin L2056® have been shown to be interesting and complex when blended post fermentation with wines made with T73 or ICV D254.

## L2226

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Merlot, Zinfandel, Sangiovese, Barbera, Cabernet Franc, Petite Sirah	
#15644	500 g
#15645	10 kg

Isolated from a vineyard in the Côtes du Rhône in France.

Lalvin L2226™ is alcohol tolerant up to 16-17% (v/v) and is highly recommended for high Brix reds.

Characterized by aromas of black cherry, berry and cherry cola in red wines.

Can be used to restart stuck or sluggish fermentations.

## M2

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Chardonnay, Sauvignon Blanc, Cabernet Sauvignon, Syrah, Carignane	
#15648	500 g
#15649	10 kg

Isolated in Stellenbosch, South Africa.

Enoferm M2™ is a medium-rate fermenter and needs a high level of balanced nutrients for a strong fermentation finish. Requires some temperature control for white wine production.

Neutral to low ester-producing strain.

It can be distinguished by its expression of citrus and blossom notes and for accentuating volume in the mouth.

## M69

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Sauvignon Blanc, Viognier, Gewürztraminer, Chardonnay	
#15080	500 g

The University of Valencia in Spain isolated Lalvin M69™ from musts taken from the hot weather region of La Mancha.

Establishes itself quickly during fermentation. Nutrient supplementation is highly recommended in juices below 150 ppm YAN.

Notable for its ability to increase the aromatic complexity of neutral white varieties and for its tolerance of high sugar levels.

Shows a low conversion efficiency of sugar to alcohol, contributing high levels of glycerol with low acetaldehyde production.

## MT

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Merlot, Cabernet Sauvignon, Carignane	
#15650	500 g
#15651	10 kg

Selected in Saint Emilion, France, by the ITV Bordeaux in collaboration with the INRA Montpellier.

Vitilevure MT™ has steady fermentation kinetics and a high alcohol tolerance (15% v/v). It benefits from a balanced nutrient strategy, especially in low nutrient musts with high potential alcohol.

Characterized by aromas of strawberry jam, caramel and spice. Enhances color intensity and tannin structure.

This yeast is particularly recommended for grapes with high maturity and long aging potential.

## NT 50

	<i>S. cerevisiae</i> • hybrid
Shiraz (Syrah), Pinot Noir, Merlot, Cabernet Sauvignon, Cabernet Franc, Grenache	
#15184	1 kg

Product of the yeast hybridization program of Infruitec-Nietvoorbij, the wine and vine institute of the Agricultural Research Council in Stellenbosch, South Africa.

Very robust strain for the production of aromatic red wines. Temperature control (not higher than 28°C/83°F) is advised. Has medium nitrogen requirements.

NT 50 produces well-rounded red wines with structured tannins and good color stability. Useful for New World styles of Syrah and Cabernet Sauvignon.

Enhances berry notes in Pinot Noir and Grenache and floral notes in Syrah and Merlot.

## NT 112

	<i>S. cerevisiae</i> • hybrid
Cabernet Sauvignon, Cabernet Franc, Merlot, Zinfandel, Shiraz (Syrah), Mourvedre, Petite Sirah	
#15190	1 kg

Product of the yeast selection program of Infruitec-Nietvoorbij, the wine and vine institute of the Agricultural Research Council in Stellenbosch, South Africa.

Alcohol tolerant up to 16% (v/v) with a low nitrogen requirement and a short lag phase. Can produce SO<sub>2</sub> under stressed conditions of high alcohol (>14% v/v) or low temperatures (20°C/68°F).

NT 112 is recommended for red wines with a firm tannic structure and enhances black currant, berry and spice flavors.

## NT 116



*S. cerevisiae* • hybrid

Shiraz (Syrah), Cabernet Sauvignon, Merlot, Petite Sirah, Pinot Gris, Pinot Blanc, Sémillon, Chenin Blanc

#15185 1 kg

Product of the yeast hybridization program of Infruitec-Nietvoorbij, the wine and vine institute of the Agricultural Research Council in Stellenbosch, South Africa.

It is alcohol tolerant up to 15.5% (v/v), cold tolerant (13°C/56°F) and has a medium nitrogen requirement.

NT 116 has a dual application in winemaking. Its fermentation kinetics make it very suitable for full-bodied, high-maturity red wines destined for oak aging. Its high ability to convert volatile thiols and high ester production at low temperatures makes it similarly suitable for the production of New World style aromatic white and rosé wines. It specifically enhances the zesty (citrus) aromas in whites.

## NT 202



*S. cerevisiae* • hybrid

Cabernet Sauvignon, Pinot Noir, Merlot, Malbec, Chambourcin, Norton

#15191 1 kg

Product of the yeast hybridization program of Infruitec-Nietvoorbij, the wine and vine institute of the Agricultural Research Council in Stellenbosch, South Africa.

It is alcohol tolerant up to 15% (v/v) and low foaming. Fermentation temperature should be monitored to control the speed. Not suitable for cold soaking.

NT 202 is an aromatic red wine yeast that promotes black currant, blackberry and plum-like flavors.

This strain has a stimulatory effect on malolactic fermentation and good fructose utilization.

## ICV OPALE



*S. cerevisiae* • *cerevisiae*



Chardonnay, Sauvignon Blanc, Rosé

#15068 500 g

ICV Opale is the most recent yeast selection from the ICV.

Has been shown to enhance varietal character and aromatics in warm weather and/or high brix grapes that might otherwise produce neutral wines. Particular benefits have been seen in Chardonnay.

Lalvin ICV Opale™ has excellent fermentation qualities with a short lag phase and medium nitrogen requirements.

Can produce significant amount of SO<sub>2</sub> and, as a result, may inhibit malolactic fermentation.

## QA23



*S. cerevisiae* • *bayanus*



Chardonnay, Sauvignon Blanc, Sémillon, Chardonnay, Gewürztraminer, Pinot Blanc, Seyval Blanc

#15652 500 g

#15653 10 kg

Selected in Portugal by the University of Trás-os-Montes and Alto Douro (UTAD) in cooperation with the Viticultural Commission of the Vinho Verde region.

Lalvin QA23™ has low nutrient and oxygen requirements. It has been known to ferment juice at low temperatures (15°C/59°F) to dryness.

Excellent thiol converter making it a complementary yeast for developing varietal Sauvignon Blanc passion fruit character.

Produces large amounts of the enzyme beta-glucosidase during growth which allows for the release of bound terpenes in aromatic varieties.

## R2



*S. cerevisiae* • *bayanus*

Riesling, Sauvignon Blanc, Gewürztraminer, Icewine, White French Hybrids, Fruit Wine

#15071 500 g

Isolated in the Sauternes region of Bordeaux, France, by Brian Croser of South Australia.

Has excellent cold temperature properties and has been known to ferment in conditions as low as 5°C(41°F).

Tends to produce VA without proper nutrition.

Lalvin R2™ helps produce intense, direct fruit style whites by liberating fruity and floral aromas. In addition, varietal characters are enhanced by the enzymatic release of bound aroma precursors.

## RA17



*S. cerevisiae* • *cerevisiae*

Pinot Noir, Gamay, Grenache, Rosé

#15056 500 g

Lalvin RA17® is a BIVB strain that was selected from the Burgundy region of France.

Proper nutrition is recommended to avoid the formation of H<sub>2</sub>S, especially in low nutrient musts.

Enhances cherry and fruit aromas in varietals such as Pinot Noir and Gamay.

Wines made with RA17 may be blended with wines fermented with RC212, W15 or BRL97 to give more complexity and fuller structure.

## RBS 133



*S. cerevisiae* • *cerevisiae*

Sangiovese, Hybrids, Rosé

#15687 500 g

NEW

Selected in collaboration with the Università degli Studi di Padova in Italy to enhance the quality and uniqueness of the wines from the Raboso del Piave grape variety.

Reduces sensation of acidity and astringency in red wines with difficult conditions such as high acidity.

Wines produced by this yeast are described as having delicate fruity aromas such as cherry, blackberry, plum and ripe fruits. Floral characters such as wild violet, as well as spice and vanilla have also been noted.

Lalvin RBS 133™ has an optimum synergy with malolactic fermentation.

## RC212



*S. cerevisiae* • *cerevisiae*

Pinot Noir, Grenache, Cabernet Sauvignon, Chambourcin, Rosé

#15057 500 g

#15097 10 kg

Selected from fermentations in Burgundy, France, by the BIVB.

Timely nutrient additions are recommended to avoid potential H<sub>2</sub>S production, particularly in low nutrient musts.

Known for its ability to generate ripe berry, bright fruit and spicy characteristics and to consistently produce Pinot Noir with good tannin structure.

Lalvin Bourgorouge RC212® wines may be blended with wines fermented with RA17, AMH, W15 or BRL97 to achieve more complexity.

## RHÔNE 4600



*S. cerevisiae* • *cerevisiae*

Rosé, Viognier, Marsanne, Roussanne, Chardonnay, Syrah

#15171 500 g

Isolated from the Côtes du Rhône region in France in collaboration with the research center of Inter Rhône.

Lalvin Rhône 4600® has a short lag phase, low nutrient demand and can ferment efficiently at low temperatures (13.5°C/56°F).

Produces high levels of polysaccharides which contribute intense mouthfeel and volume.

Complex aromatic notes and elevated ester production such as tropical (pineapple) and fresh fruit (apple, pear, strawberry) make this strain an ideal choice for rosé wines and Rhône whites. Useful for blending.

## R-HST



*S. cerevisiae* • *cerevisiae*

Riesling, Gewürztraminer, Sauvignon Blanc, Viognier, White French Hybrids, Icewine

#15130 500 g

Selected from Riesling trials conducted in the Heiligenstein region of Austria.

Tolerates fermentation temperatures as low as 10°C(50°F) and alcohol levels up to 15% (v/v). In very cold fermentations, allow the temperature to increase toward the end for a clean finish.

Lalvin R-HST® has a short lag phase and generation time, even at cold temperatures. This allows it to dominate and persist over spoilage yeast such as *Kloeckera apiculata*, where other *S. cerevisiae* might have difficulty.

Retains fresh varietal character while contributing structure and mouthfeel. It can produce crisp, premium white wines suitable for aging.

## RP15



*S. cerevisiae* • *cerevisiae*

Syrah, Zinfandel, Merlot, Cabernet Sauvignon, Cabernet Franc, Petite Sirah

#15665 500 g

#15666 10 kg

Isolated from spontaneous Rockpile Syrah fermentations in California.

Enoferm RP15™ is a moderate speed fermenter and has been known to be tolerant up to 17% (v/v) alcohol.

Used in concentrated reds for a rich, lush, balanced mouthfeel. Characterized by red fruit and mineral notes.

Has a low to moderate nitrogen demand; benefits from careful rehydration with Go-Ferm or Go-Ferm Protect Evolution.

## STEINBERGER (DGI 228)



*S. cerevisiae* • *cerevisiae*

Riesling, Pinot Gris, Gewürztraminer, Traminette

#15084 500 g

#15086 10 kg

Slow, cool fermenter with low foam production.

Has a reasonable alcohol tolerance (up to 13% v/v) with high SO<sub>2</sub> tolerance.

The beta-glucosidase activity of Uvaferm 228™ contributes elegant aromas, especially in aromatic white wines.

## SVG

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Sauvignon Blanc, Pinot Gris, Riesling, Hybrids	
#15144	500 g
#15164	10 kg

Selected in the Loire region of France as a result of an ITV collaboration with Lallemand.

Notable for its ability to enhance typical Sauvignon Blanc varietal characters (especially from cooler regions) and still maintain good fermentation kinetics.

Wines fermented with SVG are described as having more intensity and a balance of mineral, citrus and spicy notes.

## SYRAH

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Syrah, Merlot, Carignane, Mourvedre, Petite Sirah
#15657	500 g
#15658	10 kg

Enoferm Syrah™ is a Côtes du Rhône isolate from France.

Best sensory results are achieved when a proper nutrition strategy is followed. Alcohol tolerant up to 16% (v/v) with low production of H<sub>2</sub>S and SO<sub>2</sub>.

High glycerol producer and offers good mouthfeel and stable color extraction.

Typical aromas include violets, raspberries, cassis, strawberries and black pepper.

## T73

	<i>S. cerevisiae</i> • <i>bayanus</i>
Sangiovese, Nebbiolo, Tempranillo, Zinfandel, Merlot	
#15091	500 g

Isolated by La Universidad de Valencia of Spain in collaboration with Lallemand.

Lalvin T73™ is a moderate speed fermenter with relatively low nitrogen requirements and good alcohol tolerance (up to 16% v/v).

Recognized for its ability to enhance the natural aromas and flavors in red wines produced in hot climates. Its high ester production helps such wines "open up".

Enhances mouthfeel through the elevated production of glycerol. Useful for blending with wines made with L2056.

## VIN 13

	<i>S. cerevisiae</i> • hybrid
Restart Stuck Fermentations, Sauvignon Blanc, Chenin Blanc, Riesling, Viognier, Chardonnay, Rosé, Gewürztraminer	
#15183	1 kg
#15193	5 kg

Product of the yeast hybridization program of the Institute for Wine Biotechnology at the University of Stellenbosch in South Africa.

Aromatic as well as cold tolerant (10-15°C/50-59°F), VIN 13 also has high alcohol tolerance (16.5% v/v) and low nitrogen requirements (qualities obtained by hybridizing *S. bayanus* and *S. cerevisiae* strains). Good choice for restarting stuck white fermentations, especially when fructose levels remain high.

VIN 13 is a very good thiol releaser (guava, passion fruit and grapefruit) and outstanding ester producer. On tank-fermented Chardonnay it promotes pineapple and banana flavors, while on Riesling, Gewürztraminer and Viognier it accentuates floral notes.

The combination of fermentation kinetics and sensory contributions make this strain very suitable for cold-fermented aromatic whites that are fermented to dryness. Do not over inoculate.

## VIN 2000

	<i>S. cerevisiae</i> • hybrid
Chenin Blanc, Chardonnay, Sauvignon Blanc, Viognier, Chardonnay	
#15195	1 kg

Product of the yeast hybridization program of the Institute for Wine Biotechnology at the University of Stellenbosch in South Africa.

Moderate speed fermenter with very low SO<sub>2</sub> production and low foaming. Cold tolerant (12°C/55°F) and alcohol tolerant to 15.5% (v/v).

VIN 2000 is suitable for barrel fermentation.

Recommended for the production of rich and ripe style Chenin Blanc (fresh pineapple and citrus aromas), oaked Chardonnay (citrus aromas) and Sauvignon Blanc (passion fruit, guava and tropical aromas).

## VRB

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
	Tempranillo, Barbera, Sangiovese, Zinfandel, Petite Sirah, Mourvedre
#15173	500 g

Selected by Centro De Investigaciones Agrarias (CIDA) in Logroño, Spain.

Has a short lag phase and a steady fermentation rate with low VA production. With properly integrated nutrition, Uvaferm VRB® can have an alcohol tolerance of up to 17% (v/v) over a wide temperature range.

This Rioja region selection helps create exceptional flavor complexity while softening tannins and improving mid-palate mouthfeel. Enhances varietal characteristics and ester production. Has good compatibility with malolactic fermentation.

Its flavor attributes are often described as ripe fruit, jam, hazelnut and dried plums.

## W15

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Gewürztraminer, Riesling, Pinot Gris, Pinot Noir, Syrah, Rosé, French Hybrids, Fruit Wine	
#15118	500 g
#15119	10 kg

Isolated in 1991 at the Swiss Federal Research Station in Wädenswil, Switzerland.

Its low heat generation during fermentation helps winemakers minimize the potential for temperature spikes and possible H<sub>2</sub>S problems.

Produces higher levels of glycerol and succinic acid, especially when fermented between 15-20°C(59-68°F), which helps add complexity to the mid-palate.

In white wines, Lalvin W15™ helps retain bright fruit characters while optimizing mouthfeel and balance. It also performs well with both Pinot Noir and cooler climate Syrah.

## WE 372

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
Cabernet Sauvignon, Cabernet Franc, Merlot, Shiraz (Syrah), Pinot Noir, Riesling, Gewürztraminer	
#15192	1 kg

Product of the yeast selection program of Infruitec-Nietvoorbij, the wine and vine institute of the Agricultural Research Council in Stellenbosch, South Africa.

A slower fermenter than other Anchor strains. Alcohol tolerant up to 15% (v/v). The temperature should not exceed 30°C(86°F).

WE 372 promotes soft fruit, berry and floral notes in red wines.

Optimum temperature is 18-30°C(64-86°F) which makes it suitable for the production of semi-sweet wines where the fermentation can be stopped by lowering the temperature down to 10°C(50°F).

## VI-A-DRY YEAST STRAINS

### CEG (EPERNAY II)

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
White, Rosé	
#15081	500 g
#15093	10 kg

Isolated by the Geisenheim Research Institute in Germany.

Notable for its ability to deliver slow, steady and clean fermentations. Optimal fermentation temperatures range from 15-25°C(59-77°F).

CEG fermentations often stick under stressed conditions (low temperatures, low nutrient content, etc.), leaving some residual sugar. This makes CEG advantageous for use in semi-dry white wines.

### MONTRACHET (DAVIS 522)

	<i>S. cerevisiae</i> • <i>cerevisiae</i>
White	
#15060	500 g
#15074	10 kg

Selected from the Pasteur Institut strain collection in Paris, France by UC Davis researchers.

With proper nutrition, it has moderate fermentation kinetics at 10-29°C(50-85°F) with low VA and SO<sub>2</sub> formation.

This strain is sensitive to the killer factor, alcohol levels above 13% (v/v) and over-clarified musts (turbidity <50 NTU).

Considered neutral in sensory contribution.

### PM (PRISE DE MOUSSE)

	<i>S. cerevisiae</i> • <i>bayanus</i>
White, Sparkling Base, Fruit Wine	
#15085	500 g
#15083	10 kg

PM has good fermentation kinetics at temperatures between 15-25°C(59-77°F).

Moderate producer of VA and a low foam and H<sub>2</sub>S producer.

Has high SO<sub>2</sub> and alcohol tolerances.

## SPECIALTY YEAST STRAINS

### EXOTICS SPH

 *S. cerevisiae* and *S. paradoxus* hybrid  
Chardonnay, Viognier, Chenin Blanc,  
Syrah, Merlot, Tempranillo, Grenache

#15213 250 g

Anchor Exotics SPH is a product of the yeast hybridization program of The Institute for Wine Biotechnology at the University of Stellenbosch in South Africa. It is a hybrid between *S. cerevisiae* and *S. paradoxus*. *S. paradoxus* is the closest relative to *S. cerevisiae* and can be found on grapes. This hybrid inherited the aromatic capabilities of both its wparents, thereby expanding the aromatic potential and complexity from what *S. cerevisiae* strains have to offer.

White wines produced using this yeast are described as having exotic aromas and flavors, as well as good mouthfeel. It enhances guava, passion fruit, tropical and stone fruit aromas and flavors. Exotics SPH is cold sensitive and ferments at a steady rate in barrels.

Red wines produced using this yeast, particularly Syrah and Merlot, have shown aromas of cherry, floral, cocoa and strawberries. They are also described as full-bodied, well-balanced, complex and intense. Optimum temperature range in reds is 18-28°C(64-83°F).

Exotics SPH has been found to produce elevated levels of glycerol (9-13 g/L), which can potentially lead to lower alcohol conversions in high sugar musts. It has an alcohol tolerance up to 15.5% (v/v) with medium nitrogen requirements. It has low VA and SO<sub>2</sub> production. It can also partially degrade malic acid and is known to facilitate and enhance malolactic fermentation.

#### USAGE

See rehydration protocol on page 7 for more information.

#### STORAGE

Store in a cool, dry place 5-15°C(41-59°F). Once opened, use immediately.

### BIODIVA

 *Torulaspota delbrueckii*  
Chardonnay, Semillon, Syrah and  
Pinot Noir

#15685 125 g

NEW

The *Torulaspota delbrueckii* isolate Biodiva was initially sold in North American in a kit (Level<sup>2</sup>TD) in which it was partnered with a specific *S. cerevisiae* strain. Based upon market feedback the Biodiva isolate is now available by itself. Winemakers can match it with a compatible *S. cerevisiae* of their choosing for both red and white wines. The result is that winemakers can now mimic the best of wild fermentations in a controlled setting.

***S. cerevisiae* strains compatible with Biodiva are 43, BDX, ICV D254, L2056, QA23, and VRB.**

Following an inoculation of Biodiva (*Torulaspota delbrueckii*) with an inoculation of an appropriate *S. cerevisiae* leads to an increase in ester levels while helping to promote a complete and clean fermentation. Resulting wines commonly have more intense aromas, mouthfeel and complexity.

#### USAGE

1. Check the free SO<sub>2</sub> level in the juice; it must be under 20ppm. Turbidity must be >80 NTU.
2. Suspend 2 lbs/1000 gallons (25g/hL) of *Torulaspota delbrueckii* in 10 times its weight in clean, chlorine free, 30°C(86°F) water. Allow to hydrate for 15 minutes, and then mix gently.
3. Acclimatize the yeast starter to the must/juice temperature by progressively adding an equivalent volume of colder juice to it. The temperature difference between the rehydration suspension and the juice should not exceed 10°C(18°F). Total rehydration time should not exceed 45 minutes. If the YAN is below 80 mg/L of nitrogen, add Fermaid O just after inoculation with Biodiva.
4. After a drop of 1.5 to 3°Brix, inoculate with *Saccharomyces cerevisiae* yeast at 2 lbs/1000 gallons (25g/hL). Suspend 2.5 lbs/1000 (30g/hL) of Go-Ferm Protect Evolution and rehydrate with the *Saccharomyces cerevisiae* in 20 times its weight in water at 37°C(99°F). Allow to settle for 15 minutes, and then mix gently. Acclimatize the yeast starter to the juice temperature by progressively adding an equivalent volume of colder juice to it. The temperature difference between the rehydration suspension and the juice should not exceed 10°C(18°F).
5. At 1/3 sugar depletion add 2 lbs/1000 gallons (25g/hL) of Fermaid K or Fermaid A.

#### STORAGE

Store for 24 months at 4°C (39°F). Use immediately once opened.

Note: The optimum temperature for Biodiva is >16°C (61°F). If the must/juice is under 16°C (61°F) it could result in a long lag phase, slow growth of the yeast, and other problems.

## ENCAPSULATED YEASTS TECHNOLOGY FOR IMPROVED WINEMAKING

Encapsulated yeast are alginate beads (a natural polysaccharide extracted from seaweed) containing *Saccharomyces* or *Schizosaccharomyces* yeast cells. Encapsulation allows substrates and metabolites to diffuse easily throughout the beads without releasing yeast cells into the must/juice or wine. Once encapsulated, the beads are partially dehydrated in a fluidized bead column and are stored at 4°C(40°F) until ready for use. The dry beads average 2 mm in diameter.

Four encapsulated yeast products are available. Each has a unique winemaking application. ProDessert was developed for fermenting premium dessert wines, ProElif for secondary fermentation in sparkling wines, ProRestart for restarting sluggish or stuck primary fermentations and ProMalic is for metabolizing malic acid into ethanol.

### PRODESSERT

 Double encapsulated yeast for premium dessert wine fermentation

#15150 1 kg  
#15158 ProMesh barrel  
#15159 ProMesh tank bag

The most difficult aspect of dessert wine production is arresting the primary fermentation at the desired residual sugar level. ProDessert<sup>®</sup> was developed by Proenol (in collaboration with Lallemand) to make this process easier and more effective. When using ProDessert, the alcoholic fermentation is arrested by simply removing the beads from the wine. Precautionary measures (e.g. sulfur dioxide additions, chilling and/or filtration) may still be required to completely stop or remove indigenous yeast, although less overall intervention may be needed. For example, the need for large sulfur dioxide additions or drastic tank chilling may be reduced.

#### RECOMMENDED DOSAGE

100 g/hL 8.0 lb/1000 gal

Note: Each 1 kilo bag will treat approximately 260 gallons.

#### USAGE

1. Remove the beads from the 4°C(40°F) storage temperature and allow them to adjust to room temperature.
2. Place the beads in barrel or tank sized ProMesh bag(s). Use 2 bags/barrel (109 g/bag) and no more than 5 kg (11 lb)/tank bag.
3. Distribute the beads evenly throughout the bag(s) to ensure good contact with the rehydration solution.
4. In a clean container, add 40 g/L (151 g/gal) sugar into a volume of clean, 37°C(98°F) water, 5 times the weight of the beads. (For example: 1 bag beads (2.2 lb) x 5 = 11 ÷ 8.33 lb/gal water = 1.32 gal water = 196 g sugar/1.32 gal water.)
5. Once the sugar dissolves, add the bag(s) containing the beads to the rehydration solution.
6. Wait 4-5 hours before inoculation.  
Note: The sugar solution does not get added to the juice.
7. Once the beads are properly rehydrated, suspend the bag(s) in the juice at the start of fermentation.
8. Shake the bag(s) 2-3 times daily and stir tanks daily to help eliminate CO<sub>2</sub> adhering to the beads.
9. Remove each bag when the desired residual sugar level is reached.

#### STORAGE

Dated expiration. Store at 4°C(40°F). **Do not freeze.** Once opened use immediately.

For more detailed information, technical data sheets are available on our website at [www.scottlab.com](http://www.scottlab.com).

## PROELIF

 Double encapsulated yeast for secondary fermentation in sparkling wine production

#15571 1 kg

ProElif® is an encapsulated yeast product developed by Proenol for secondary fermentations. The yeast cells are double encapsulated in an alginate bead. The beads can be directly inoculated into the bottle (eliminating the need to prepare a starter culture). This helps ensure control of the number of cells per bottle. Upon fermentation completion, the beads have a greater density than the wine and will quickly drop to the neck of the bottle when inverted. The beads accumulate more tightly than traditional riddling, therefore less wine is lost during disgorging. Traditional freezing and disgorging methods are used to finish the process. The use of ProElif results in a fresh sparkling wine. If greater yeast character is desired, you may make changes to the base wine with this in mind. For example, ProElif has been used with Opti-WHITE treated base wine with good results.

For ProElif to be successful, the base wine should fall within these parameters:

Alcohol	≤	11.5% (v/v)
Free SO <sub>2</sub>	≤	15 mg/L
pH	≥	3.0
Free Assimilable Nitrogen	≥	100 mg/L
Calcium	≤	80 mg/L
Protein Stability	=	stable
Tartrate Stability	=	stable
Fermentation Temperature	>	12°C(54°F)

The base wine must be stable to avoid agglomeration of the beads which could cause subsequent difficulty during disgorging. All of these parameters act in synergy with one another. It is critical to manage them together. If one parameter is over the limit, try to compensate with the others or ferment at a higher temperature.

### RECOMMENDED DOSAGE

133-200 g/hL 1.0-1.5 g/750 mL bottle Note: 1 g of ProElif beads = 4-6 million active cells/mL.

### USAGE

1. Prepare the base wine according to normal protocols.
2. To reduce the risk of haze formation and microbial contamination it is important that the base wine fall within the previously mentioned parameters.
3. Filter the base wine through a 0.45 micron sterile membrane filter the same day as bottling to avoid contamination during fermentation. Meticulous hygiene and sterility of the base wine are essential.
4. Tirage liqueur must be filtered the same day as bottling. The addition of tannins to give volume or structure must be made before the final filtration. Since there is no riddling, no adjuvants or riddling agents are necessary.
5. Add the beads directly to the empty bottles (adding after filling is acceptable but before filling is often easier). Temperature difference between the base wine and ProElif should not exceed 10°C(18°F).
6. Add the tirage liqueur and cap the bottles.
7. Store the bottles on their sides for maximum contact between the cuvée and the beads.
8. ProElif is temperature sensitive and the fermentation environment should remain above 12°C(54°F).

### STORAGE

Dated expiration. Store at 4°C(40°F). **Do not freeze.** Once opened use immediately.

For more detailed information, technical data sheets are available on our website at [www.scottlab.com](http://www.scottlab.com).

## PROMESH BAGS

 For use with ProDessert, ProMalic and ProRestart

#15158 ProMesh barrel  
#15159 ProMesh tank bag

### BARREL BAGS

For ProDessert use 2 bags/barrel containing 109 g/bag. One kilogram of beads will treat 260 gallons, or 4 barrels.

For ProMalic use 2 bags/barrel containing 109 g/bag. One kilogram of beads will treat 260 gallons, or 4 barrels.

For ProRestart use 2 bags/barrel containing 82 g/bag. One kilogram of beads will treat 360 gallons, or 6 barrels.

### TANK BAGS

Use up to 5 kg (11 lb. per bag).

## PROMALIC

 Encapsulated yeast for naturally lowering juice acidity

#15572 1 kg  
#15158 ProMesh barrel  
#15159 ProMesh tank bag

ProMalic® was created by Proenol (in collaboration with Lallemand) as a good alternative to malolactic fermentation or chemical deacidification. *Schizosaccharomyces pombe* metabolizes malic acid into ethanol. It is usually considered a spoilage organism due to its production of off-characters when left too long in the wine after fermentation. Now that it has been encapsulated in double-layered alginate beads it can be removed once the desired malic level is reached. ProMalic is added to the juice at the beginning of alcoholic fermentation and removed once the desired malic level is achieved.

### RECOMMENDED DOSAGE

100 g/hL 8.0 lb/1000 gal Note: Each 1 kilo bag will treat approximately 260 gallons.

### USAGE

1. Remove the beads from the 4°C(40°F) storage temperature and allow them to adjust to room temperature.
2. Place the beads in barrel or tank sized ProMesh bag(s). Use 2 bags/barrel (109 g/bag) and no more than 5 kg (11 lb)/tank bag.
3. Distribute the beads evenly throughout the bag(s) to ensure good contact with the rehydration solution.
4. In a clean container, add 40 g/L (151 g/gal) sugar into a volume of clean, 28-30°C(82-86°F) water, 5 times the weight of the beads. (For example: 1 bag beads (2.2 lb) x 5 = 11 ÷ 8.33 lb/gal water = 1.32 gal water = 196 g sugar/1.32 gal water.)
5. Once the sugar dissolves, add the bag(s) containing the beads to the rehydration solution.  
Note: The sugar solution does not get added to the juice.
6. Wait 4-5 hours before inoculation.
7. Once the beads are properly rehydrated, suspend the bag(s) in the juice at the start of alcoholic fermentation.
8. The temperature difference between the beads and the wine should be less than 10°C(18°F).
9. The free SO<sub>2</sub> in the must has to be below 25 mg/L.
10. Shake the bag(s) 2-3 times daily and stir tanks daily to help eliminate CO<sub>2</sub> adhering to the beads.
11. Remove each bag when the desired malic level is reached.

### STORAGE

Dated expiration. Store at 4°C(40°F). **Do not freeze.** Once opened use immediately.

For more detailed information, technical data sheets are available on our website at [www.scottlab.com](http://www.scottlab.com).

## PRORESTART

 Encapsulated yeast to restart sluggish or stuck fermentations

#15154 1 kg  
#15158 ProMesh barrel  
#15159 ProMesh tank bag

Please see page 28 for full Rehydration Protocol for ProRestart.

ProRestart® was created by Proenol (in collaboration with Lallemand) for completing sluggish and stuck fermentations effectively. It has been acclimated to high alcohol and other harsh conditions prior to being encapsulated in the alginate beads. This conditioning allows the yeast cells to work to metabolize residual sugars in sluggish or stuck wine. It can help decrease spoilage risks related to microbiological contamination and consequently helps preserve wine quality.

ProRestart can be effective when utilized within the following specific wine parameters:

Potential Alcohol	<	15.5% (v/v)
Free SO <sub>2</sub>	<	20 mg/L
pH	>	3.0
Residual Sugar		May work as low as 10 g/L of sugar
Volatile Acidity	<	0.61 g/L (acetic acid)
Temperature		Optimal 20-22°C(68-72°F) Range 12-25°C(54-77°F)

All of these parameters act in balance with one another. It is critical to manage them together. For example, if you have a red wine with high alcohol and high SO<sub>2</sub>, increase the temperature to 20-25°C(68-77°F).

Note: 25°C(77°F) is a higher temperature than we recommend when using traditional restart protocols.

If harsh wine conditions exist, a more rigorous rehydration protocol may be required. If conditions fall outside of the recommended wine parameters, a traditional build-up method is necessary.

### RECOMMENDED DOSAGE

75 g/hL 6.0 lb/1000 gal Note: Each 1 kilo bag will treat approximately 360 gallons.

### USAGE

First analyze the sluggish or stuck wine for microbial contamination. If necessary, treat the wine prior to adding the ProRestart. For microbial contamination see information on lysozyme on page 62.

### STORAGE

Dated expiration. Store at 4°C(40°F). **Do not freeze.** Once opened use immediately.

## PROTOCOL RECOMMENDED METHOD TO RESTART STUCK FERMENTATIONS

When restarting a sluggish or stuck fermentation, it is essential to address yeast biomass buildup together with the low nutrient levels. Appropriate yeast rehydration nutrients such as Go-Ferm and Go-Ferm Protect Evolution are useful tools. Both are rich in micronutrients and survival factors. When added to the rehydration water these factors promote increased biomass of the selected yeast strain. Consequently the selected yeast can acclimate more easily to the often hostile environments (including high alcohol and low temperature) associated with stuck fermentations.

When stuck wines include high residual sugar levels, an addition of a complex nutrient to the stuck wine is also recommended.

In addition, spoilage organisms like *Lactobacillus* and *Pediococcus* are often present in stuck fermentations. These microorganisms can compete for nutrients and release metabolites that inhibit yeast growth. Adding lysozyme to the stuck wine prior to restarting the fermentation may help control such unwanted bacteria and provide an improved environment for the restart to take place (see page 62).

Adding yeast hulls or Nutrient Vit End to the stuck wine prior to restarting the fermentation may also help reduce accumulated toxins and improve chances for a successful restart.

### FOR WINES STUCK AT >3°BRIX

#### STEPS 1–9 BUILD-UP FOR STUCK WINE

1. Add 2 lb/1000 gal (25 g/hL) of yeast hulls 24-48 hours prior to restarting.
2. After 24-48 hours, rack off from the yeast hulls.
3. Add another 1 lb/1000 gal (12.5 g/hL) of yeast hulls.
4. Add a complex yeast nutrient (Fermaid\*) directly to the tank of stuck wine at a rate of 0.5-1.0 lb/1000 gal (6-12 g/hL). Many winemakers also add lysozyme at this time to reduce potential bacteria problems (see page 62).
5. In another clean container mix equal volumes of stuck wine and water. Generally this would total 10% of the total wine volume. (Example: For 1000 gal of stuck wine, use 50 gal water + 50 gal wine.) This container will be the "Mother Restart Tank".
6. Calculate the amount of Go-Ferm or Go-Ferm Protect Evolution at 1.25 times the amount of yeast to be used. Dissolve this yeast rehydration nutrient in 20 times its weight of clean, chlorine free, 43°C(110°F) water. (Example: 5 lb Go-Ferm x 20 = 100 lb, divided by 8.33 lb/gal water = 12 gal water needed.) Mix the solution and cool to 40°C(104°F).
7. Select a yeast strain that is both alcohol tolerant and a vigorous fermenter such as 43, BC (Bayanus), K1 (V1116) or VIN 13. Calculate the amount of yeast required for the total volume of stuck wine at 3-5 lb/1000 gal (36-60 g/hL). When the Go-Ferm/water solution temperature has cooled to 40°C(104°F), slowly (over 5 minutes) add yeast. Stir gently to mix and avoid clumping. Let this yeast suspension stand for 15-20 minutes.
8. Check the temperature of the yeast suspension. There should not be more than 10°C(18°F) difference between the yeast suspension and the diluted wine in the Mother Restart Tank. If there is too great a temperature difference, atemperamentation may be required. Cold temperatures may shock the yeast cells.
9. When the yeast suspension is properly rehydrated and proper consideration has been given to temperature differences, add the yeast to the Mother Restart Tank and wait 20-30 minutes.

#### STEPS 10–13 INOCULATION OF STUCK WINE

10. Add 10% of stuck wine to the Mother Restart Tank and wait 20-30 minutes. (Example: For 1000 gal stuck wine, add 100 gal wine.)
11. Add 20% of stuck wine to the Mother Restart Tank and wait 20-30 minutes. (Example: For 1000 gal stuck wine, add 200 gal wine.)
- 12a, 12b, 12c. Repeat step 11.
13. Add any remaining wine to the Mother Restart Tank.

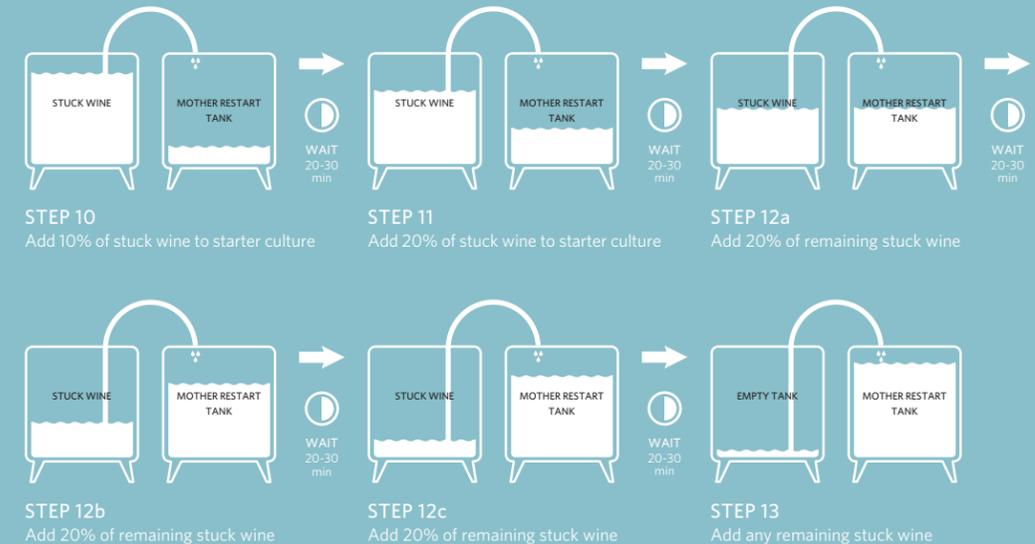
\*Fermaid A, Fermaid K or Fermaid O.

STEP BY STEP

### FOR WINES STUCK AT >3°BRIX BUILD-UP FOR STUCK WINE



### INOCULATION OF STUCK WINE



### FOR WINES STUCK AT 1–2°BRIX

Follow this restart protocol, except in STEP 4 reduce the complex yeast nutrient addition to 0.5 lb/1000 gal (6 g/hL).

### FOR WINES STUCK AT <1°BRIX

Follow this restart protocol, except in STEP 4 eliminate the addition of a complex yeast nutrient.

## PROTOCOL RECOMMENDED METHOD TO REHYDRATE PRORESTART

### STEP 1 PREPARATION OF STUCK WINE AND ADDITION OF BEADS TO PROMESH NYLON BAGS

1. Add 25-30 g/hL (2.0-2.5 lb/1000 gal) yeast hulls to the stuck wine 24 hours prior to bead addition. Rack off of the yeast hulls, if possible.
2. Remove the encapsulated yeast beads from the recommended 4°C(40°F) storage temperature and allow them to adjust to room temperature. This will avoid thermal shock to the encapsulated yeast.

Place the beads in the ProMesh nylon bags before rehydrating. See ProMesh bags (on page 24) for dose per bag. To ensure good contact with the wine, distribute the beads evenly throughout the ProMesh nylon bags, leaving plenty of space for bead movement.

### STEP 2 BEAD REHYDRATION

3. Prior to rehydration, add the correct concentration of sugar (see chart below) into a volume of clean 37°C(98°F) water 5 times the weight of the beads (or enough sugar solution to completely cover the beads). Once the sugar dissolves, add the ProMesh nylon bag containing the beads.

Potential Alcohol % (v/v)	Sugar Concentration (g/L)	Hours of Soaking Required
13	20	2
13.5	40	4
14	60	6
14.5	80	8
15	100	10
15.5	120	12

Note: The sugar solution does not get added to the wine. It is only necessary to aid in encapsulated yeast activation.

Wait between 2 and 12 hours (see chart above for the recommended rehydration length) before adding the beads to the must.

### STEP 3 ADDITION OF BEADS TO STUCK WINE

4. Introduce the ProMesh nylon bags containing the beads into the tank/barrel of stuck wine. The temperature difference between the beads and the wine should be less than 10°C(18°F).
5. If several bags are added to the same tank, they must be placed at different heights for better distribution. A weight (ballast) is to be hung beneath the bags to prevent them from floating.
6. Bags should be gently shaken several times a day to release accumulated CO<sub>2</sub>. The wine must be stirred daily without aeration.
7. Leave the beads in the wine until the desired degree of fermentation is achieved.

# NUTRIENTS

Classic wine yeast strains of *Saccharomyces cerevisiae* perform best when their specific needs are considered. In addition to issues like temperature and turbidity, nutritional factors are critical. If requirements are met, yeast can thrive and perform at their peak while converting juice into wine.

Nitrogen is an important part of yeast nutrition and has a significant impact on the fermentation outcome. YAN (yeast assimilable nitrogen) content in must/juice directly influences fermentation speed. It impacts the yeast biomass at the beginning of fermentation, as well as the sugar transport kinetics during fermentation.

Interestingly, it is normal for must/juice to be nitrogen depleted at the end of the yeast growth phase even though the majority of the sugar remains to be fermented. This results in a decrease in both protein synthesis and sugar transport activity.

An addition of YAN at the end of the growth phase reactivates protein synthesis and the sugar transport speed which corresponds to an increased fermentation rate.

## BASICS

Grapes provide nitrogen in the form of proteins, peptides, alpha amino acids and ammonium ions. Yeast assimilable nitrogen (YAN) is composed of only two of these elements: alpha amino acids (assimilable organic nitrogen) and ammonium ions (inorganic nitrogen). When determining the YAN in must/ juice, it is critical to take the nitrogen contribution from both of these into account. Healthy fermentations contain a balance of yeast assimilable nitrogen from both sources. Low levels of YAN can put undue stress on yeast cells and significantly hinder their performance. In some cases, yeast may create unpleasant flavors and/or aromas or even stop fermenting.

## HOW MUCH YAN IS NEEDED?

The range of YAN in grapes is enormous. It can vary from year to year and from vineyard to vineyard. As a general rule, YAN of 150 to 200mg/L should be considered as the minimum to complete a standard fermentation to 13% ethanol (v/v). If the natural levels are lower than this, the must/juice should be considered to be nitrogen deficient. Addition of a YAN containing nutrient is recommended.

In addition, nutrient management also requires consideration of the following factors:

### INITIAL SUGAR CONTENT

The higher the initial concentration, the more YAN required.

QUALITY AND QUANTITY of the nitrogen initially present and supplemented (organic versus inorganic).

### TEMPERATURE

An increase in temperature stimulates the growth of yeast and fermentation rate, thereby requiring increased levels of nitrogen.

### TURBIDITY

When juice is over-clarified, many nutritional factors for yeast are removed, making it necessary to supplement with complete and balanced nutrients.

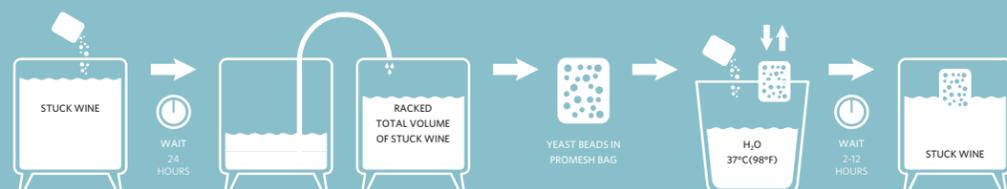
The YEAST STRAIN selected for the fermentation.

### OXYGEN

When adding more O<sub>2</sub> to the must, nitrogen is captured faster and more is needed when compared to fermentations taking place under anaerobic conditions (white wine).

The sanitary status of the grapes, grape chemistry, as well as pre-fermentation winemaking practices also directly influence the YAN.

STEP BY STEP



**STEP 1**  
Add yeast hulls, rack after 24 hours.

**STEP 2**  
Let yeast beads adjust to room temperature. Place beads into a ProMesh bag.

**STEP 3**  
Soak beads in sugar solution.

**STEP 4**  
Introduce ProMesh bag into stuck wine. Gently shake bag several times per day. Leave beads in the wine until desired degree of fermentation.

## REGENERATION PROTOCOL

The encapsulated yeast beads for ProDessert and ProRestart may need to be "regenerated" if they become clogged with tannins or tartrate crystals. In some reds, high levels of polyphenols may cause ProRestart to slow down. If this occurs, regenerate by rinsing for 1-2 hours in a 40 g/L sugar solution that is 10°C(18°F) higher than the wine temperature (but no more than 35°C/95°F). Then, reintroduce into the stuck wine.

Please see page 25 for full product listing of ProRestart.

## YEAST NUTRIENT YAN CONTRIBUTION

NUTRIENT	DOSE 25 g/hL (2 lb/1000 gal)	DOSE 30 g/hL (2.5 lb/1000 gal)	YAN SOURCE
DAP	50 mgN/L	63 mgN/L	Inorganic nitrogen
FERMAID A	30 mgN/L	36 mgN/L	Inorganic nitrogen (from DAP) and organic nitrogen from autolyzed yeast
FERMAID K	25 mgN/L	30 mgN/L	Inorganic nitrogen (from DAP) and organic nitrogen from autolyzed yeast
FERMAID O	10 mgN/L	12 mgN/L	Organic nitrogen from autolyzed yeast
GO-FERM	7.5 mgN/L	10 mgN/L	Organic nitrogen from autolyzed yeast
GO-FERM PROTECT EVOLUTION	7.5 mgN/L	10 mgN/L	Organic nitrogen from autolyzed yeast
NUTRIENT VIT END	7 mgN/L	8.5 mgN/L	Organic nitrogen from autolyzed yeast
PHOSPHATE TITRES	50 mgN/L	63 mgN/L	Inorganic nitrogen
SIY 33 (FERMAID 2133)	8 mgN/L	10 mgN/L	Organic nitrogen from autolyzed yeast

## CHOOSING THE CORRECT YEAST NUTRIENT

Note: With the exceptions of Fermaid K and Fermaid K (Kosher), all ingredients of the products shown in the nutrient section of this handbook (pages 29-41) are listed by the TTB as acceptable in good commercial winemaking practice listed in 27 CFR 24.246. The ingredients in Fermaid K and Fermaid K (Kosher) are listed as acceptable in good commercial winemaking practice in either 27 CFR 24.250 or 27 CFR 24.246. For more information please visit [www.TTB.gov](http://www.TTB.gov).

👉 Highly Recommended

	DAP	FERMAID A	FERMAID K	FERMAID K (KOSHER)	FERMAID O	GO-FERM	GO-FERM PROTECT EVOLUTION	INOCEL	NUTRIENT VIT END	PHOSPHATE TITRES	SIY 33 (FERMAID 2133)	SIY CELL HULLS
PAGE	34	34	34	34	35	33	33	35	35	36	36	36
OMRI Listed					👉	👉			👉			
Contains organic nitrogen		👉	👉	👉	👉	👉	👉		👉		👉	👉
Contains DAP	👉	👉	👉	👉						👉		
DAP and thiamin blend										👉		
Yeast nutrient without DAP					👉	👉	👉	👉	👉		👉	👉
Yeast rehydration nutrient						👉	👉					
Yeast rehydration nutrient for difficult conditions							👉					
Complex yeast nutrient		👉	👉	👉								
Contains added vitamins and/or minerals			👉	👉						👉		
Contains higher levels of sterols and fatty acids							👉					
Inactivated yeast for challenging conditions									👉			👉
Yeast nutrient certified Kosher for Passover				👉								
Contains cellulose									👉			
Approved under TTB 24.246	👉	👉			👉	👉	👉		👉	👉	👉	👉
Approved under TTB 24.250			👉	👉								

## ARTICLE OPTIMIZING ALCOHOLIC FERMENTATIONS

Working with a natural product requires an awareness of its variable and dynamic attributes. No two sets of fruit or circumstances are exactly the same. It is crucial to understand the many factors that can negatively impact a fermentation. This understanding allows the winemaker to be proactive and address potential issues before they occur. This is critical as we strive to produce the best possible wines from the raw materials that nature has given us.

### WHAT ARE THE MAJOR PARAMETERS THAT INFLUENCE FERMENTATION PERFORMANCE?

#### YEAST STRAIN SELECTION AND HANDLING

The *Saccharomyces cerevisiae* strains available for winemakers are diverse and robust. In addition to converting sugars to ethanol, they have varying secondary capabilities such as polysaccharide production,  $\beta$ -glucosidase activity and the creation or enhancement of aroma potentials.

*S. cerevisiae* strains chosen for fermentations need to tolerate and grow in circumstances of high physiological stress. Environmental challenges include high sugar,  $SO_2$ , and antagonistic microorganisms. They need to thrive while making, accumulating and tolerating increasing levels of ethanol. Choose a yeast strain suited for the task. Take into consideration the ethanol and temperature tolerances of the strain, as well as their nutritional needs.

See yeast reference chart on page 8-11 for guidance.

#### CELL NUMBERS AND HEALTH

In order to assure that your selected yeast strain dominates during fermentation, inoculation should be done at a rate of no less than 25 g/hL (2 lb/1000 gallons) of must/juice. This converts to an initial inoculation of approximately  $4 \times 10^6$  cells/mL. If yeast inoculations are at recommended levels, they should then be able to suppress indigenous microorganism which otherwise might be competitive. This suppression results in a shorter lag (cell acclimatization) phase and reduced likelihood that volatile acidity problems will develop. Further, if the 25g/hL rate is respected, the yeast will be stronger, grow more rapidly, and the fermentations will finish faster.

Note also:

- If the initial sugar level is between 25-30°Brix, we recommend increasing the yeast inoculation level to 35 g/hL (2.9 lb/1000 gallons).
- If the initial sugar level exceeds 30°Brix, we recommend increasing the yeast inoculation level to 40 g/hL (3.3 lb/1000 gallons). For ice wine, we recommend 50g/hL (4.25 lb/1000 gallons).

If GoFerm or GoFerm Protect Evolution are used, any increase in yeast inoculation should be matched by a similar increase in these nutrients.

#### NUTRITIONAL REQUIREMENTS

The nutritional needs of yeast are complex and diverse. They require more than nitrogen to succeed. Macronutrients (e.g. oxygen), micronutrients (minerals: magnesium, calcium, zinc, manganese; vitamins: thiamin, biotin, calcium pantothenate) and microprotectors (e.g. polyunsaturated fatty acids and sterols) each have a role. Together they determine the vitality of the yeast. Vitamins have a role in cell growth, fermentation activity and nitrogen metabolism. Minerals impact the correct functioning of the yeast and can have a direct correlation to the sensory properties of the wine. Sterols and polyunsaturated fatty

acids help the yeast resist stress factors. Each is necessary to a successful fermentation.

Interestingly, some factors are more critical at the fermentation's onset (vitamins and minerals), some at mid-point (nitrogen and oxygen) and some later on (polyunsaturated fatty acids and sterols). To achieve optimal fermentation results we recommend that these needs be anticipated with a multi-stage nutrition program including both rehydration and fermentation nutrients. Any program should be tailored to the individual needs of the particular yeast you have chosen, the condition of the must/juice chemistry, the pre-fermentation processes, and initial nitrogen levels. Notably, if nitrogen is deficient, then we can also assume that other essential nutrients are lacking as well.

#### TEMPERATURE

Temperature control during fermentation is critical! Temperature stress can permanently inactivate yeast cells. Temperature stress can be viewed as over-cooling (whites and rosés), excessive heat (most notably in reds) and rapid temperature swings (commonly from hot to very cool). Temperature management is especially important at the end of fermentation when ethanol levels are at their maximum.

We strongly recommend that the maximum temperature for red wine fermentations does not exceed 24-26°C (75-78°F) as measured under the cap. For white and rosé fermentations the peak temperature should be 20°C (68°F).

For temperature minimums please consult individual strain recommendations. Remember, however, that fermentations should never be initiated at the lower limits of a strain's tolerance. This will only introduce an unnecessary stress variable.

#### TOXINS AND COMPETITIVE FACTORS

Toxins can originate from both grapes and stressed yeast cells. Examples of such toxins are short to medium chain fatty acids,  $SO_2$  and ethanol. Antagonistic microorganisms and residual agro-chemicals can also be problematic. Natural yeast derivatives (see page 37 for further details) are very useful in detoxifying the environment for the fermenting yeast.

#### FINAL POINT: KEEP YOUR YEAST IN SUSPENSION

It is important to keep the yeast moving and to have some level of solids in fermenting must/juice. As fermentations progress, yeast cells can settle to the bottom of the vessel or get trapped under the cap. As yeast settle they are compacted in the lees and this contributes additional stress. This may result in elevated volatile acidity and sulfide production. If the juice is too clear you can increase the level of solids by adding fermentation nutrients, yeast hulls or Inocel.

Since successful winemaking depends on alcoholic fermentation management, it is important to have a keen understanding of factors listed above and how they interrelate. Awareness and proactive wine-making increase the chances for successful fermentations. This can optimize your fruit resulting in wines with more positive aromatics and focused structure.

## STRATEGY: YEAST PROTECTION AND NUTRITION

### WINE YEAST NUTRIENT: RECOMMENDED ADDITION RATES

JUICE/MUST YAN	STEP 1 YEAST REHYDRATION*	STEP 2 FERMENTATION NUTRITION	
		START OF ALCOHOLIC FERMENTATION	1/3 AF COMPLETION
>200 mg/L	GO-FERM 30 g/hL (2.4 lb/1000 gal)*	FERMAID O 10-20 g/hL (0.8-1.7 lb/1000 gal)	FERMAID O 10-20 g/hL (0.8-1.7 lb/1000 gal) <b>OR</b> FERMAID K 25 g/hL (2 lb/1000gal)
125-200 mg/L	GO-FERM 30 g/hL (2.4 lb/1000 gal)*	FERMAID O 10-20 g/hL (0.8-1.7 lb/1000 gal)	FERMAID A 10-30 g/hL (0.8-2.4 lb/1000 gal) <b>OR</b> FERMAID K 10-25 g/hL (0.8-2 lb/1000 gal)
<125 mg/L	GO-FERM PROTECT EVOLUTION 30 g/hL (2.4 lb/1000 gal)*	FERMAID A 10-30 g/hL (0.8-2.4 lb/1000 gal) <b>OR</b> FERMAID K 10-25 g/hL (0.8-2 lb/1000 gal)	FERMAID A 10-30 g/hL (0.8-2.4 lb/1000 gal)** <b>OR</b> FERMAID K 10-25 g/hL (0.8-2 lb/1000 gal)**

Note: Knowing the initial YAN in the must/juice is only one piece of the puzzle. Other factors are critical as well. Do not forget to consider the balance and availability of nitrogen, micronutrients and microprotectors, relative nitrogen needs of the selected yeast strain, SO<sub>2</sub>, temperature, fruit condition, oxygen, and the variety of other factors which can impact yeast health and a successful fermentation.

\* Quantity may change based on yeast dose.  
\*\* DAP may be required to further adjust the YAN

## REHYDRATION NUTRIENTS FOR YEAST PROTECTION AND STIMULATION

This is the first stage of your nutrient strategy. Yeast rehydration nutrients provide natural micronutrients (vitamins and minerals) to the yeast during the yeast rehydration phase. If these micronutrients were added directly to the must/juice, competitive microorganisms would use a significant amount of them and others would be chelated by polyphenols or inactivated by SO<sub>2</sub>. By adding these bio-available nutrients at the rehydration stage yeast cells benefit most directly. Cell viability and vitality is enhanced, resulting in fermentations that finish stronger, with reduced chances of sensory deviations.

Never use nutrients containing ammonia salts, such as DAP, during yeast rehydration—they are toxic to the yeast.

### GO-FERM

 Yeast rehydration nutrient

 OMRI listed

#15149	1 kg
#15135	2.5 kg
#15161	10 kg

Go-Ferm® is a natural yeast rehydration nutrient containing a balance of vitamins and minerals. It was developed to enhance fermentation kinetics and to help avoid fermentation problems. By suspending Go-Ferm in the rehydration water before adding the selected active dried yeast culture, the yeast soak up the valuable bio-available micronutrients as they rehydrate. Infusing yeast with these critical nutrients arms them against ethanol toxicity and optimizes nutrient availability, protecting and stimulating the yeast culture.

### GO-FERM PROTECT EVOLUTION

 Next generation yeast rehydration nutrient for challenging conditions

 #15103 2.5 kg

**NEW LOOK**

Go-Ferm Protect Evolution® is the next generation of natural yeast rehydration nutrient with improved sterol content (quality and quantity) together with micronutrients which help to increase yeast cell viability and vitality. This second generation formulation improves yeast stress tolerance and enhances fermentation security (especially in difficult conditions).

Difficult conditions may include overripe fruit, marginal fruit quality (poorly developed fruit, *Botrytis*, molds, high bacteria count), insecticide or fungicide residue, low nutrient levels, or over-clarified juice. It is especially useful in white and rosé fermentations when oxygen additions are difficult. The enhanced sterol content can replace the second oxygen addition recommended at 1/3 sugar depletion.

Go-Ferm Protect Evolution provides a combination of protective and nutritive benefits for optimal fermentation and sensory results.

### ALL GO-FERM PRODUCTS

#### RECOMMENDED DOSAGE

30 g/hL 2.5 lb/1000 gal

Note: This recommendation is based on a yeast inoculum of 2 lb/1000gallons (25 g/hL). If using more or less yeast, respect the ratio of 1 part yeast to 1.25 Go-Ferm or Go-Ferm Protect Evolution.

#### USAGE

- Mix Go-Ferm or Go-Ferm Protect Evolution in 20 times its weight in clean 43°C (110°F) water. For every 1 kg (2.2 lb) Go-Ferm or Go-Ferm Protect Evolution, use approximately 5 gallons of water.
- Let the mixture cool to 40°C (104°F) then add the selected active dried yeast.
- Let stand for 20 minutes.
- Slowly (over 5 minutes) add equal amounts of must/juice to be fermented to the yeast slurry. Do not allow more than 10°C (18°F) difference. Atempere as necessary (see page 7 for more details).

#### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## FERMENTATION NUTRIENTS FOR YEAST NUTRITION AND FERMENTATION SECURITY

Yeast nutrition refers to the utilization of essential food sources for anabolic and catabolic reactions which ultimately ensure the growth and survival of the cell. Fermentation nutrition is therefore considered a vital part of a controlled fermentation strategy. Nitrogen is an extremely important yeast nutrient. The cells use nitrogen for growth, protein and enzyme synthesis, and sugar transport. Yeast nutrition, however, is more than nitrogen. Yeast cells also require a balanced supply of minerals (magnesium, zinc, etc.), vitamins and oxygen. Tailor your fermentation regime for optimal yeast reproduction, sugar transport and aromatic expression.

### DIAMMONIUM PHOSPHATE (DAP)

 Inorganic nitrogen source

#15805 5 kg

DAP is an inorganic nitrogen source that should be used in conjunction with complex nutrients to ensure a complete nutritional strategy is followed. DAP is used to supplement in nitrogen deficient environments.

### FERMAID A

 Complex yeast nutrient

#15070A 10 kg

Fermaid A™ is a complex yeast nutrient blend of inactivated yeast supplying organic nitrogen (alpha amino nitrogen) and diammonium phosphate (DAP). There are no supplemented vitamins or minerals. The nitrogen blend in Fermaid A is aimed at encouraging a balanced rate of fermentation. An addition elevates the yeast's intracellular amino reserve, reducing the chances of a stuck or sluggish fermentation. The available YAN in the fruit directly impacts the fermentation rate and the formation of flavor-active volatile compounds. For best results, Fermaid A should be used in conjunction with an appropriate yeast rehydration nutrient (Go-Ferm or Go-Ferm Protect Evolution). This will assure proper nutrition of the selected yeast from rehydration through completed fermentation.

#### RECOMMENDED DOSAGE

10-30 g/hL 0.8-2.4 lb/1000 gal

### FERMAID K\*

 Complex yeast nutrient

#15073 2.5 kg

#15070 10 kg

Fermaid® K is a complex yeast nutrient that contains a blend of inactivated yeast, free amino acids (organic nitrogen derived from inactivated yeast), sterols, unsaturated fatty acids, key nutrients (magnesium sulfate, thiamin, folic acid, niacin, calcium pantothenate) and ammonium salts (DAP). The unsaturated fatty acids and sterols that Fermaid K provides are important survival factors needed to maintain alcohol resistance and permease (sugar uptake) activity. The nitrogen from the alpha amino acids contained in Fermaid K is utilized much more efficiently than from the ammonia salts. The cell wall fractions in Fermaid K absorb short and medium chain fatty acids that are toxic to the yeast. They also provide nucleation sites to help keep the yeast in suspension. For best results, Fermaid K should be used in conjunction with an appropriate yeast rehydration nutrient (such as Go-Ferm or Go-Ferm Protect Evolution) to assure proper nutrition of selected yeast from rehydration through completed fermentation.

#### RECOMMENDED DOSAGE

25 g/hL 2 lb/1000 gal

\*Note: The ingredients in Fermaid K are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.250 together with CFR 24.246. The ingredients in all other products shown on pages 29-41 are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.246. For more information please visit [www.TTB.gov](http://www.TTB.gov).

### FERMAID K (KOSHER)\*

 Kosher certified complete yeast nutrient

#15070K 10 kg

Fermaid® K (Kosher) is very similar to Fermaid K except that it is certified as Kosher for Passover.

#### RECOMMENDED DOSAGE

25 g/hL 2 lb/1000 gal

\*Note: The ingredients in Fermaid K Kosher are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.250 together with CFR 24.246. The ingredients in all other products shown on pages 29-41 are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.246. For more information please visit [www.TTB.gov](http://www.TTB.gov).

### FERMAID O

 Organic yeast nutrient

 OMRI listed

#15067 2.5 kg

#15107 10 kg

Fermaid O™ is a blend of highly specific fractions from inactivated yeast that are rich in assimilable amino acids (organic nitrogen). Organic nitrogen is known to be a highly effective nutrient source (especially when compared to inorganic nitrogen) consistently resulting in lower peak fermentation temperatures, lower levels of negative sulfur compounds and cleaner fermentation kinetics. Organic nitrogen use has been correlated with positive aromatic expression. Fermaid O does not contain any DAP or supplemented micronutrients. For optimal results, Fermaid O should be used in conjunction with an appropriate yeast rehydration nutrient (Go-Ferm or Go-Ferm Protect Evolution) to assure proper micronutrient nutrition of selected yeast from rehydration through completed fermentation.

#### RECOMMENDED DOSAGE

40 g/hL 3.3 lb/1000 gal

### ALL FERMAID PRODUCTS JUST LISTED

#### USAGE

In order to avoid CO<sub>2</sub> release and overflowing of fermentation vessels, all Fermaid products should be mixed with room temperature water before adding to an active fermentation. The amount of water used is not critical. Simply add enough water to make a slurry.

#### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

Note: Due to high nutrient requirements, some yeast strains may benefit from additional nutrient supplementation (see yeast reference chart on pages 8-11).

### INOCEL

 Cellulose powder for over-clarified juice

#15804 1 kg

Inocel is purified cellulose powder. Inocel increases the turbidity of white and rosé juice. It may be used alone or in combination with complex nutrients to improve alcoholic and malolactic fermentation kinetics. Add to freshly pressed juice at the beginning of fermentation.

#### RECOMMENDED DOSAGE

10-60 g/hL 0.8-5 lb/1000 gal\*

\*Each 10 g/hL of Inocel equals a rough increase of 20 NTU

#### USAGE

Blend Inocel into 20 times its weight of room temperature water. Once hydrated, add directly to the juice, mixing thoroughly.

#### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

### NUTRIENT VIT END

 Inactivated yeast for compromised fruit and/or treating sluggish and stuck fermentations

 OMRI listed

#15679 2.5 kg

Nutrient Vit End™ is a highly specific inactivated yeast. It has high bio-adsorptive properties for binding short and medium chain fatty acids and fungicides. Saturated fatty acids are produced under stressful conditions resulting in a modification of the yeasts sugar transport capacity. When used during fermentation Nutrient Vit End can bind toxins and help minimize the risk of sluggish or stuck fermentations. It can also be used to detoxify the wine for restarting a sluggish or stuck fermentation.

#### RECOMMENDED DOSAGE

Juice/Must 30 g/hL 2.5 lb/1000 gal

Sluggish or Stuck Wine 40 g/hL 3.3 lb/1000 gal

#### USAGE

Suspend Nutrient Vit End in water, juice or wine and mix well before adding to juice or must. If using for a stuck or sluggish fermentation, allow to settle and rack off prior to restart.

#### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## PHOSPHATE TITRES



DAP and thiamin blend for optimized fermentations

#15887 1 kg  
#15888 5 kg

Phosphate Titres is a blend of diammonium phosphate (DAP) and thiamin (vitamin B1) for nutrient supplementation of deficient juice/must. Wine yeast requires a supply of thiamin for cell growth. Phosphate Titres can help ensure regular yeast multiplication and sugar utilization. Add at the start of alcoholic fermentation in low YAN juice/must situations (alongside a complex yeast nutrient) or at 1/3 sugar depletion. Phosphate Titres contains 1% thiamin.\*

### RECOMMENDED DOSAGE

6 g/hL 0.5 lb/1000 gal

### USAGE

Suspend Phosphate Titres in cold water and mix well before adding to juice or must.

### STORAGE

Dated expiration. Store in a cool and dry environment below 25°C (77°F). Once opened, keep tightly sealed and dry.

\*This product contains thiamin. The TTB Maximum Legal Dose for thiamin hydrochloride = 0.60 mg/L (0.005 lb/1000 gal) of wine or juice. 21 CFR 184.1875

## SIY 33 (FERMAID 2133)



Autolyzed yeast

#15100 10 kg

SIY 33™ (Fermaid 2133) is a pure, autolyzed, spray dried yeast. It provides natural alpha amino nitrogen, B vitamins and yeast hulls. SIY 33 (Fermaid 2133) will help supplement the alpha amino nitrogen component of YAN. Add at 1/3 sugar depletion when inorganic nitrogen is NOT desired. Unlike Fermaid A and K, SIY 33 (Fermaid 2133) does not contain added ammonia salts (DAP) or supplemented micronutrients.

### RECOMMENDED DOSAGE

25 g/hL 2 lb/1000 gal

### USAGE

In order to avoid CO<sub>2</sub> release and overflowing of fermentation vessels, SIY 33 (Fermaid 2133) should be mixed with room temperature water before adding to an active fermentation. The amount of water used is not critical. Simply add enough water to make a slurry.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## SIY CELL HULLS



Yeast hulls for difficult fermentation conditions

#15069 < 44 lb  
44 lb bag

SIY Cell Hulls™ (yeast ghosts or skeletons) are a preparation of the insoluble fraction of whole yeast cells (i.e. cell walls). The addition of yeast hulls has been shown to increase the number of viable yeast cells and to help increase the surface area of over-clarified juice and wine. In difficult or sluggish alcoholic or malolactic fermentations, yeast hulls assist by absorbing toxins such as hexanoic and decanoic acids and their esters. Yeast hulls are highly beneficial in oxygen deficient juice and wine as they contribute sterols and unsaturated fatty acids. Together with adequate assimilable nitrogen, yeast hulls can help promote cell growth and increase fermentation kinetics. For severe conditions, such as botrytised musts, high sugar musts, over-fined musts or warm cellar conditions, higher doses (>25 g/hL) are recommended. Racking will remove yeast hulls and may necessitate a second addition.

### RECOMMENDED DOSAGE

25 g/hL 2 lb/1000 gal

### USAGE

In order to avoid CO<sub>2</sub> release and overflowing of fermentation vessels, SIY Cell Hulls should be mixed with room temperature water before adding to an active fermentation. The amount of water used is not critical. Simply add enough water to make a slurry.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## NATURAL YEAST DERIVATIVE NUTRIENTS

Natural yeast derivative nutrients are highly specialized inactivated strains of enological yeast. These yeast strains are grown in a controlled environment and harvested at the end of their growth phase. At this stage the yeast has produced a range of enologically attractive polysaccharides that are more reactive compared to the polysaccharides that are released during the yeast autolysis phase.

Our inactivated yeasts are derived from the biomass of whole yeast cells and have been treated to suppress their fermentative capacity. Each of our natural yeast derivative nutrients can be differentiated by the strains of yeast used, the level of refinement of the yeast cells, their polysaccharide contribution, as well as the presence of specific fractions such as glutathione. These enological tools contribute certain fermentative advantages together with significant wine quality improvement. Used alone, however, they should not be viewed as a substitute for the complete range of fermentation nutrition products listed elsewhere in this Handbook.

## CHOOSING THE RIGHT NATURAL YEAST DERIVATIVE NUTRIENT

👉 Highly Recommended  
👈 Recommended

	ICV BOOSTER BLANC	ICV BOOSTER ROUGE	ICV NOBLESSE	OPTIMUM WHITE	OPTI-RED	OPTI-WHITE	REDSTYLE
PAGE	38	38	39	39	39	40	40
OMRI Listed			👉	👉	👉	👉	
Increases aromatic freshness in whites and rosés	👉			👉		👉	
Develops mid-palate intensity in whites and rosés	👉			👈		👈	
Increases mid-palate intensity in reds		👈			👉		👉
Color and tannin stabilization		👉			👉		👉
Increases aromatic structure & complexity	👉	👈	👉	👉	👉	👈	👉
Decreases alcohol perception	👈		👉		👉		
Facilitates wood integration	👉			👉	👉	👉	
Develops aromatic/spicy notes		👉					👉
Increase overall balance	👉	👉	👉	👉	👉	👉	👉
Avoids off-aromas and oxidation	👉		👉	👉			
Reduces bitterness or green character	👈			👉	👉	👉	👉
Reduced production of sulfur off-odors during fermentation	👉		👉				
Reduces sulfur defects	👈		👉		👈		
Contains enzyme							👉

## ICV BOOSTER BLANC

 Increases smooth mid-palate intensity and fresh fruit in whites and rosés

#15179      2.5 kg

ICV Booster Blanc® was developed from an ICV yeast strain specific for whites and rosés. This yeast derivative nutrient is produced by the inactivation of yeast cells and through this process soluble fractions of the cells walls are made readily available.

When added to juice, Booster Blanc participates in the colloidal balance of the wine resulting in smooth mid-palate intensity and increased fresh varietal fruit aromas. Interactions take place that diminish bitterness, vegetal and chemical perceptions. Booster Blanc helps to maintain freshness and aroma stability in wines that go through MLF. If used at the beginning of the primary fermentation, it can be helpful in lowering the production of off-sulfur compounds (notably in botrytised grapes). It can be added toward the end of fermentation to help reveal muted aromatics. To help decrease the perception of woody aromas, add before placing in new barrels. Booster Blanc greatly complements premium whites or rosés that are fermented with ICV D21 and ICV GRE.

### RECOMMENDED DOSAGE

30 g/hL      2.5 lb/1000 gal

Note: Dosage should be increased when grapes are affected by more than 15% rot or when there is an absence of oxygen during fermentation.

### USAGE

Mix Booster Blanc in 10 times its weight in water or juice. Booster Blanc is only partially soluble. Stir to maintain suspension before and during addition.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## ICV BOOSTER ROUGE

 For greater and smoother tannin structure in reds

#15169      2.5 kg

ICV Booster Rouge® is a yeast derivative nutrient originating from a specific wine yeast isolated and selected by the ICV. The yeast macromolecules in Booster Rouge interact with red wine polyphenols, resulting in a positive influence on the colloidal balance of the final wine. When used in red must sourced from hot climates, Booster Rouge wines are perceived as having higher fore-mouth volume and smoother mid-palate tannic structure as well as fresher aromatic sensations. Booster Rouge complements short maceration times in premium reds fermented with ICV GRE resulting in mid-palate intensity and fresh varietal aromas. Sensations of aggressive and drying tannic sensations are minimized due to the high molecular weight polysaccharides that are released. In ultra-premium reds from balanced and mature grapes, Booster Rouge shows good synergy with ICV D254 and ICV D21. Licorice aromas and mid-palate intensity are also enhanced. Booster Rouge may also be added during the latter part of the alcoholic fermentation to contribute tannin intensity and alcohol integration.

### RECOMMENDED DOSAGE

30 g/hL      2.5 lb/1000 gal

### USAGE

Mix Booster Rouge in 10 times its weight in must or water. Booster Rouge is only partially soluble. Booster Rouge can be added directly to the crusher or later during a pump-over. Stir to maintain suspension before and during addition.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## ICV NOBLESSE

 Contributes to balance and softness on the finish



OMRI listed

#15105      2.5 kg

ICV Noblesse® is a yeast derivative nutrient for use in red and white winemaking which adds a perception of sweetness to balanced wines. The production process used for Noblesse inactivates sulfite-reductase potential, greatly limiting sulfur off-odors. Wines made using Noblesse exhibit a more intense perception of ripe fruit together with an overall roundness and softness on the finish. There is also decreased tannic intensity on the mid-palate. Noblesse can help reduce undesirable aggressive characters or sensations of dryness due to the release of low molecular weight polysaccharides. It can also help reduce the burning sensations common in higher alcohol wines and in wines made from botrytised grapes. Although immediate results are possible, full integration may take three to five months.

### RECOMMENDED DOSAGE

30 g/hL      2.5 lb/1000 gal

### USAGE

Mix Noblesse in 10 times its weight in water or must/juice. Add during a pump-over or tank mixing. This product is partially soluble. Stir to maintain suspension before and during addition.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## OPTIMUM WHITE

 For optimizing aromatic intensity and longevity



OMRI listed

#15198      1 kg

#15202      2.5 kg

OptiMUM White® is a yeast derivative nutrient which is produced using a new process that increases the glutathione bio-availability and the level of available polysaccharides. Glutathione is a natural anti-oxidant that has been shown to protect against browning, enhance the fruity nature of aromatic wines and minimize undesirable aroma compounds. OptiMUM White should be added early in the fermentation process (after settling). This helps protect juice from oxidation. When used at this point it also has a positive impact on volatile thiol preservation. This natural yeast derivative nutrient favors aromatic intensity, stabilization and longevity in whites and rosés. In order to achieve the maximum anti-oxidant protection OptiMUM White should be used with a complete nutritional program.

### RECOMMENDED DOSAGE

20-40 g/hL      1.6-3.3 lb/1000 gal

### USAGE

Mix OptiMUM White in 10 times its weight in water or juice. Add to the juice after settling or directly to the tank at the onset of fermentation. This product is partially soluble. Stir to maintain suspension before and during addition. Stir to maintain suspension before and during addition.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## OPTI-RED

 For rounded and smooth tannin reds



OMRI listed

#15148      1 kg

#15138      2.5 kg

#15211      10 kg

Opti-RED® is a unique inactivated yeast derivative nutrient. It is the product of a specific refining process which results in a high level of polyphenol reactive high molecular weight cell wall polysaccharides. Opti-RED may be used either at the beginning or towards the end of red wine fermentations. Using Opti-RED in the must releases polysaccharides. These polysaccharides are then available to complex with polyphenols as soon as they are released and diffused. This early complexing results in red wines with more intense color and better tannin integration. Using Opti-RED in the latter part of alcoholic fermentation allows the winemaker to shape harsh polyphenolics into smoother, more approachable tannins.

### RECOMMENDED DOSAGE

30 g/hL      2.5 lb/1000 gal

### USAGE

Mix Opti-RED in 10 times its weight in must or water. If adding early in fermentation, distribute into the tank as it is filling or during a pump-over. Opti-RED can also be added directly to the crusher. If adding later, add during a pump-over or during tank mixings. This product is partially soluble. Stir to maintain suspension before and during addition.

### STORAGE

Dated expiration. Store at 18°C (65°F). Once opened, keep tightly sealed and dry.

## OPTI-WHITE

	Protects fresh aromas
	OMRI listed
#15165	1 kg
#15136	2.5 kg
#15216	10 kg

Lallemand introduced this natural yeast derivative nutrient for use in white and rosé wine production after an extensive research program. Opti-WHITE is prepared using a specific production process that results in a yeast derivative rich in polysaccharides and high in anti-oxidant peptides (glutathione). These glutathione peptides work synergistically with SO<sub>2</sub>, allowing the winemaker to potentially lower their SO<sub>2</sub> dosage. When added to the juice at the onset of fermentation, Opti-WHITE enhances smoothness, helps avoid browning from oxidation and protects fresh aromas during aging. Opti-WHITE may also be added in the last stages of alcoholic fermentation to help bring out flavor profiles often associated with lees aging.

### RECOMMENDED DOSAGE

25-50 g/hL\*    2-4 lb/1000 gal

\*Use 50 g/hL for maximum anti-oxidative properties

### USAGE

Mix Opti-WHITE in 10 times its weight in juice or water. Add to the juice after settling or directly to the barrel or tank prior to the onset of fermentation. If adding during the later stages of alcoholic fermentation, add during a tank mixing for proper homogenization. This product is partially soluble. Stir to maintain suspension before and during addition.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## REDSTYLE

	Increases extraction of juice and improves structure
#15662	2.5 kg

REDStyle™ is a unique blend of inactivated yeast derivative nutrients with a pectinase enzyme. It is used during the maceration of red grapes to increase the extraction of juice and to improve structure. It can enhance color stability and increase tannin intensity. REDStyle can be used on low maturity or Botrytised grapes or musts to shorten maceration times, increase color stability and build structure. It can also help mask unripe (green) characters.

### RECOMMENDED DOSAGE

227 g/ton    0.5 lb/ton

### USAGE

Mix REDStyle in 10 times its weight in must or water. Use during maceration. Add into the tank as it is filling or during a pump-over. REDStyle can also be added directly to the crusher. This product is partially soluble. Stir and maintain suspension before and during addition.

### STORAGE

Dated expiration. Store in a cool and dry environment at 18°C (65°F). Once opened, keep tightly sealed and dry.

## FREQUENTLY ASKED QUESTIONS

### MY WINE IS AT 8°B AND I MISSED THE ADDITION OF NUTRIENTS AT 1/3 SUGAR DEPLETION. SHOULD I ADD FERMAID K AT THIS POINT?

The purpose of a nitrogen addition at this point of fermentation is for re-synthesis of the sugar transport system in the yeast cell so that fermentation can continue to completion. Nitrogen uptake is inhibited above 10% alcohol. Depending on the initial juice chemistry this may not cause issues. If you are in low nitrogen situations, a small addition of organic nutrient (Fermaid O or Nutrient Vit End) may be beneficial. This really is a case-by-case scenario.

### EVERY HARVEST I ADD 2 LB/1000 GAL OF A COMPLETE YEAST NUTRIENT 1/3 OF THE WAY THROUGH FERMENTATION. IS THAT WHAT IS RECOMMENDED?

Nitrogen supplementation during fermentation must be carefully managed. Each fermentation the initial YAN of the juice should be checked. The yeast strain, temperature of the fermentation, the initial grape sugar, as well as other contributing factors should all be considered prior to nutrient additions. Latest research has shown that timely nutrient additions are important to a successful fermentation. The first addition should be at the onset of fermentation (drop of 2-3°B) followed by a second addition at 1/3 way through fermentation.

### SOME SUPPLIERS SAY THEIR NUTRIENTS CONTAIN A LOT MORE NITROGEN THAN FERMAID K AND GO-FERM. WHY?

Other suppliers may be calculating total nitrogen versus the amount of nitrogen that can be utilized by the yeast. Not all sources of nitrogen are available to the growing yeast cells. That is why Lallemand prefers to list the yeast assimilable nitrogen for each product so the winemaker can plan a balanced nutrition strategy.

### CAN I USE FERMAID K IN MY YEAST REHYDRATION WATER INSTEAD OF GO-FERM?

No, using nutrients that contain ammonia salts during the rehydration phase can be toxic to the yeast.

### WHAT IS THE DIFFERENCE BETWEEN GO-FERM AND GO-FERM PROTECT EVOLUTION?

Go-Ferm Protect Evolution was specifically formulated by Lallemand and the INRA in France after a multi-year study of problem fermentations. In addition to the nutrients that Go-Ferm supplies, Go-Ferm Protect Evolution contains unsaturated fatty acids and sterols for improved membrane integrity. In known difficult conditions such as high Brix juices or excessively clarified juice, Go-Ferm Protect Evolution is the best solution. In musts without such difficult conditions, Go-Ferm is a perfect choice.

### WHAT IS THE DIFFERENCE BETWEEN SIY 33 AND FERMAID O?

SIY 33 was originally developed to provide a complex nutrient base from inactivated whole yeast cells. Fermaid O differs as it is comprised of specially selected fractions from enological yeast providing a consistent amino acid base. Fermaid O takes into account the latest research surrounding the efficient use of organic nitrogen by yeast.

### I CHECKED MY YAN AND ADDED DAP ACCORDINGLY. WHY DO I STILL HAVE OFF-AROMAS AND/OR STUCK FERMENTATIONS?

Both inorganic (DAP) and organic nitrogen occur naturally in grape must. Each type of nitrogen has a distinct role and impact on an optimal fermentation. While yeast may show an affinity for inorganic nitrogen adding only DAP is not what is best for the yeast. A diet balanced with organic nitrogen, vitamins and minerals can produce healthier fermentations, better aromatics and lower levels of undesirable compounds.

### I AM NOTICING SULFUR OFF-ODORS DURING FERMENTATION — WHAT SHOULD I DO?

First, assess your nutrient regime. If it is early enough in the fermentation, consider increasing your nutrient additions. Organic nutrients such as Fermaid O and Nutrient Vit End can go a long way in improving aromatics. If you are past the point where additional complex nutrients are recommended, run a bench trial with Noblesse and Redules.

### AS FERMENTATION PROGRESSES, I HAVE NOTICED AN INCREASED PERCEPTION OF 'HOTNESS' ON THE FINISH OF MY WINE. ARE THERE ANY PRODUCTS THAT CAN HELP WITH THIS?

Try an addition of Booster Blanc, Noblesse, or Opti-Red, depending on the wine.

### MY WHITES AND ROSÉS TEND TO LOSE THEIR AROMATIC FRESHNESS QUICKLY. WHAT CAN I DO TO PRESERVE THE AROMATICS?

Inactivated yeast derivative products like OptiMUM WHITE or Opti-WHITE can help retain aromatic intensity and longevity.

# TANNINS

## BASICS

### FERMENTATION TANNINS

Tannins are used in wines from all wine-making areas. Fermentation tannins can be used for very specific reasons, such as when there is *Botrytis* on the grapes, or on fruit where the resulting wines from certain vineyards lack tannins and structure. Fermentation tannins are also used routinely by some wineries to enhance mouthfeel and stabilize color.

### CELLARING AND FINISHING TANNINS

Cellaring and finishing tannins are a helpful tool when fine tuning a wine. Some wine-makers are looking for more mid-palate structure and aging potential while others are looking for an influence from oak. Bench trials are a valuable tool when deciding which tannin works best.

Winemaking tannins come from a variety of sources. These include oak (both American and European, toasted and untoasted), chestnut, grapes (both skins and seeds), exotic woods (such as tara and quebracho) and gall nuts. Though all tannins provide some degree of anti-oxidative protection, each is also quite distinctive. The selection, processing and blending are all critical when developing commercial tannins for use in wine. The descriptors often used to characterize tannin types are inadequate to the task. Words such as ellagic (meaning oak or chestnut wood) or proanthocyanidins (meaning from grapes and some exotic woods) are very broad. The producer of winemaking tannins needs to understand and quantify the potential of specific raw materials and then apply this knowledge. Tools such as GC/MS (gas chromatography/mass spectrometry), reverse phase HPLC (high performance liquid chromatography) and TLC (thin layer chromatography) analysis (silica/fluorescence; cellulose) are common in this process.

Raw materials need to be tasted in different concentrations in different wines. Even if laboratory tools are useful for understanding products, tasting remains the key. There is no substitute if we wish to understand issues such as mouthfeel, relative astringency and increasing roundness. In particular, the polysaccharides linked with tannins contribute to the overall impact on the palate.

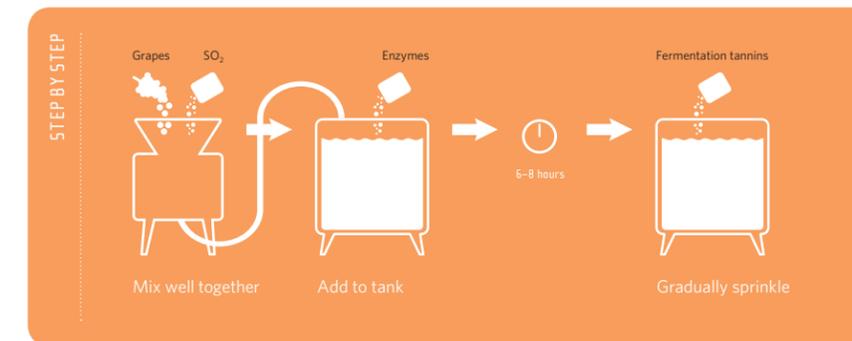
These are the elements that went into the development of the Scott'Tan™ product range. It was an elaborate program. We believe you will appreciate the results.

## CHOOSING THE RIGHT TANNINS

	FERMENTATION					FERM/CELLARING		CELLARING			FINISHING		OTT	
	FT COLORMAX	FT ROUGE	FT ROUGE SOFT	FT BLANC	FT BLANC SOFT	UVA-TAN	UVA-TAN SOFT	COMPLEX	ESTATE	REFRESH	RICHE	RICHE EXTRA	BOLD	FINESE
PAGE	44	44	44	45	45	46	46	47	47	47	48	48	49	49
Reds	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥
Whites and Rosé			🔥	🔥	🔥	🔥	🔥		🔥	🔥	🔥	🔥	🔥	🔥
Fruit, Cider and Mead		🔥	🔥	🔥	🔥									
Promotion of color, body and fruit	🔥	🔥	🔥			🔥	🔥							
Protection from oxidation for white wine				🔥	🔥									
Mouthfeel enhancement for white wine					🔥									
Grape tannin						🔥	🔥							
Enhances structure		🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥		
Enhances mid-palate volume								🔥	🔥					
Stabilizes Color	🔥	🔥	🔥											
French oak character										🔥	🔥		🔥	🔥
American oak character											🔥	🔥	🔥	🔥
Vanillin oak character											🔥	🔥	🔥	
Protects grapes from rot		🔥	🔥	🔥	🔥									
Enhances aging potential	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥	🔥				
Perception of sweetness											🔥	🔥	🔥	🔥
Lowers perception of alcohol											🔥	🔥	🔥	🔥

## PROTOCOL

### TIMING OF ADDITIONS: SO<sub>2</sub>, ENZYMES AND TANNINS



Add SO<sub>2</sub> and mix well prior to adding enzymes. Tannins can be added 6-8 hours later. Please see FAQs on page 50 for more information. Yeast derivative nutrients (e.g. Opti-Red) can be added at any point during fermentation.

## FERMENTATION TANNINS

Fermentation tannins are valuable fermentation tools. The goal is to bring out the best that the grapes have to offer, beginning from the moment they enter the winery.

### FT COLORMAX

Promotion of color stability

Red, Fruit

#15968 1 kg

Scott'Tan™ FT ColorMax is a natural catechin product developed for its superior ability to stabilize color. Its special formulation goes into solution more easily than conventional fermentation tannin products. It is intended for use in conjunction with FT Rouge. Wines made with FT ColorMax tend to have a softer palate than those made with FT Rouge alone.

#### RECOMMENDED DOSAGE

##### Red Must

100-300 ppm 10-30 g/hL 0.8-2.5 lb/1000 gal

##### USAGE

Add FT ColorMax at 1/3 sugar depletion. If a cold soak has been done, add FT ColorMax during the first pump-over.

### FT ROUGE

Promotion of color, body and fruit

Red, Fruit

#15950 1 kg

#15951 5 kg

Scott'Tan™ FT Rouge is a proprietary tannin which is a blend of highly reactive tannins derived from exotic woods and chestnut. The addition of FT Rouge at the beginning of red wine fermentation helps preserve the grapes' natural tannins so they can combine with anthocyanins to create optimal color stability. Mouthfeel is also enhanced. FT Rouge provides anti-oxidative protection and may inhibit oxidative enzymes (such as laccase) associated with browning.

#### RECOMMENDED DOSAGE

##### Red *Vinifera* Must

200-500 ppm 20-50 g/hL 1.6-4.0 lb/1000 gal

##### Red Non-*Vinifera* Must

300-600 ppm 30-60 g/hL 2.5-5.0 lb/1000 gal

##### Fruit

200-500 ppm 20-50 g/hL 1.6-4.0 lb/1000 gal

##### USAGE

Gradually sprinkle FT Rouge directly on grapes at the crusher or add to the must during a pump-over to obtain good homogenization. If subsequent additions of FT Rouge are desired, this can be done in increments of 0.5 lb/1000 gal (63 ppm) during pump-overs. If an addition of FT Rouge is made post-fermentation, we recommend waiting 3-6 weeks after the tannin addition before racking, fining, filtering or bottling.

### FT ROUGE SOFT

Promotion of color, body and fruit

Red, Fruit

#15952 1 kg

#15953 5 kg

Scott'Tan™ FT Rouge Soft is a proprietary tannin specifically formulated for its gentle impact. It is particularly suitable for Pinot Noir and early-to-release wines. FT Rouge Soft is reactive with natural grape proteins and thus helps promote optimal color and color stability while enhancing structure. Mouthfeel and roundness are improved while the potential for bitter characters is reduced. FT Rouge Soft provides anti-oxidative protection.

#### RECOMMENDED DOSAGE

##### Red *Vinifera* Must

200-500 ppm 20-50 g/hL 1.6-4.0 lb/1000 gal

##### Red Non-*Vinifera* Must

300-600 ppm 30-60 g/hL 2.5-5.0 lb/1000 gal

##### Fruit

200-500 ppm 20-50 g/hL 1.6-4.0 lb/1000 gal

##### USAGE

Gradually sprinkle FT Rouge Soft directly on grapes at the crusher or add to the must during a pump-over to obtain good homogenization. If subsequent additions of FT Rouge Soft are desired, this can be done in increments of 0.5 lb/1000 gal (63 ppm) during pump-overs. If an addition of FT Rouge Soft is made post-fermentation, we recommend waiting 3-6 weeks after the tannin addition before racking, fining, filtering or bottling.

### FT BLANC

Protection from oxidation

White, Rosé, Red, Fruit, Cider

#15954 1 kg

Scott'Tan™ FT Blanc tannin is a white gall nut tannin specifically formulated for use on grapes with mold or rot (e.g. *Botrytis*). It helps protect juice from browning by acting as an anti-oxidant and inhibiting laccase activity. On sound grapes FT Blanc is an effective anti-oxidant when used with SO<sub>2</sub>. In protein rich varieties, such as Sauvignon Blanc, FT Blanc can help remove proteins. In some wines it will also contribute notes of minerality.

#### RECOMMENDED DOSAGE

##### White/Rosé Juice

50-150 ppm 5-15 g/hL 0.42-1.2 lb/1000 gal

##### White/Rosé Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

##### Red Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

##### Fruit, Cider, Mead

50-200 ppm 5-20 g/hL 0.42-1.6 lb/1000 gal

##### USAGE

Add FT Blanc by sprinkling directly on the grapes at the crusher or by adding to the juice or the wine during a tank mixing. Good homogenization is important. If an addition of FT Blanc is made post-fermentation, we recommend waiting 3-6 weeks after the tannin addition before racking, fining, filtering or bottling.

### FT BLANC SOFT

Oxidation protection and mouthfeel enhancement for white wine

White, Rosé, Red, Fruit, Cider, Mead

#15955 1 kg

Scott'Tan™ FT Blanc Soft is similar to FT Blanc in application but wines made with it are also characterized by softness and improved mouthfeel. White and rosé wines made with FT Blanc Soft have enhanced texture with a perception of sweetness on the palate. Even relatively small dosages can contribute to minerality in wines. Similar improvements can be seen in fruit and mead wines.

#### RECOMMENDED DOSAGE

##### White/Rosé Juice

50-150 ppm 5-15 g/hL 0.42-1.2 lb/1000 gal

##### White/Rosé Wine\*

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

\*A small addition of 2.5-5.0 g/hL (0.21-0.42 lb/1000 gal) may help mask the perception of bitterness in a finished wine

##### Red Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

##### Fruit, Cider, Mead

50-200 ppm 5-20 g/hL 0.42-1.6 lb/1000 gal

##### USAGE

Add FT Blanc Soft by sprinkling directly on the grapes at the crusher or by adding to the juice or the wine during a tank mixing. Good homogenization is important. If an addition of FT Blanc Soft is made post-fermentation, we recommend waiting 3-6 weeks after the tannin addition before racking, fining, filtering or bottling.

### ALL FERMENTATION TANNINS

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C (65°F). Once opened, keep tightly sealed and dry.

## FERMENTATION/CELLARING TANNINS

Natural grape tannins derived from skins and/or seeds can be used either as fermentation or cellaring tannins. When used as a cellaring tannin, bench trials are recommended.

### UVA'TAN

 Grape seed and skin tannin for fermentation and cellaring

Red Must, White, Rosé, Red

#15964 500 g

Scott'Tan™ Uva'Tan is composed entirely of grape tannins (seeds and skins). It is high in polyphenols and low in astringency. Uva'Tan can be used both during fermentation and later during cellaring and finishing. For fermentations, Uva'Tan is particularly useful when natural grape tannin levels are deficient. Post-fermentation it can be used to stabilize color, enhance structure and provide anti-oxidant protection. Used prior to barreling it can improve integration of tannins in wines. It is recommended that Uva'Tan additions be made well in advance of bottling (six weeks at least) for better integration. Additions closer to bottling will still have a beneficial effect but filtration throughput will likely be reduced.

#### RECOMMENDED DOSAGE

##### Red Must

50-400 ppm 5-40 g/hL 0.42-3.3 lb/1000 gal

##### White Wine

50-150 ppm 5-15 g/hL 0.42-1.2 lb/1000 gal

##### Rosé Wine

50-200 ppm 5-20 g/hL 0.42-1.6 lb/1000 gal

##### Red Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

#### USAGE

Sprinkle Uva'Tan evenly on the must/juice at the crusher or into the wine during a transfer or racking. Further additions can be made during the next 2-3 rackings followed by organoleptic evaluation. Final additions can be made up to 3 weeks before bottling, though 6 weeks are recommended for a more complete polymerization, settling and optimal filtration.

### UVA'TAN SOFT

 White grape skin tannin for fermentation and cellaring

Red Must, White, Rosé, Red

#15965 500 g

Scott'Tan™ Uva'Tan Soft is made entirely from grape skin tannins. They are extracted directly from fresh grapes after pressing to avoid the oxidation of the polyphenols. These highly reactive tannins are characterized by very low astringency. Like Uva'Tan, Uva'Tan Soft can be used in fermentations as well as in cellaring and finishing. During fermentations Uva'Tan Soft can be useful when the grapes' natural tannins are insufficient and softness is a concern. Post-fermentation it can be used to stabilize color, soften structure and provide anti-oxidant protection. Used prior to barreling it can improve integration of tannins. Additions of Uva'Tan Soft should be made well in advance of bottling (six weeks at least) for a more complete polymerization. Additions closer to bottling may still have a beneficial effect but filtration throughput will likely be reduced. At low dosages, Uva'Tan Soft will optimize the aging potential of white and rosé wines.

#### RECOMMENDED DOSAGE

##### Red Must

50-400 ppm 5-40 g/hL 0.42-3.3 lb/1000 gal

##### White Wine

50-150 ppm 5-15 g/hL 0.42-1.2 lb/1000 gal

##### Rosé Wine

50-200 ppm 5-20 g/hL 0.42-1.6 lb/1000 gal

##### Red Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

#### USAGE

Sprinkle Uva'Tan Soft evenly on the must/juice at the crusher or into the wine during a transfer or racking. Further additions can be made during the next 2-3 rackings followed by organoleptic evaluation. Final additions can be made up to 3 weeks before bottling, though 6 weeks are recommended for a more complete polymerization, settling and optimal filtration.

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C(65°F). Once opened, keep tightly sealed and dry.

### UVA'TAN AND UVA'TAN SOFT

## CELLARING TANNINS

Cellaring tannins are used to enhance mid-palate structure and aging potential. They can also enhance aroma complexity. Bench trials are required to determine the best tannin for a particular wine or style.

### COMPLEX

 Tannin structure enhancement

Red

#15956 1 kg

Scott'Tan™ Complex is a proprietary cellaring and finishing product. It is a blend of proanthocyanidic (exotic woods) and ellagic (oak) tannins. It enhances structure, aids color stabilization and provides anti-oxidant protection. It is less reactive and more polymerized than some other tannins, thus it integrates well and provides balance. It is particularly useful in wines with up-front fruit or where smooth tannin structure is lacking.

#### RECOMMENDED DOSAGE

##### Prior to Barrel Aging Red Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

##### Prior to Bottling (3-6 weeks)

30-100 ppm 3-10 g/hL 0.25-0.83 lb/1000 gal

Note: Complex is best used prior to barrel aging. This encourages tannin integration in the wine over time. It may also dramatically improve a red wine when added prior to bottling. At this stage, Complex should be added at least six weeks before bottling to allow reaction and polymerization. Successful additions can be made closer to bottling, but this may result in less throughput during filtration.

#### USAGE

During transfer or racking add Complex into the wine. Mix well to assure homogeneity. Additions may be made during the first 2-3 rackings, followed by organoleptic evaluation. First additions should be made at least 3-6 weeks before bottling to allow for polymerization and settling.

### ESTATE

 Mid-palate volume

Red

#15958 1 kg

Scott'Tan™ Estate can help compensate for lack of tannins in finished wine without the "dryness" associated with barrels. It enhances mid-palate, complexity and balance while providing a measure of anti-oxidant protection. Fruit characters can be enhanced. Estate is especially recommended when using older, tannin depleted barrels.

#### RECOMMENDED DOSAGE

##### Prior to Barrel Aging Red Wine

50-300 ppm 5-30 g/hL 0.42-2.5 lb/1000 gal

##### Prior to Bottling (3-6 weeks) or During Rackings

50-100 ppm 5-10 g/hL 0.42-0.83 lb/1000 gal

Note: Estate is best used prior to barrel aging. This encourages tannin integration in the wine over time. It may also dramatically improve a red wine when added prior to bottling. At this stage, Estate should be added at least six weeks before bottling to allow reaction and polymerization. Successful additions can be made closer to bottling, but this may result in less throughput during filtration.

#### USAGE

During transfer or racking add Estate into the wine. Mix well to assure homogeneity. Additions may be made during the first 2-3 rackings, followed by organoleptic evaluation. First additions should be made at least 3-6 weeks before bottling to allow for polymerization and settling.

### REFRESH

 French oak character for neutral barrel cellaring

White, Rosé, Red

#15960 500 g

Scott'Tan™ Refresh is a proprietary tannin extracted from 100% French oak. It will contribute wood nuance without smoky or toasty characters and is especially useful when old or neutral barrels are used during aging. This finishing tannin is a strong anti-oxidant. It will help preserve color and can increase the complexity of the wine's finish.

#### RECOMMENDED DOSAGE

30-200 ppm 3-20 g/hL 0.25-1.6 lb/1000 gal

#### USAGE

Gradually add Refresh to the wine during a transfer or during racking. After the addition of Refresh, it is recommended to proceed with normal rackings until fining. In young wines kept in tanks, Refresh should be added immediately after malolactic fermentation. If malolactic fermentation is not desired, add at the end of alcoholic fermentation.

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C(65°F). Once opened, keep tightly sealed and dry.

### ALL CELLARING TANNINS

## FINISHING TANNINS

Finishing tannins can enhance complexity in wines prior to bottling. Bench trials are required to determine the best tannin for a particular wine or style.

### RICHE

 French oak character and perception of sweetness

White, Rosé, Red

#15962 500 g

Scott'Tan™ Riche is a cellaring and finishing tannin notable for enhancing complexity. Derived from 100% toasted French oak, Riche imparts hints of coconut and vanilla together with a perception of sweetness. It can contribute the final touch to your wine.

#### RECOMMENDED DOSAGE

##### White/Rosé Wine

30-70 ppm 3-7 g/hL 0.25-0.58 lb/1000 gal

##### Red Wine

30-150 ppm 3-15 g/hL 0.25-1.25 lb/1000 gal

#### USAGE

Gradually add Riche into the wine during a transfer or mixing, mixing well to achieve homogeneity. After additions with Riche we recommend racking as normal. Final additions should be made at least 3 weeks prior to bottling.

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C(65°F). Once opened, keep tightly sealed and dry.

### RICHE EXTRA

 Smooth vanillin American oak qualities

Red, White

#15963 500 g

Scott'Tan™ Riche Extra was specifically developed from 100% American oak. This proprietary tannin contributes nuances similar to Riche but with heightened perception of vanillin oak character. It works well in conjunction with low doses of other tannins (e.g. Complex, Estate, FT Blanc). Riche Extra can help smooth a wine's finish.

#### RECOMMENDED DOSAGE

##### White Wine

50-100 ppm 5-10 g/hL 0.42-0.83 lb/1000 gal

##### Red Wine

50-200 ppm 5-20 g/hL 0.42-1.6 lb/1000 gal

#### USAGE

Dissolve Riche Extra in about 10 times its weight of warm water (35-40°C/95-104°F) then add it to the wine and mix well. Good homogenization is important. Final additions should be made at least 3 weeks prior to bottling. After additions, proceed with normal racking.

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C(65°F). Once opened, keep tightly sealed and dry.

## OTT TANNINS

OTT (Over The Top) Tannins are bold finishing tannins developed to provide a final stylistic touch to wines.

### BOLD

 Vanillin oak character and perception of sweetness

White, Rosé, Red

#15970 500 g

NEW

Scott'Tan™ BOLD was developed to provide an amplified final touch to your wine. Wood, caramel and vanilla notes are highlighted on the nose and in the mouth of wines adjusted with BOLD. These wines also exhibit a pronounced oaky aroma. BOLD can increase the perception of sweetness, while also altering the tannin profile to reduce the perception of alcohol in reds.

#### RECOMMENDED DOSAGE

##### Red, White and Rosé Wine

150-300 ppm 3-15 g/hL 1.25-2.5 lb/1000 gal

#### USAGE

Gradually add Scott'Tan BOLD into the wine during a transfer or blending, mixing well to achieve homogeneity. After additions with BOLD, we recommend continuing racking as normal. Final additions should be made at least three weeks prior to bottling.

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C(65°F). Once opened, keep tightly sealed and dry.

### FINESSE

 Adds perception of sweetness while reducing perception of alcohol

White, Rosé, Red

#15971 500 g

NEW

Scott'Tan™ FINESSE was developed as a stylistically New World finishing tannin, but with an eye on organoleptic balance. This proprietary tannin has been shown to lower the perception of alcohol and hotness in reds and as well as perceived "biting" acidity in whites. Aromatically, it can exhibit tropical notes in Chardonnay and red fruit in Cabernet Sauvignon. FINESSE will also heighten the perception of oak and sweetness.

#### RECOMMENDED DOSAGE

##### Red, White and Rosé Wine

150-300 ppm 3-15 g/hL 1.25-2.5 lb/1000 gal

#### USAGE

Gradually add Scott'Tan FINESSE into the wine during a transfer or blending, mixing well to achieve homogeneity. After additions with FINESSE, we recommend continuing racking as normal. Final additions should be made at least three weeks prior to bottling.

#### STORAGE

Dated expiration. Unopened, the shelf-life is 5 years at 18°C(65°F). Once opened, keep tightly sealed and dry.

## FREQUENTLY ASKED QUESTIONS

### WHEN IS THE BEST TIME TO ADD TANNINS? HOW DO I ADD THEM?

Tannins are best added early in the winemaking process. In red wine, an addition during the fermentation stage integrates tannin into the wine and offers the greatest opportunity for color stability and increased mid-palate structure. They can be added at the crusher or to the tank during the first pump-over, depending on the grape quality (rotten vs. sound). Additional tannin can be added with each pump-over. If adding to a white wine, add directly to the grapes at the crusher or to the tank during a tank mixing.

### I AM USING TANNIN AND ENZYMES. WILL SO<sub>2</sub> INTERFERE WITH MY ADDITIONS?

Using all three products together is fine, but timing is important! High SO<sub>2</sub> content can inhibit enzyme activity. Do not add SO<sub>2</sub> and enzymes at the same time. It is okay to add enzymes after the SO<sub>2</sub> is adequately dispersed OR to add SO<sub>2</sub> after the enzymes are adequately dispersed. Follow with a tannin addition six to eight hours later. When enzymes are not being used, add SO<sub>2</sub> first, allow to disperse, then follow with the tannin addition.

### CAN I USE TANNINS ON WHITE JUICE AND WINE?

Yes, a tannin addition in white juice may be beneficial to remove off-aromas, to improve clarification, to inhibit laccase activity from *Botrytis* or rot, or to serve as an anti-oxidant. We recommend using either Uva'Tan, Uva'Tan Soft, FT Blanc or FT Blanc Soft. Tannins can also be added later to wine to improve mid-palate structure or softness.

### WHY SHOULD I USE TANNINS ON MY "PREMIUM" RED GRAPES?

Tannins can be used to protect the color and phenolic structure of your wines. For the easiest and most efficient integration of tannins, add FT Rouge or FT Rouge Soft at the crusher. If needed, an addition of Uva'Tan, Uva'Tan Soft or Estate prior to aging can help reinforce phenolic balance. During long maturation in barrels, Estate will help prevent excessive oxidation that can result in loss of structure and freshness. For improved SO<sub>2</sub> management add small amounts of Estate (5-7.5 g/hL) during each racking.

### WILL TANNIN ADDITIONS INCREASE COLOR IN LOW-COLOR GRAPE VARIETIES?

Tannins do not add color to the must of low color grapes. Recent research indicates that early addition of tannins such as FT Rouge allows them to bind up available proteins. This preserves the grapes' own natural tannins, making them available to bind with the grapes' anthocyanins and thereby provides increased color stability.

### WHY NOT ADD OAK CHIPS? AREN'T THEY A SOURCE OF ACCESSIBLE TANNIN?

Oak chips are a source of ellagic (wood) tannin. The level of tannin available will differ depending upon the wood source and the treatment regime. When using oak based products, macromolecules (lignin, cellulose, hemicellulose, etc.) other than oak will be extracted. The oak based addition may help mask flavors, provide some oxidative protection and leave an oak finish, but they will NOT improve mid-palate structure. By contrast, the combination of wood and proanthocyanidic tannins in FT Rouge or FT Rouge Soft will help improve structure and color stability.

### WHAT IF I DID NOT ADD ENOUGH TANNIN DURING THE PRIMARY FERMENTATION?

If more tannin structure and flavor is desired post-fermentation, make additions with Complex or Estate. Addition is best before barrel aging when tannins can be incorporated into the wine and when oxidation and polymerization are slow. Refresh, Riche and Riche Extra are the best tannins to use prior to bottling (3-6 weeks) when a bit of oak influence is desired. Any of these tannins can be used throughout winemaking, depending on the desired effect. Bench trials are required to determine the best tannin for a particular wine or style.

### WILL ADDING TANNINS INHIBIT BARREL AGING?

Tannins protect wine from oxidation during barrel aging. The wood tannins extracted from a new barrel protect the wine from over-oxidation during the slow process needed for tannin polymerization and wine development. When using old barrels, indigenous tannin may have been completely leached out. A small tannin addition of 5-10 g/hL will act as an anti-oxidant and help protect the wine. Attaining a good phenolic profile will slow the maturation process and still protect the wine.

### CAN TANNINS HELP REMOVE UNDESIRABLE ASTRINGENCY OR BITTERNESS?

Yes. Over-astringency is caused by an imbalance of tannin molecules or by insufficiently bound tannin complexes. By adding a more refined, highly polymerized tannin to the wine, the imbalance can be corrected and the perception of astringency or bitterness reduced. This frequently improves the perception of fruit.

### WHAT IF I ONLY WANT TO USE PURE GRAPE TANNIN IN MY WINE?

Uva'Tan (tannins from grape skins and seeds) and Uva'Tan Soft (tannins from grape skins only) are comprised of 100% grape tannin. All other tannins are sourced from a combination of grapes, exotic woods, oak or chestnut.

# MALOLACTIC BACTERIA

Malolactic fermentation (MLF) not only converts malic acid to lactic acid, but also has a direct impact on wine quality. Uncontrolled spontaneous malolactic fermentations or wild lactic acid bacteria can result in diminished varietal and fruit flavors, reduced esters, masked aromas and off-characters. The importance of choosing a selected strain has increased due to evolving winemaking preferences (e.g. higher pH levels, lower SO<sub>2</sub>, higher alcohol, etc.), as well as concerns such as biogenic amines. The use of selected malolactic strains can contribute positively to wines while minimizing risks.

## BASICS

It is very important to know the status of the wine prior to inoculating with malolactic bacteria. Analyze the wine for pH, SO<sub>2</sub>, VA, residual sugar, malic acid and alcohol level. Creating an optimal environment for malolactic bacteria includes:

### TEMPERATURE

Between 20-25°C (68-77°F).

### ALCOHOL LEVEL

Below 13% (v/v).

### pH

Above 3.4.

### SO<sub>2</sub>

Free SO<sub>2</sub> below 10 ppm, total SO<sub>2</sub> below 25 ppm.

### VOLATILE ACIDITY (VA)

If the pH is high, other bacteria strains may already be growing causing an elevated VA. The wine should be monitored for unwanted bacteria.

### NUTRITIONAL STATUS

Was a complete yeast nutrient used during primary fermentation? Was a high nutrient demanding yeast strain used for primary fermentation? Good nutrition is important for malolactic bacteria. Malolactic nutrients such as Acti-ML, Opti'ML Blanc, Opti'Malo Plus, and ML Red Boost will help with the growth and survival of specific malolactic bacteria.

### YEAST STRAIN

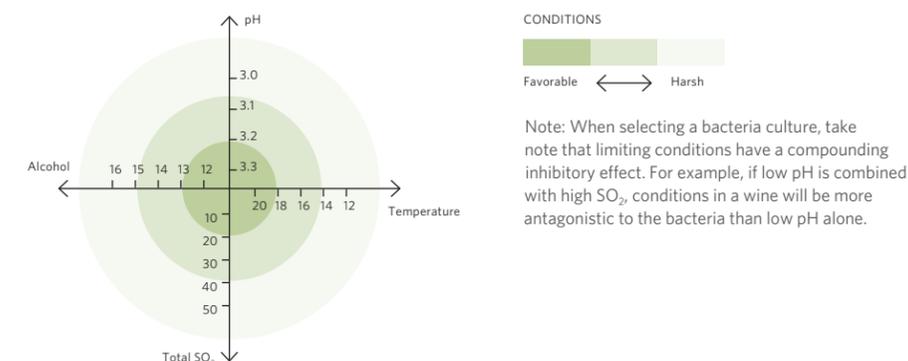
Choose a yeast strain which is compatible with the selected malolactic bacteria.

See MLF Compatibility in the yeast charts on pages 8-11.

### MALIC ACID

Measure malic acid levels. Wine conditions are difficult for bacteria if the malic level is <0.5 g/L or >7.0 g/L.

## ML CULTURE GROWTH CONDITIONS



# CHOOSING THE RIGHT MALOLACTIC BACTERIA

	FREEZE-DRIED DIRECT INOCULATION (MBR)						CO-INOCULATION	1-STEP		NUTRIENTS			
	ALPHA	BETA	ICV ELIOS 1	MBR 31	PN4	VP41		BETA CO-INOC	1-STEP ALPHA	1-STEP VP41	ACTI-ML	OPTI'MALO PLUS	OPTI'ML BLANC
PAGE	53	53	54	54	54	54	54	55	54	59	59	59	59
Reds	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Whites and Rosé	Highly Recommended	Highly Recommended		Highly Recommended	Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Fruit, Cider and Mead	Recommended			Highly Recommended	Highly Recommended				Highly Recommended	Highly Recommended			
Higher alcohol tolerance	Highly Recommended		Highly Recommended		Highly Recommended	Highly Recommended		Highly Recommended	Highly Recommended				
Lower pH tolerance				Highly Recommended	Highly Recommended								
Higher SO <sub>2</sub> tolerance		Highly Recommended			Highly Recommended	Highly Recommended	Highly Recommended		Highly Recommended				
Lower temperature tolerance	Highly Recommended			Highly Recommended									
Low nutrient demand	Highly Recommended					Highly Recommended		Highly Recommended	Highly Recommended				
Medium nutrient demand			Highly Recommended	Highly Recommended	Highly Recommended								
High nutrient demand		Highly Recommended					Highly Recommended						
Higher diacetyl production	Recommended	Highly Recommended		Highly Recommended	Highly Recommended			Recommended					
Restart stuck or sluggish MLF								Highly Recommended	Highly Recommended				
Bacteria rehydration nutrient										Highly Recommended			
Nutrient for difficult red MLF's													Highly Recommended
Nutrient for difficult white MLF's												Highly Recommended	
General ML Nutrient											Highly Recommended		
Alcohol (% v/v)	<15.0	<15.0	<15.5	<14.0	<16.0	<16.0	<15.0	<15.5	<16.0				
pH	>3.2	>3.2	>3.4	>3.1	>3.0	>3.1	>3.2	>3.2	>3.1				
Total SO <sub>2</sub> (mg/L)	<50	<60	<50	<45	<60	<60	<60	<50	<60				
Temperature °C(°F)	>14° (57°)	>14° (57°)	>18° (64°)	>13° (55°)	>14° (57°)	>16° (61°)	>14° (57°)	>14° (57°)	>16° (61°)				
Impact on mouthfeel fullness	Highly Recommended		Recommended			Highly Recommended		Highly Recommended	Highly Recommended				
Impact on mouthfeel structure	Recommended		Highly Recommended			Recommended		Recommended	Recommended				
Impact on fruitiness		Highly Recommended	Recommended	Highly Recommended	Recommended	Recommended	Highly Recommended						
Typical fermentation kinetics	Start	Fast	Slow	Mod	Slow	Mod	Mod	Slow	Fast	Mod			
	Finish	Slow	Fast	Mod	Fast	Fast	Mod	Fast	Slow	Mod			

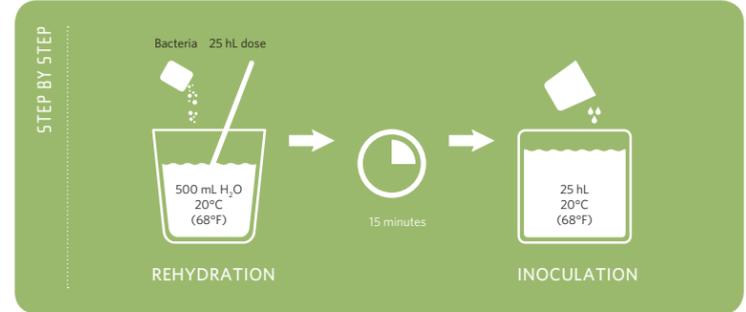
Note: The limits shown are individually stressful. In combination, stresses are increased. Other aspects such as nutrition can also be critical.

# FREEZE-DRIED DIRECT INOCULATION CULTURES

Since wine environments can be hostile, direct inoculation starter cultures must be conditioned to this environment during their production. The direct inoculation process was developed to prepare the cell membrane in advance for these difficult conditions. The result is highly active cultures which are ready for easy and quick inoculation of wine. Proper nutrition can help enhance performance, especially in a harsh environment. All Lallemand direct inoculation strains are produced with the MBR® process. The MBR form of malolactic bacteria represents a Lallemand acclimation process that stresses the bacteria, enabling it to withstand the rigors of direct inoculation. The conditioned MBR bacteria can conduct a more reliable MLF.

None of our commercial ML strains contain the decarboxylase enzymes known to produce biogenic amines.

## PROTOCOL ADDING DIRECT INOCULATION CULTURES TO WINE



If using a direct inoculation culture, allow packet to come to room temperature. Open the packet, rehydrate in 20 times its weight in 20°C(68°F) chlorine-free water for 15 minutes and then add directly to the wine. The 25 hL dose is rehydrated in 500 mL of water.

### ALPHA

**LALLEMAND** *O. oeni* adapted to high alcohol; enhances mouthfeel  
White, Red  
#15601 2.5 hL (66 gal) dose  
#15602 25 hL (660 gal) dose  
#15603 250 hL (6,600 gal) dose

Enoferm Alpha™ was selected by the Institut Technique du Vin (ITV) from a spontaneous fermentation. It shows good fermentation activity and provides a positive sensory contribution. Alcohol tolerant to 15.5% (v/v) and low temperature tolerant to 14°C(57°F). Alpha is a dominant strain and shows good resistance to botrycides. It is often described as enhancing mouthfeel and complexity while reducing perceptions of green and vegetative characters.

### BETA

**LALLEMAND** *O. oeni* adapted to high SO<sub>2</sub>; positive aroma impact  
White, Red  
#15604 2.5 hL (66 gal) dose  
#15605 25 hL (660 gal) dose  
#15606 250 hL (6,600 gal) dose

Enoferm Beta™ was isolated in the Abruzzi wine region of Italy. This strain is pH tolerant to 3.2, total SO<sub>2</sub> to 60 ppm, temperature to 14°C(57°F) and alcohol to 15% (v/v). The name Beta comes from its capacity to increase levels of beta-damascenone and beta-ionone which are compounds that contribute floral notes, particularly in Merlot. In trials, winemakers have found pronounced fruity and berry notes in Cabernet Sauvignon and Merlot, when compared to the control. Beta can also be found to enhance diacetyl in white wines when used in a sequential fermentation. Benefits from the addition of a malolactic nutrient.

## ICV ELIOS 1

	<i>O. oeni</i> adapted to high alcohol; contributes to tannin mouthfeel intensity
Red	
#15108	25 hL (660 gal) dose
#15109	250 hL (6,600 gal) dose

Lalvin MBR ICV Elios 1® was isolated by the Institut Coopératif du Vin (ICV) from a spontaneous malolactic fermentation for use in warm region red wines with high alcohol (15.5% v/v) and high pH.

Performs well when pH is above 3.4, temperatures are 18-25°C(64-77°F) and total SO<sub>2</sub> levels are <50 ppm.

This strain was evaluated against other *Oenococcus oeni* strains and was found to have a superior sensory profile.

Contributes to the mouthfeel of the finished wine by enhancing the perception of overall tannin mouthfeel intensity while avoiding green and vegetative characters.

## MBR 31

	<i>O. oeni</i> adapted to low temperature and low pH; enhances polyphenolic content and fruit character
White, Red, Fruit, Cider	
#15022	2.5 hL (66 gal) dose
#15032	25 hL (660 gal) dose
#15127	250 hL (6,600 gal) dose

Lalvin MBR 31® was selected by the ITV for use in red and white wines.

Performs well even under stressful conditions such as low pH (3.1) and low temperature (greater than 13°C/55°F).

Known for its positive sensory characteristics. In reds, it may increase berry fruit flavors and mouthfeel. In whites, it is known for light buttery flavor, respect for fruit, increased body and length of finish.

It is sometimes slow to start, but finishes quickly.

## PN4

	<i>O. oeni</i> adapted to difficult conditions of pH, alcohol and SO <sub>2</sub>
Red, White	
#15607	25 hL (660 gal) dose
#15608	250 hL (6,600 gal) dose

MBR PN4® was isolated from a spontaneous malolactic fermentation in a Pinot Noir by the Institute of San Michele in the Trentino region of Italy.

This strain has been known to perform under difficult conditions such as low pH (3.0-3.1) and high alcohol (up to 16% v/v).

Temperature tolerant to 14°C(57°F) and tolerant to total SO<sub>2</sub> levels up to 60 ppm. Known for its fast fermentation kinetics.

Especially suitable for spicy and structured Pinot Noir wines.

## VP41

	<i>O. oeni</i> adapted to high SO <sub>2</sub> and high alcohol; enhances complexity and mouthfeel
Red, White	
#15048	2.5 hL (66 gal) dose
#15042	25 hL (660 gal) dose
#15044	250 hL (6,600 gal) dose

Lalvin MBR VP41® was isolated in Italy during an extensive European Union collaboration.

Performs well at a pH above 3.1 and a total SO<sub>2</sub> level of 50-60 ppm. In temperatures below 16°C(61°F) it is a slow starter but can complete fermentation.

Chosen for its strong implantation, steady fermentation, high alcohol tolerance (up to 15.5% v/v), enhanced mouthfeel and wine structure.

Both red and white wines fermented with VP41 have increased richness and complexity.

## CO-INOCULATION

### BETA CO-INOC

	<i>O. oeni</i> for use in co-inoculation
White, Red	
#15617	25hL (660 gal) dose
	

Specifically selected by Lallemand for reliable performance in co-inoculation of wines with pH >3.2. Not recommended for use in a sequential MLF.

Beta Co-Inoc is added to the juice/must 24-48 hours after yeast inoculation and before alcohol reaches 5% v/v. Recommended temperature at inoculation is between 18-25°C (64-77°F) and recommended ongoing temperatures are between 15-28°C(59-82°F). Total SO<sub>2</sub> at crusher should not exceed 80 ppm.

Wines that are co-inoculated result in more fruit-forward wines as diacetyl is consumed by the yeast and bacteria.

Note: In co-inoculation, the health and success of the primary fermentation are keys to success. Factors such as pH, turbidity, temperature and nutrition must be considered. If the primary fermentation is sluggish or stuck, it may be necessary to add lysozyme. This is especially important if the pH is over 3.5. Beta Co-Inoc is not recommended for wines with alcohol potential >15% v/v.

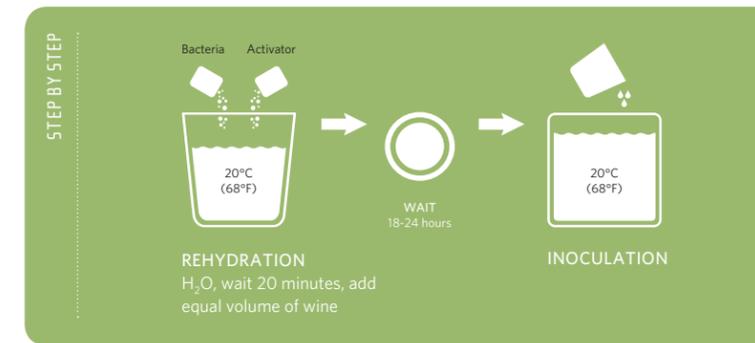
## 1-STEP CULTURES

1-Step® cultures are new and improved versions of an old concept. The purpose is to provide winemakers with a product that combines the economy and activity of standard strains with a degree of the convenience associated with the direct inoculation strains.

In lieu of direct inoculation or prolonged build-up, a simple 18-24 hour acclimatization step is required using a culture of *Oenococcus oeni* and an activator (included in the kits). 1-Step cultures are good choices where efficiency and cost management are essential.

None of our commercial ML strains contain the decarboxylase enzymes known to produce biogenic amines.

### PROTOCOL ADDING 1-STEP CULTURES TO WINE



Please see 1-Step procedure in more detail at [www.scottlab.com](http://www.scottlab.com).

### 1-STEP ALPHA

	<i>O. oeni</i> adapted to high alcohol; enhances mouthfeel
White, Red	
#15609	25 hL (660 gal) dose
#15610	100 hL (2,600 gal) dose
#15611	500 hL (13,000 gal) dose
#15612	1,000 hL (26,000 gal) dose

1-Step® Alpha (same strain as Enoferm Alpha) was selected by the ITV in France from a spontaneous malolactic fermentation. It shows good fermentation activity.

The 1-Step Alpha starter kit combines a highly effective malolactic starter culture with an activator to induce malolactic fermentation in an 18-24 hour acclimatization procedure.

Known strain that has proven effective at alcohol levels up to 15.5% (v/v), pH above 3.2 and total SO<sub>2</sub> up to 50 ppm.

### 1-STEP VP41

	<i>O. oeni</i> adapted to high SO <sub>2</sub> and high alcohol; enhances complexity and mouthfeel
Red, White	
#15029	100 hL (2,600 gal) dose
#15058	500 hL (13,000 gal) dose
#15054	1,000 hL (26,000 gal) dose

The 1-Step® VP41 (same strain as Lalvin MBR VP41) starter kit combines a highly effective malolactic starter culture with an activator to induce malolactic fermentation in an 18-24 hour build-up procedure.

Known strain that has proven effective at high alcohol levels (up to 16% v/v), pH above 3.1 and total SO<sub>2</sub> up to 60 ppm.

The 1-Step cultures can also be used to restart a stuck or sluggish MLF. Please see our website ([www.scottlab.com](http://www.scottlab.com)) for the protocol.

## TESTIMONIAL

Marco Piccoli  
Jackson-Triggs Winery



"In 2012 we trialed co-inoculation using 1-Step VP41 on both whites (Chardonnay) and three different Bordeaux red varieties (Cabernet Sauvignon, Cabernet Franc and Merlot).

In our Chardonnay trials, grapes were received at the winery in good condition. Neither VA nor *Botrytis* were noted. On average the juice was between 22.5 and 23°Brix, the pH was 3.30 and the TA was 6.3 g/L.

We inoculated the juice with Lalvin ICV D254 yeast at 20g/hL (1.6 lb/1000 gallons). Two days later (after a 4°Brix depletion) we added the 1-Step VP41 bacteria. No specific malolactic nutrients were added. Average temperature during the fermentations was 17°C (63°F).

We noticed a very good synergy of fermentation. The alcoholic fermentation completed in 17 days. At that time the malic was zero and pH was 3.43 and the TA was 5.2 g/L. VA change was insignificant. Moreover, flavors and aromas were very clean and intense and fruit was notably enhanced. The palate was very soft and elegant, with nice body structure.

We saw no abnormal interference between the yeast and bacterial fermentations. Nothing stuck and no slow fermentation kinetics were observed.

Our Bordeaux red co-inoculation trials used three different yeast strains (CSM, ICV 254 and BRL 97) together with 1-Step VP41. The bacteria were added one day after the yeast inoculations and tank temperatures averaged 28°C (82°F).

Malolactic fermentations completed concurrent with the alcoholic fermentations. Wines exhibited a clean, fruity aromatic spectrum. We noticed a good color stability (pH was around 3.40 at the end), clean aromas and low green characters. Body structure was nice.

Given the above noted results, we are interested in using co-inoculation in the future to make fruity and structured red wines."

## ARTICLE CO-INOCULATION OF SELECTED WINE BACTERIA

Sibylle A. KRIEGER-Weber, Lallemend

Co-inoculation refers to the increasingly popular practice of adding selected malolactic bacteria (MLB) early in the winemaking process. Properly implemented, co-inoculation provides multiple advantages in achieving the goal of a successful malolactic fermentation (MLF).

Interestingly, when co-inoculation is practiced, the activity of the bacteria is suppressed by the yeast during alcoholic fermentation (AF). As the ethanol level is rising, however, the selected bacteria are acclimating incrementally. The acclimated bacteria then transition from their lag phase into their logarithmic growth phase at the same time as the process of yeast cell death. The result of this is known to be highly beneficial to bacteria and to malolactic fermentation itself.

The following discussion will highlight the practicalities of co-inoculation in different pH environments compared to the traditional practice of introducing bacteria at the end of alcoholic fermentation.

### ADVANTAGES AND RISKS OF CO-INOCULATION STRATEGIES

Lactic acid bacteria and acetic acid production are common concerns when considering co-inoculation. Traditionally, inoculation with selected wine bacteria starter cultures has occurred after all fermentable sugars have been consumed. This is due to the desire of winemakers to avoid possible production of acetic acid and D-lactic. Over the past decade, however, co-inoculation has been applied with success around the world. Further, research has demonstrated that when correctly adhering to basic principles, these problems can be avoided.

### VOLATILE ACIDITY PRODUCTION

Strong bacterial growth can inhibit yeast growth and lead to the production of excessive amounts of volatile acidity (VA). A study done by Rader (1963), however, puts this concern into perspective. Bacteria will begin to consume sugars and impact VA only when the degradation of organic acids is complete. Malic acid is consumed first, followed in by citric, fumaric and other organic acids. (See Figure 1). The degradation of sugars at this point will result in a significant increase in volatile acidity, but this is strongly influenced by the pH.

### CONCERNS ABOUT PH

#### LOW PH WINES (pH < 3.5):

For over a decade, research on low pH wines (<3.5) conducted by Lallemend (in collaboration with respected research groups worldwide) have shown that acetic acid will not be produced from sugars during growth of MLB or during the active MLF. In these experiments the selected bacteria showed no propensity to consume sugar. The limited acetic acid production (0.1 g/L) was noted only when almost 1/2 of the malic acid was degraded and the bacteria began to utilize citric acid. Trials conducted in <3.5 pH wines using co-inoculation versus post AF bacterial inoculation showed no difference in the final acetic acid concentration. Also notable is the fact that different MLB strains exhibit different abilities to degrade citric acid. Co-inoculation of yeast and MLB into Riesling juice showed that the co-inoculation had no influence on the AF. In fact, the co-inoculation MLF completed much faster than when the MLB inoculations were post-AF. The timing of inoculation also had an important impact on the sensory profile of the finished wines. In the co-inoculation experiment, the reductive environment generated by the yeast prevented the formation of buttery or lactic aromas. Wines were fresher and retained more varietal character.

The results shown in Table 1 derive from a research collaboration with Ramón Mira de Orduña at Massey University, New Zealand. The experiment was conducted with Chardonnay grapes from Hawke's Bay in New Zealand. The fruit was pressed, no SO<sub>2</sub> was added and the must was cold settled at 4°C for 24 hours. At that time 300 mg/L of DAP was added. Vinifications were carried out in triplicate. Initial must analysis was 20.7° Brix at pH 3.28. An ML compatible yeast strain (Lalvin CY3079) was used and two malolactic bacteria strains were trialed. For each yeast/bacterium combination, the MLB were inoculated either together with the yeast (co-inoculation) or post AF. The results presented in Table 1 show that post-AF inoculation always resulted in prolonged malolactic fermentation when compared to co-inoculation.

TABLE 1  
Time until end of malic acid degradation during vinification of Chardonnay must with co-inoculation and post-AF AF/MLF.

MLF STARTER CULTURE	CO-INOCULATION	POST-AF INOCULATION
ML starter MBR A	26 days	74 days (residue)
ML starter MBR B	19.5 days	68 days

In the first two weeks of the experiment, no significant differences in the degradation of glucose and fructose were seen. The alcoholic fermentations were progressing at the same rate. After 20 days, however, neither glucose nor fructose was detectable in the co-inoculation tests, whereas glucose and fructose had a combined concentration of 700 mg/L in the post-AF inoculation trials. The complete absence of these two sugars in the co-inoculation samples was clearly a source of increased microbiological stability.

Degradation of citric acid was also different. In the co-inoculation treatments, citric acid was degraded faster and slightly more acetic acid was produced. The differences in final acetic acid concentrations, however, were small and statistically insignificant (Table 2).

TABLE 2  
Acetic acid production vs. inoculation protocol

MLF STARTER CULTURE	CO-INOCULATION	POST-AF INOCULATION
ML starter culture MBR A	0.195 g/L	0.147 g/L
ML starter culture MBR B	0.187 g/L	0.168 g/L

#### HIGH PH WINES (pH > 3.5):

Co-inoculation can be an effective option when making wines with a pH greater than 3.5. It should be acknowledged that if the yeast fermentation becomes stuck or sluggish and this is not rectified, problems can arise. Bacteria can be opportunistic under such circumstances and populations can grow. Organic acid consumption will be followed by the degradation of sugars (resulting in the production of volatile acidity). These caveats aside, however, co-inoculation can be a very useful tool winemaking tool.

In 2010 Zapparoli et al. published the results of their co-inoculation studies in red table wine production at >3.5 pH. Trials involved selected bacterial inoculations at the beginning of the AF using several grape varieties. In most of the microvinification trials, MLF was completed before or within one week after racking. The acetic acid content remained within an acceptable level (<0.60 g/L) as shown in Figure 2.

In addition to these trials, Zapparoli expanded tests to production scale (5,280 gals/200 hL) on highly structured (and ultimately high alcohol) Amarene wines in Italy. Again, the results were positive. The malolactic fermentation induced by co-inoculation was complete before the wine was racked. By contrast the wine inoculated post AF took 33 days longer. The acetic acid levels in the co-inoculation wine were actually lower than the level in the traditionally made wine. The authors concluded that the decrease in time compared to traditional MLF offers winemakers a significant advantage.

Additional co-inoculation trials have been conducted on high pH red wines over the seven most recent vintages (northern and southern hemisphere). Massera et al. (2009) studied the comparative effects on fermentation performance, sensory and stability attributes on Malbec (see Figure 3). There were no observed negative effects on yeast population and alcoholic fermentation performance.

In reviewing the science and practice of co-inoculation, we can say that under high pH wine conditions co-inoculation with a selected bacteria strain can be a viable alternative. As always, however, the winemaker must be attentive to the progress of the fermentations and the uniqueness of each lot of wine. Nutrition, temperature, turbidity, and choice of yeast and bacteria strains may each have an impact beyond the pH and the decision to co-inoculate.

FIGURE 1  
Metabolism of sugars and organic acids during MLF In wine

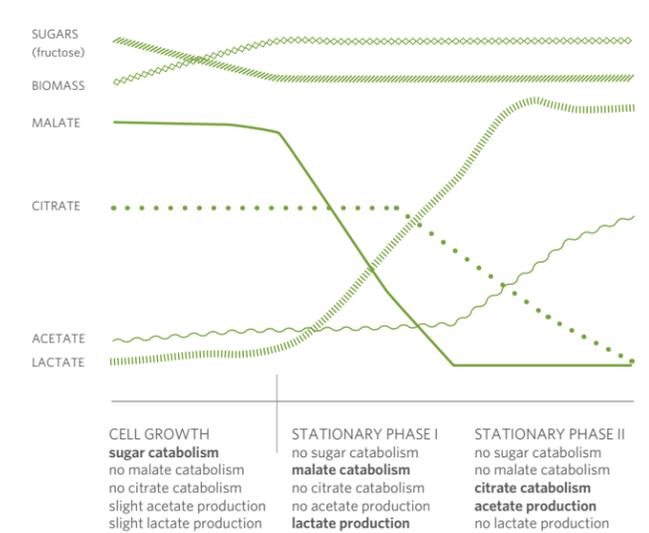


FIGURE 2  
Relationship between the pH and acetic acid contents in 100 wines with co-inoculation with linear regression line and relation coefficient (r<sup>2</sup>). (Zapparoli et al. 2010)

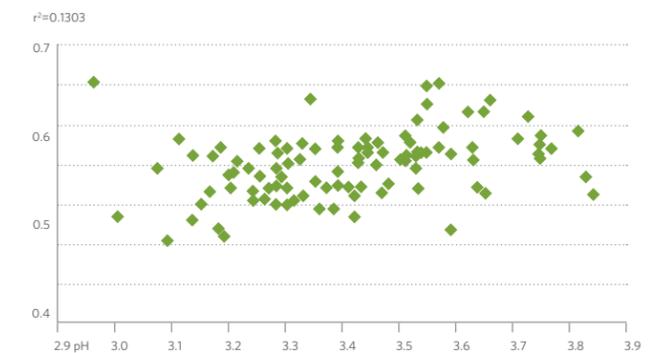
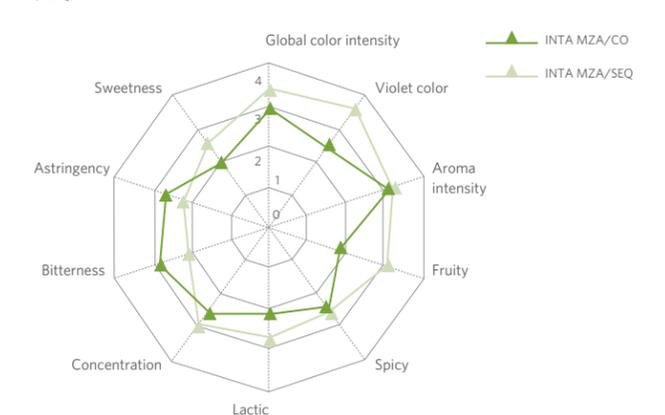


FIGURE 3  
Sensory descriptors of Malbec wines fermented with *S. cerevisiae* strain (INTA MZA) and *Oenococcus oeni* strain (Enoferm Alpha) in co-inoculation (CO) and post-AF (SEQ) inoculation.



## STANDARD ML FREEZE-DRIED BUILD-UP CULTURES

When using Direct Inoculation cultures, strict adherence to the 7-10 day build-up protocol must be followed. Please contact us for more information when using these products.

### IB (INOACTER)

 *O. oeni* adapted for sparkling wines; neutral sensory effect

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Sparkling, White, Red

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#15024 25-50 hL (660-1,320 gal) dose

The IOC IB™ malolactic strain was isolated by the Comité Interprofessionnel du Vin de Champagne (CIVC) in France.

Strain of choice for many sparkling wine producers when malolactic fermentation is desired.

Contributes a neutral sensory effect, especially in lower pH wines.

### MT01

 *O. oeni* with low volatile acidity and diacetyl production; neutral sensory effect

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Sparkling, White, Red

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#15027 25-35 hL (660-925 gal)

Lalvin MT01™ was isolated and selected in Epernay, France.

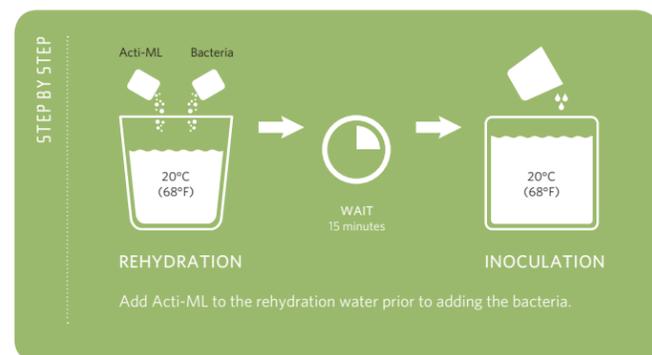
Characterized by very low VA and diacetyl production resulting from a lack of citrate permease activity.

## MALOLACTIC BACTERIA NUTRITION

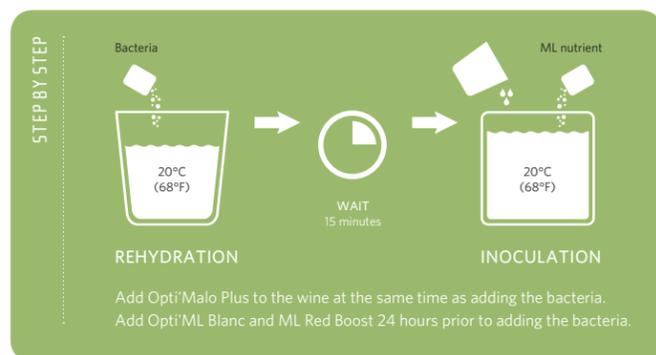
Even under ideal conditions *Oenococcus oeni* malolactic bacteria grow slowly. The nutrient needs of the yeast chosen for primary fermentation affect nutrients available for malolactic bacteria. Highly mature grapes tend to have lower nutrient levels. Indigenous microflora utilize the same nutrients. Highly clarified wines are often stripped of nutrients. All of these factors contribute to the need for sufficient nutrition for *O. oeni*. A small yeast population with little autolysis or a yeast strain that does not fully autolyze may not provide the needed nutrient release. *O. oeni* have complex nutrient needs and wine is often a poor source of these nutrients. Malolactic bacteria require sugar (fructose, glucose), organic acids (malic, citric, pyruvic), organic nitrogen (amino acids, peptides), vitamins (B group, pantothenic acid) and trace minerals (Mn, Mg, K, Na). The unfavorable

conditions of wine can make malolactic fermentation very difficult. Temperature, pH, alcohol, SO<sub>2</sub>, polyphenols, medium chain fatty acids and nutritional levels all affect malolactic bacteria growth and activity. High and low temperatures will inhibit malolactic bacteria. High levels of alcohol or SO<sub>2</sub> can kill malolactic bacteria. Stuck or sluggish malolactic fermentations may be caused by difficult conditions in the wine or by the malolactic bacteria not being able to multiply and reach the minimum population required for malolactic fermentation. Malolactic bacteria nutrients help create a better environment in the wine. Used properly, they help the selected bacteria get a faster start, increase survival rates and lower the risk of problems from undesirable bacteria (biogenic amines, VA, off-flavors and aromas, etc.).

### PROTOCOL ADDING ACTI-ML TO WINE



### PROTOCOL ADDING OPTI'MALO PLUS, OPTI'ML BLANC, OR ML RED BOOST TO WINE



### ACTI-ML

 Bacteria rehydration nutrient

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#15681 1 kg

Acti-ML® is a bacteria nutrient used during rehydration of the direct addition and standard malolactic bacteria strains. It was developed by the Lallemand bacteria R&D team led by Dr. Sibylle Krieger-Weber. Acti-ML is a specific blend of inactive yeasts rich in amino acids, mineral cofactors and vitamins. These inactive yeasts are mixed with cellulose to provide more surface area to help keep bacteria in suspension. Acti-ML can help strengthen the development of bacteria growth under difficult conditions.

#### RECOMMENDED DOSAGE

20 g/hL 50 g/60 gal 1.7 lb/1000 gal

#### USAGE

Mix Acti-ML into 5 times its weight in 25°C(77°F) chlorine-free water. Add bacteria, then wait 15 minutes before adding the suspension to the wine.

#### STORAGE

Dated expiration. Store at 18°C(65°F). Once opened, keep tightly sealed and dry.

### OPTI'MALO PLUS

 Complete malolactic nutrient

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#15141 1 kg

Opti'Malo Plus® is a natural nutrient developed by Lallemand specifically for MLF. It is a blend of inactive yeasts rich in amino acids, mineral cofactors, vitamins, cell wall polysaccharides and cellulose. The cellulose provides surface area to help keep the bacteria in suspension and to help adsorb toxic compounds that may be present at the end of primary fermentation.

#### RECOMMENDED DOSAGE

20 g/hL 50 g/60 gal 1.7 lb/1000 gal

#### USAGE

Suspend in a small amount of water or wine and add directly to the wine at the same time as the malolactic culture. It should not be added to the rehydration water.

#### STORAGE

Dated expiration. Store at 18°C(65°F). Once opened, keep tightly sealed and dry.

### OPTI'ML BLANC

 Malolactic nutrient for difficult White and Rosé fermentations

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#15217 1 kg

NEW

Malolactic fermentation in Chardonnay wines can often be the last to finish. Lallemand researched this issue by looking at different peptide formulations, which resulted in the development of Opti'ML Blanc. Opti'ML Blanc is a unique malolactic nutrient specifically formulated for white and rosé wines. Formulated from a blend of selected inactivated yeasts, Opti'ML Blanc helps compensate for amino nitrogen and peptide deficiencies. The bioavailability of certain peptides stimulates the growth of selected bacteria and shortens the duration of MLF, especially under difficult white winemaking conditions.

#### USAGE

Suspend in small amount of water or wine and then add directly to the wine 24 hours before adding the malolactic bacteria.

#### STORAGE

Dated expiration. Store at 18°C(65°F). Once opened, keep tightly sealed and dry.

### ML RED BOOST

 Malolactic nutrient for difficult Red fermentations

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#15218 1 kg

NEW

Specific polyphenolics in red wines from high maturity grapes have an inhibitory effect on malolactic fermentations. To address this challenge Lallemand has formulated ML Red Boost. This malolactic bacteria nutrient is formulated from specific inactivated yeast fractions which enhance the bacteria's resistance to high polyphenol levels. In addition, the availability of certain peptides and polysaccharides in ML Red Boost favor the health of the bacteria and can be effective in reducing the duration of the MLF.

#### USAGE

Suspend in small amount of water or wine and then add directly to the wine 24 hours before adding the malolactic bacteria.

#### STORAGE

Dated expiration. Store at 18°C(65°F). Once opened, keep tightly sealed and dry.

## FREQUENTLY ASKED QUESTIONS

### CAN I USE HALF A SACHET OF BACTERIA NOW AND SAVE THE OTHER HALF TO USE LATER?

No. Once the sachet of bacteria is opened it must be used immediately. Exposure to oxygen and excess moisture can be detrimental to the survival of the bacteria.

### MY BACTERIA ARRIVED AND THE ICE PACK HAS MELTED. HOW CAN I BE CONFIDENT THAT MY MALOLACTIC CULTURE IS IN GOOD SHAPE?

We ship bacteria overnight with ice packs. If, despite our best efforts, the ice pack has melted and the container is not cold to the touch when your bacteria arrive, do not be alarmed. Lallemand's proprietary manufacturing process means its bacteria is stable. Provided that any warming period is moderate (e.g. 30°C/86°F for less than 48 hours) viability should be excellent. Place the bacteria in the freezer (0°C/-18°F is preferred but up to 4°C/40°F is acceptable) and store until you need it.

### I WOULD LIKE TO HAVE LESS DIACETYL IN MY WHITE WINES. WHICH STRAIN SHOULD I CHOOSE?

High inoculation levels of neutral strains will help control excessive diacetyl production. Co-inoculate by adding bacteria one day after yeast addition (if the pH is under 3.5). The diacetyl will be consumed by the yeast and bacteria. Leaving wine on the lees will also reduce diacetyl levels, as does conducting the MLF at warmer temperatures (24°C/75°F compared to 17°C/63°F).

### CAN I USE CITRIC ACID TO ACIDULATE MY WINE FOR INCREASED DIACETYL FORMATION?

We do not recommend that you use citric acid for acidification before MLF is finished. It can promote acetic acid in addition to diacetyl formation during malolactic fermentation. If increased diacetyl is the goal, choose a bacteria strain that is a known diacetyl producer such as Beta or PN4.

### WHY IS MY MALOLACTIC FERMENTATION NOT FINISHING?

Check the wine parameters (free and total SO<sub>2</sub>, alcohol, pH, VA, malic acid and temperature) to determine if there is an obvious reason the fermentation is not completing. Pesticide and fungicide residue, juice concentrates and preservatives in juice or wine can also inhibit malolactic bacteria, as can a lack of essential nutrients. A restart may be necessary. A restart protocol for stuck or sluggish MLF's is on our website ([www.scottlab.com](http://www.scottlab.com)).

### DOES THE YEAST STRAIN USED FOR PRIMARY FERMENTATION AFFECT THE MALOLACTIC FERMENTATION?

Yes. Some yeast strains are harder for malolactic fermentation than others. Yeast strains differ in nutrient demand, production of SO<sub>2</sub> and rate of autolysis which has a resulting effect on the bacteria. Please refer to the yeast charts on pages 8-11.

### DOES MY BACTERIA NEED NUTRIENTS?

Unfortunately, there is no easy answer. There are no analytical tools to determine nutrient deficiencies for bacteria. Bacteria need amino acids (not ammonium salts), peptides, vitamins and minerals to complete a successful MLF. Each strain of bacteria, like yeast, has specific requirements. We are happy to help you make a decision that is suitable for your particular wine style.

### HOW DO I CHOOSE THE CORRECT STRAIN OF BACTERIA FOR MY WINE?

Each strain of bacteria performs best within specific environmental parameters. Consider free and total SO<sub>2</sub> levels, pH, alcohol, temperature constraints as well as malic acid concentration (see chart on page 52).

### WHY DOES THE TSO<sub>2</sub> NEED TO BE MEASURED WHEN CHOOSING THE CORRECT STRAIN OF BACTERIA?

SO<sub>2</sub> can be bound to acetaldehyde. Bacteria can break that bond and liberate free SO<sub>2</sub>, making their environment more challenging.

### HOW DO I CHOOSE THE CORRECT NUTRIENT FOR MALOLACTIC FERMENTATIONS?

Like alcoholic fermentation options we have rehydration nutrients (Acti-ML) and fermentation/conversion nutrients (Opti-Malo Plus, Opti'ML Blanc and ML Red Boost). These nutrients can assist with the general nutritional needs of the bacteria (Opti-Malo Plus) or to overcome specific challenges that the bacteria may encounter (Opti'ML Blanc or ML Red Boost). Opti'ML Blanc was developed to overcome the nutritional deficiencies and growth difficulties which often present themselves in white wines. ML Red Boost was developed for challenging red wines which were harvested at high maturity levels where the level of polyphenolic compounds can pose challenges for the bacteria.

### I HAVE TRIED EVERYTHING TO GET MY WINE THROUGH MLF BUT NOTHING IS WORKING. WHAT SHOULD I DO?

Sometimes MLF might not be possible in certain wines. Our laboratory can perform a Stuck & Sluggish ML Package to determine whether MLF is even possible on that wine. Contact our laboratory for more information.

### WHAT IS THE DIFFERENCE BETWEEN DIRECT INOCULATION, 1-STEP AND STANDARD BUILD-UP CULTURES?

Direct inoculation cultures are acclimatized by Lallemand to withstand the rigors of direct inoculation. The 1-Step cultures are an improved version of an old concept. A simple 18-24 hour acclimatization step provides the winemaker with an option when efficiency and cost management are essential. The standard strains are generally used in sparkling winemaking due to the low pH. The procedure for building up the standard cultures is more elaborate than the other types of cultures but offers an alternative when conditions are difficult for MLF.

### I'M THINKING OF TRYING CO-INOCULATION. WHICH BACTERIA STRAIN SHOULD I USE?

Beta Co-Inoc was developed by Lallemand for use in co-inoculation. Because of the slow lag phase, there is less risk of malolactic fermentation finishing before primary. Therefore, there is also less risk of VA production and the result is a timely completion of both fermentations.

# MICROBIAL CONTROL AGENTS

Making wine can be described as the process of controlling microbes to encourage a desirable fermentation while also preventing microbial spoilage. Practices such as adding yeast and ML starter cultures, regular sulfur dioxide additions, acidification, sanitation, and filtration are common ways in which microbial control is applied during winemaking. Though many wine spoilage problems can be prevented with good winemaking practices, there are still circumstances that require extra microbial control. This section describes some of the tools that Scott Laboratories offers to prevent, inhibit or eliminate unwanted microorganisms.

## BASICS

### REMOVAL

Microorganisms are physically removed from the wine. Removal strategies include filtration, centrifugation and some types of fining when followed by racking.

### INHIBITION

Microbe replication is stopped or slowed, but organisms are not necessarily killed. Microbes may start to grow and multiply once the inhibitory pressure is removed. Inhibition strategies include acidification to lower pH and use of sulfur dioxide at non-lethal concentrations.

### DESTRUCTION

Microorganisms are killed and will not survive to replicate. Destruction strategies include Velcorin treatment, No Brett Inside additions, use of lysozyme (especially at pH >4.0) and addition of alcohol (as in the case of fortified wines).

## CHOOSING THE RIGHT MICROBIAL CONTROL AGENT

	LYSOZYME		SO <sub>2</sub>		CHITOSAN	DMDC
	LYSO-EASY	LYSOVIN	INODOSE GRANULES	INODOSE TABLETS	NO BRETT INSIDE	VELCORIN
PAGE	62	62	63	63	64	66
Reds	🔹	🔹	🔹	🔹	🔹	🔹
Whites and Rosé	🔹	🔹	🔹	🔹	🔹	🔹
Fruit, Cider and Mead	🔹	🔹	🔹	🔹		🔹
Protection from indigenous yeast			🔹	🔹		
Control gram positive bacteria (LAB)	🔹	🔹	🔹	🔹		
Control gram negative bacteria ( <i>Acetobacter</i> )			🔹	🔹		
Inhibit oxidation of grapes and juice			🔹	🔹		
Control spoilage yeast ( <i>Brettanomyces</i> )			🔹	🔹	🔹	🔹
Protection during stuck and sluggish fermentations	🔹	🔹				
Delay MLF	🔹	🔹				
Helps prevent refermentation in bottle			🔹	🔹		🔹

🔹 Highly Recommended  
 🔹 Recommended

## LYSOZYME

Lysozyme is a naturally occurring enzyme which can be used in wine to control lactic acid bacteria (LAB) including *Oenococcus spp.*, *Pediococcus spp.* and *Lactobacillus spp.* *Oenococcus oeni* is favorably associated with malolactic fermentation (MLF) but can also produce volatile acidity (VA) under certain conditions. *Pediococcus* and *Lactobacillus* are usually considered spoilage organisms. Lysozyme is a natural product isolated from egg whites and has been used for many years as a biopreservative in the processing and storage of hard cheese.

The enzymatic activity of lysozyme can degrade the cell walls of gram-positive bacteria (including LAB) but not gram-negative bacteria (*Acetobacter*) or yeast. Lysozyme's effectiveness depends on the type of bacteria and the number of cells present.

### LYSO-EASY

 Lactic acid bacteria inhibitor—ready-to-use lysozyme solution

#16405	250 mL
#16406	1 L
#16407	5 L

Lyso-Easy is a ready-to-use solution of 22% lysozyme.

#### USAGE

No preparation is needed. Once opened, it should be used immediately.

#### STORAGE

Dated expiration. Store tightly sealed at ambient temperature.

### LYSOVIN

 Lactic acid bacteria inhibitor—granular lysozyme

#16402	500 g
#16400	1 kg
#16401	5 kg

Lysovin is a powdered lysozyme that needs to be properly rehydrated.

#### USAGE

Rehydrate Lysovin in 5 times its weight in warm water. Stir gently for 1 minute and avoid foaming. Allow to soak for 45 minutes. Repeat until the solution is a clear, colorless liquid. Please refer to [www.scottlab.com](http://www.scottlab.com) for the complete rehydration procedure.

#### STORAGE

Store in dry form for 5-10 years at 18°C(65°F). Once rehydrated, Lysovin should be refrigerated and will retain 90% of activity after 12 months.

### LYSO-EASY AND LYSOVIN

#### RECOMMENDED DOSAGE

LYSOZYME APPLICATIONS		RED	WHITE	LYSO-EASY		LYSOVIN			TIMING OF ADDITION
<b>Inhibit Growth of LAB in Must and Juice</b> To inhibit spoilage characters due to uncontrolled microbial growth. This is especially important in high pH conditions or with grapes containing rot.		💧	💧	91 mL/hL	3.4 mL/gal	200 ppm	20 g/hL	0.75 g/gal	Add prior to fermentation
<b>Protection During Stuck and Sluggish Fermentations</b> To encourage yeast growth in the absence of SO <sub>2</sub> while reducing the risk of VA production by lactic acid bacteria.		💧	💧	114-182 mL/hL	4.3-6.8 mL/gal	250-400 ppm	25-40 g/hL	0.94-1.50 g/gal	Add at first signs of a stuck fermentation
<b>Delay MLF/Post-MLF Stabilization</b> To protect wine without the negative effects of SO <sub>2</sub> , to allow for maceration or aging, to allow for implantation of selected bacteria, or to increase efficiency of Phase I micro-oxygenation.	Delay	💧	💧	46-91 mL/hL	1.7-3.4 mL/gal	100-200 ppm	10-20 g/hL	0.38-0.75 g/gal	Add at juice stage or immediately after alcoholic fermentation
	Stabilize	💧	💧	114-228 mL/hL	4.3-8.6 mL/gal	250-500 ppm	25-50 g/hL	0.94-1.90 g/gal	
<b>Inhibit MLF when Blending Partial and Complete ML Wines</b>		💧	💧	136-227 mL/hL	5-8.6 mL/gal	300-500 ppm	30-50 g/hL	1.10-1.90 g/gal	Add during blending

1 mL of Lyso-Easy contains 0.22 g granular lysozyme.

**Warning:** In the case of low color potential grapes such as Pinot Noir, lysozyme products should never be added prior to completion of alcoholic fermentation. If spoilage yeasts such as *Brettanomyces* are suspected, SO<sub>2</sub> addition should not be delayed. Lysozyme is only effective against gram-positive bacteria and has no effect on yeast or gram-negative bacteria such as *Acetobacter*.

## SULFUR DIOXIDE

Wine quality can be preserved with sulfur dioxide. Sulfur dioxide is used in wine for its anti-oxidant and anti-microbial properties. The effectiveness of sulfur dioxide as an anti-microbial is dependent upon pH. As pH increases, the portion of sulfur dioxide that is active against microorganisms decreases. Therefore, increases in pH require the addition of more sulfur dioxide to maintain adequate anti-microbial activity. Inodose Granules and Tablets are an easy and effective way to add sulfur dioxide to grapes, juice or wine.

### INODOSE GRANULES

 Effervescent sulfur dioxide granules

#15777	2 g (40/box)
#15778	5 g (25/box)
#15779	10 g (15/box)
#15780	100 g
#15781	400 g

Note: Volume discounts are available. See order form on page 106 for details.

Inodose Granules are small, effervescent granules made of potassium metabisulfite and potassium bicarbonate. As they dissolve into wine or must the granules release a precise dose of SO<sub>2</sub>. Inodose Granules come in pre-measured packs. A pack of Inodose Granules 100, for example, will release 100 grams of pure SO<sub>2</sub>. Inodose Granules are perfect for SO<sub>2</sub> additions to incoming must, juice and to wines prior to clarification and fining. The potassium bicarbonate fraction in these granules has little or no effect on pH.

#### STORAGE

Store in a dry, well-ventilated environment at temperatures below 25°C(77°F). Use whole packet quickly once opened, as potency will decrease after opening.

### INODOSE TABLETS

 Effervescent sulfur dioxide tablets

#15775	2 g (42/box)
#15776	5 g (48/box)

Note: Volume discounts are available. See order form on page 106 for details.

Inodose Tablets are a blend of potassium metabisulfite and potassium bicarbonate. They are packaged in 2 g and 5 g dosage levels. The effervescent action of the bicarbonate provides mixing in barrels or small tanks while reducing time and labor needed for stirring. The easy-to-use tablet form helps prevent overdose problems associated with traditional forms of SO<sub>2</sub> additions. Sealed strip packages keep unused tablets fresh for optimal potency. The potassium bicarbonate fraction in these tablets has little or no effect on pH.

#### STORAGE

Store in a dry, well-ventilated environment at temperatures below 25°C(77°F). Once the blister pack has been opened, the tablet should be used immediately.

### INODOSE GRANULES AND INODOSE TABLETS

#### USAGE

Various applications include:

- In gondolas or picking bins to inhibit oxidation of grapes and juice, especially from *Botrytis* or mold.
- During transport of must or juice.
- To inhibit indigenous yeast and bacteria.
- In tanks before fermentation and directly into barrels after malolactic fermentation.
- To make sulfite additions to barrels.

#### INODOSE GRANULES AND TABLETS CONVERSION CHART – PPM OF TOTAL SULFUR DIOXIDE

ITEM SIZE	1 LITER	1 GALLON	60 GALLONS	100 GALLONS	1000 GALLONS
2 g	2,000	529	9	5	0.5
5 g	5,000	1,321	22	13	1.3
10 g	10,000	2,642	44	26.4	2.64
100 g	100,000	26,420	440	264	26.4
400 g	400,000	105,680	1,761	1,057	106

## TESTIMONIAL

Dan Petroski  
Larkmead Vineyards



"We switched to Inodose Granules after years of liquid SO<sub>2</sub> usage. Using the Inodose packets has had a tremendous impact on the quality of our sulfur dioxide addition as we've been able to reach and hold targeted desired FSO<sub>2</sub> levels with less additions over the course of the wine's life. The packets' ease of use has also helped be more time efficient in the cellar, which is a valuable benefit unto itself."

# CHITOSAN

## NO BRETT INSIDE

**LALLEMAND** *Brettanomyces* spp. control agent

#16410 100g

NEW

No Brett Inside® is a commercial preparation of Chitosan that was introduced by Lallemand and distributed exclusively in the North American market by Scott Laboratories.

No Brett Inside specifically targets *Brettanomyces* cells. The active ingredient, Chitosan, works in two ways. The *Brettanomyces* cells are adsorbed onto the chitosan and settle out of the wine. In addition to the physical effect there is a biological effect which results in cell death. This double action of No Brett Inside will help to control contaminating populations helping to preserve wine quality.\*

\*No Brett Inside should be added post-ML.

### RECOMMENDED DOSAGE

4-8g/hL

### USAGE

Suspend No Brett Inside in 5 times its weight in cool water (No Brett Inside is insoluble, so it will not go into solution). No Brett Inside can be added during a pump-over or tank/barrel mixings insuring a homogenous addition. Leave the No Brett Inside in contact with the wine for 10 days and then conduct a clean racking.

To determine the effectiveness of your addition, a period of 20-30 days post-racking should be respected. This is irrespective of the method used; traditional plating, microscopic observations or RT-PCR.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C (77°F).

## ARTICLE: NO BRETT INSIDE® CHITOSAN: A NEW TOOL FOR THE CONTROL OF *BRETTANOMYCES*.

The yeast *Brettanomyces bruxellensis* continues to be a major threat to wine quality at all stages of the vinification process. At the International Wine Challenge in 2010, it was estimated that 13% of the wines submitted (from vintages 2006-2009) were contaminated with *Brettanomyces* (Sam Harrop, MW, Personal Communication). Such statistics make this organism a global concern.

*Brettanomyces* can survive and grow in very poor nutrient conditions and is associated with various forms of spoilage derived from grape components. In particular, *Brettanomyces* metabolizes grape derived hydroxycinnamic acid (p-coumaric acid, p-ferulic acid and caffeic acid) in a two stage process. First, these compounds undergo a decarboxylation stage to produce vinyl phenols. Then, they are further reduced to their representative ethyl phenols (4-ethyl phenol, 4-ethylguaiacol and 4-ethylcatechol). These ethylphenols are volatile and are responsible for the aromas that winemakers characterize as "Brett".

If these volatile phenolic compounds are present at sub-threshold levels they still can diminish the natural character of the wines and mask varietal and regional characters. Levels above threshold can produce unflattering aroma descriptors such as metallic bitterness, barnyard, leather and Band-Aid™.

Recent research has allowed us to make great strides in controlling and eliminating *Brettanomyces*. One such effort involves the isolation and purification of a fungal chitosan. Chitosan is a logical product for *Brettanomyces* control. It has selective natural anti-microbial properties. It is derived from the deacetylation of chitin. Chitin is the second most common bio-polymer in nature after cellulose.

Chitosan is now available as a commercial product from Lallemand and is marketed under the name No Brett Inside. No Brett Inside targets contaminating *Brettanomyces* cells.

In Figure 1 we can observe *Brettanomyces* cells at x20,000 magnification.

When we add 4g/hL of the commercial chitosan preparation (No Brett Inside) as observed in Figure 2 there is adsorption of the *Brettanomyces* cells on to the chitosan matrix.

The *Brettanomyces* adsorbed onto the chitosan settle out of the wine. This is essentially a fining action. Racking is recommended after 10 days of contact. This physical action resulting in the adsorption of the *Brettanomyces* causes sedimentation of the cells. In addition to the physical effect, there is also an anti-microbial action which results in the cell's death. Cell death can be attributed to the compromised integrity of the cell wall and cell membrane causing the leakage of cellular components. This is demonstrated (in Figure 3) by the release of Adenosine Triphosphate (ATP) into the surrounding synthetic medium. The release of ATP is arbitrarily measured as reflective light units.

Many trials have demonstrated No Brett Inside's positive results. Trials conducted by Dr. Richard DeScenzo of ETS Laboratories in St. Helena, CA, showed that treatment at 4 g/hL resulted in a 78% decrease in the cell population after 10 days. Treatment with 8 g/hL showed a 97% decrease compared with a 752% increase in population in the untreated control.

Long term effects are still being determined. Population determinations six months post treatment, however, showed no viable cells (Figure 4).

It is recommended that winemakers wait 20-30 days after racking off the chitosan before running RT-PCR, or traditional microbiological analysis. Respecting this time interval will avoid false positive results.

In Europe, No Brett Inside has been approved for use at levels up to 10 g/hL since 2010. The recommended dose and contact time is 4-8 g/hL for 10 days. Treatment is then followed by a clean racking.

No Brett Inside is currently available in the US and should be used in accordance with current regulatory considerations. At the time of printing this Handbook, Chitosan is listed under 27 CFR 24.250 (Continual use of a wine treating material or processing. Acceptable in good commercial practice). For the most current information please refer to our website [www.scottlab.com](http://www.scottlab.com).

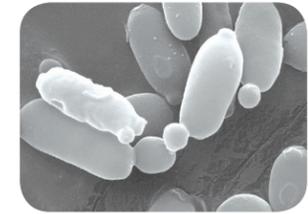


FIGURE 1  
Scanning Electron Micrograph x20,000 magnification *Brettanomyces*—No Treatment.

Image courtesy of Biljana Petrova and Dr. Charles G. Edwards, Washington State University, Pullman, WA

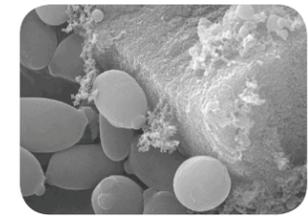


FIGURE 2  
Scanning Electron Micrograph x20,000 magnification *Brettanomyces* treated with 4 g/hL of No Brett Inside.

Image courtesy of Biljana Petrova and Dr. Charles G. Edwards, Washington State University, Pullman, WA

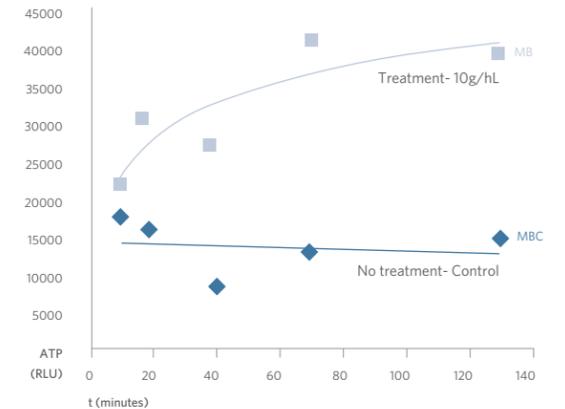


FIGURE 3  
Evolution of released ATP, synthetic medium, initial Brett population 18.10<sup>6</sup> CFU/mL

Adenosine Triphosphate leakage into the medium due to cell structure disruption.

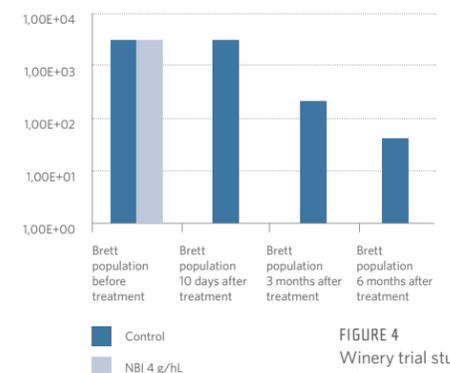


FIGURE 4  
Winery trial studying the effect of No Brett Inside over time.

## VELCORIN

Velcorin® is the trade name for dimethyldicarbonate (DMDC), a microbial control agent produced by LANXESS. Since 1988, Velcorin has been used in the United States in wine, low-alcohol wine and non-alcoholic wine as well as juice, juice sparklers, sports drinks and ready-to-drink teas. Velcorin is very effective at low dosages against a broad range of yeast, bacteria and molds. Unlike other chemical preservatives, Velcorin is non-persistent and does not affect wine taste, bouquet or color. In addition, Velcorin can remain active for several hours (depending on hydrolysis rate) thereby helping to eliminate contamination from sources such as bottles, closures and filling equipment.

### VELCORIN

**LANXESS** Yeast inhibitor; microbial control agent

#18000 3 kg

For more information on Velcorin and dosing machines, please contact Rebekka Swanson at Scott Laboratories, Inc.

### USAGE

#### To help prevent refermentation in finished wines.

Wines containing residual sugar are susceptible to fermentation in the bottle which can lead to haze, off-odors, off-flavors and effervescence. Adding Velcorin to wine during bottling can help prevent refermentation. Also, Velcorin can be used to replace or decrease the amount of sorbate which is sometimes used in wines containing residual sugar.

#### To control spoilage yeast such as *Brettanomyces* (especially in unfiltered or moderately filtered wines).

*Brettanomyces* is a spoilage yeast that can produce 4-ethylphenol and other undesirable sensory attributes. *Brettanomyces* has been known to live off of ethanol and/or cellobiose from toasted barrels as its sole carbon source. These factors can make *Brettanomyces* difficult to control in winery environments. In this application, Velcorin can be used either in the cellar or at the time of bottling.

#### To decrease the amount of sulfur dioxide used in wines.

Sulfur dioxide used in combination with Velcorin has been shown to achieve microbial stability at lower overall sulfur dioxide levels. Velcorin does not provide anti-oxidant protection.

#### To reduce warehouse holding time in early-to-market wines.

Velcorin can be used to decrease the amount of sulfur dioxide and/or decrease the degree of filtration. These wines undergo speedier sulfur dioxide equilibration and less bottle-shock. They are therefore palatable sooner and can be released earlier.

### CONDITIONS OF USE

#### Velcorin must be used with an approved dosing system.

Scott Laboratories will only sell Velcorin to those using a LANXESS approved dosing machine. Velcorin is a chemical and must be handled with respect. Therefore, all Velcorin handlers must undergo annual safety training (provided at no charge by Scott Laboratories, Inc.). The current cost of a Velcorin dosing machine starts at approximately \$70,000.

## FREQUENTLY ASKED QUESTIONS

### LYSOZYME

#### HOW LONG DOES IT TAKE FOR LYSOZYME TO WORK?

The rate of activity depends on many factors including temperature, pH, bacterial load, bacterial resistance and the specific matrix of any given wine. Even though lysozyme starts working immediately, it doesn't necessarily kill all the bacteria immediately. If lysozyme-treated wine samples are plated too quickly after treatment, results may show a false-positive. To ensure accurate results, wait one week before culturing for microbes.

#### IS LYSOZYME EFFECTIVE AGAINST ALL LACTIC ACID BACTERIA?

No, some lactic strains show resistance to lysozyme. Bench trials MUST be performed to accurately determine the effectiveness and correct addition rate of lysozyme for your wine.

#### HOW SOON AFTER A LYSOZYME ADDITION CAN I BOTTLE?

Wait at least one week, even if you have diligently completed your lab trials. Lysozyme is a protein and may produce lees (especially in reds) and affect the protein stability in whites. It is not recommended to bottle white wines that contain residual lysozyme.

#### WILL LYSOZYME TREATMENT AFFECT THE COLOR OF RED WINE?

Lysozyme added to red must can bind with tannins and other polyphenols that otherwise would have stabilized anthocyanins. This tannin loss can result in reduced color. In general, using 100-200 ppm should not cause a decrease in color. Lysozyme added post-MLF for microbial stability during barrel aging may have positive color effects when compared to stabilization with SO<sub>2</sub>. Any decrease in color should occur in the first few days of treatment. For low color potential grapes (e.g. Pinot Noir) lysozyme shouldn't be added before alcoholic fermentation is complete. Bench trials are critical.

#### IS LYSOZYME APPROVED FOR USE IN CANADA?

Winemakers in Canada do not yet have approval to use lysozyme in their wine.

### SULFUR DIOXIDE

#### CAN I USE A PARTIAL BAG OF INDOOSE GRANULES?

No, use the entire packet for a single dose of SO<sub>2</sub>. The formulation (therefore dosage), can be affected if the granules absorb any moisture.

#### CAN I BREAK THE INDOOSE TABLETS IN HALF TO DELIVER A SMALLER DOSE?

No, do not break the tablets for smaller dose additions. The combination of potassium metabisulfite and potassium bicarbonate may not be evenly distributed in the tablet. The tablets are available in two sizes to help give dosing choices.

### CHITOSAN

#### DO I HAVE TO RACK OFF THE NO BRETT INSIDE LEES AFTER 10 DAYS?

Yes. The wine needs to be racked off 10 days after a No Brett Inside addition due to fact that the *Brettanomyces* cells can be adsorbed onto the surface of the Chitosan and then settle into the lees.

#### DOES NO BRETT INSIDE IMPACT THE SENSORY OF THE WINE?

No Brett Inside is insoluble so it should not impact wine sensory. This also means that it will not remove any of the sensory compounds that may already be present due to a *Brettanomyces* infection (4-ethylphenol & 4-ethylguaiacol).

### VELCORIN

#### HOW DOES VELCORIN WORK?

Velcorin controls microorganisms by entering the cell and inactivating some of the key enzymes required for cell function. Specifically, Velcorin is thought to react with the histidyl residues of proteins including those involved in the active site of many enzymes. Susceptible enzymes are consequently rendered functionless due to blockage of the active site and/or conformational changes in structure. Excess Velcorin then completely hydrolyzes in the presence of water.

#### WHY DO I HAVE TO USE AN APPROVED DOSING SYSTEM?

Due to the unique physical properties of Velcorin and to help assure safe handling, LANXESS Corp. requires the use of an approved dosing machine. Velcorin is hydrophobic and solidifies at 17°C(63°F). The dosing machines are designed specifically for Velcorin, complete with safety features, special metering systems and temperature controls to prevent solidification and aid in Velcorin solubility. There are now several companies that offer a mobile Velcorin-dosing service. Please refer to [www.scottlab.com](http://www.scottlab.com) for a complete list of these companies.

#### WHAT FACTORS DETERMINE VELCORIN EFFECTIVENESS?

The effectiveness of Velcorin depends on microbial type, microbial load and other factors. At low doses, Velcorin is very effective against yeast. At greater doses Velcorin is also effective against bacteria and certain fungi. Pretreatment of wine must reduce the microbial load to less than 500 microorganisms/mL. Velcorin is not a substitute for good sanitation practices.

#### DO I HAVE TO LIST VELCORIN AS AN INGREDIENT ON THE LABEL?

No, the FDA lists Velcorin as a direct secondary food additive and therefore no labeling is required (21 CFR 101.100).

#### IS VELCORIN-TREATED WINE APPROVED IN COUNTRIES OTHER THAN THE U.S.?

Velcorin approval is product and country specific. Countries that currently allow Velcorin treatment for wine include: European Union member states, Chile, Argentina, Australia, New Zealand and South Africa. In addition, US wine treated with Velcorin may be exported to Canada in accordance with certain trade agreements. Please note that it is the exporter's responsibility to ensure the tradeability of products. For a current list of countries that allow Velcorin-treated wine, please contact Scott Laboratories.

# CLEANING

“Cleanliness is the basic condition for quality.”  
Emile Peynaud, *Knowing and Making Wine*

Cleaning and sanitation protocols are an integral part of any quality assurance program. It is our belief that good hygiene is not only the first step, but also an important key to maintaining wine quality.

**Cleaning** [klee-ning] *n.*  
the active removal of both inorganic (mineral) and organic substances from wine contact surfaces.

**Sanitation** [san-i-tey-shuh] *n.*  
reduction of viable population of contaminating cells. This is different from both sterilization and disinfection.

## BENEFITS OF AiRD PRODUCTS

- Specially formulated for the wine industry
- Cleaners contain chelators and surfactants for more efficient cleaning
- Cleaners can be used effectively over a wide temperature range
- Products have low environmental impact, fast biodegradation and recyclable packaging

## CONSIDERATIONS

### WATER QUALITY

The quality of water that is used within the winery should be considered for all wine processing stages, including cleaning and sanitation. Water should be potable, free from suspended particles and free from compounds that can impart odor and flavors. We also must consider the hardness of the water used. Hard water can contribute to an unsightly mineral scale on equipment and can act as a reservoir for the accumulation of organic debris and microbes.

### DOCUMENTATION AND SAFETY CONSIDERATIONS

When designing your program, the following should be considered: cleaning agent concentration, temperature of the water, contact time and flow rate. By maximizing these factors, you can minimize the amount of cleaning and sanitation agents used, as well as conserving water and energy. Always consider chemical compatibility of all agents with equipment, regulations and worker safety.

It is essential to maintain records and incorporate cleaning and sanitation protocols into every stage of your quality assurance program. In addition, all products used in the sanitation program must be approved for use, including the concentration that you intend to use them at. Do not decant into unlabelled containers and do not deviate from the prescribed use. Personal Protective Equipment (PPE) should be used at all times. For details on PPE, please refer to the Material Safety Data Sheet (MSDS).

## CHOOSING THE RIGHT CLEANING AGENT

CLEANING OPTIONS	CLEANSKIN-K	DESTAINEX-LF	OAK RESTORER-CWF
Dosage	0.5-4% w/v	0.5-1.5% w/v	0.5-2% w/v
Tartrate remover	X		X
Color Remover	X	X	X
Mold Remover		X	
Hot water required (>140°F)	No	No	No
Alkaline Base	X	X	X
Type of Formulation	Solid	Solid	Solid
Incompatible With	Acids and high temperatures	Acids and high temperatures	Acids and high temperatures
Contains Chlorine	No	No	No
Requires Hazardous Shipping	No	No	No

### DOSAGE RATES FOR CLEANING PRODUCTS

0.5%w/v = 0.5 g/100mL = 5 g/L = 19 g/gal = 19 kg/1000 gallons = 42 lb/ 1000 gallons of cleaning water  
 1% w/v = 1 g/100mL = 10 g/L = 38 g/gal = 38 kg/1000 gallons = 83 lb/1000 gallons of cleaning water  
 1.5% w/v = 1.5 g/100mL = 15 g/L = 57 g/gal = 57 kg/1000gallons = 125 lb/1000 gallons of cleaning water  
 2% w/v = 2 g/100mL = 20 g/L = 76 g/gal = 76 kg/1000gallons = 167 lb/ 1000 gallons of cleaning water  
 4% w/v = 4 g/100mL = 40 g/L = 151 g/gal = 151 kg/1000 gallons = 334 lb/1000 gallons of cleaning water

## CLEANSKIN-K

**AiRD** Multi-purpose cleaner and tartrate remover

#18500 5 kg

NEW

Cleanskin-K is an alkaline detergent developed by AiRD Chemistry. This potassium carbonate based formulation also contains a proprietary percarbonate plus chelating and sequestering agents for enhanced cleaning.

Cleanskin-K efficiently removes wine tartar, color, proteins and organic soil. Cleanskin-K can be used with an automated CIP system or with manual cleaning. It is a multi-purpose particulate preparation for cleaning stainless steel.

### RECOMMENDED DOSAGE

Use with soft or treated water. Hard water may require supplemental product. Cleanskin-K is a free-flowing, fast-dissolving powder. Volume of water required relates directly to the size of the job (i.e. surface area and tartar). Cleanskin-K is soluble in water up to about 12% weight to volume. Recommended temperature range is 20–60°C (68–140°F). Dose at 0.5-4% weight to volume. Lower temperatures will need extend cleaning times.

### USAGE

Prepare appropriate volume of potable water at 10% of tank volume. Accurately measure the correct weight of the Cleanskin-K. Slowly add the powder into the water mixing until a consistent solution is obtained. Initially the prepared solution will appear milky, but will soon clarify. Once the solution has clarified it is ready for use. Contact time is based on temperature of use and turbulence of contact. Conduct trials to determine contact time, average contact time is 20 minutes.

### STORAGE

Store in a dry, odor-free environment between 50–68°F (10–20°C) away from sunlight.

## DESTAINEX-LF

**AiRD** Multi-purpose cleaner for organic soil and molds

#18504 5 kg

NEW

Destainex-LF is a multi-purpose oxidizing cleaner which contains peroxy-carbonates, surfactants and chelating agents.

Destainex-LF is used to remove color, protein and other organic soil as well as mold and mildew.

Destainex-LF can be used with an automated CIP system or with manual cleaning.

It is a granular multi-purpose oxidizing cleaning agent for stainless steel, galvanized metal, concrete, glass, flexible hoses and HDPE/LDPE/PP\*. \*HDPE/LDPE- High/Low density polyethylene, PP= Polypropylene.

### RECOMMENDED DOSAGE

Soft or treated water is recommended for use in Destainex-LF solutions. Hard water may require supplemental product. For best results water should be 40–60°C (104–140°F) and concentrations of 1%-1.5% weight to volume. Lower temperatures will need extended cleaning times.

### USAGE

Prepare appropriate volume of potable water at 10% of tank volume. Accurately measure the correct weight of the Destainex-LF. Slowly add the powder into the water mixing until a consistent solution is obtained. Initially the prepared solution will appear milky, but will soon clarify. Once the solution has clarified it is ready for use. Contact time is based on temperature of use and turbulence of contact. Conduct trials to determine contact time, average contact time is 20 minutes.

### STORAGE

Store in a dry, odor-free environment between 50–68°F (10–20°C) away from sunlight.

## OAK RESTORER-CWF

**AiRD** Oak cleaner and restorer

#18508 5 kg

NEW

Oak Restorer-CWF is a blend of buffered carbonate, bicarbonate and proprietary surfactants.

It was developed to remove tartrate crystals, wine color, protein and organic soils, and to clean barrels using cold water (68–86°F/20–30°C) water.

This fast dissolving formulation contains 100% active components for advanced cleaning action compared with carbonates alone. By thoroughly cleaning the internal contact surface you can extend the working life of your oak (barrels and staves).

### RECOMMENDED DOSAGE

Soft or treated water is recommended. Hard water may require supplemental product. For a single 60 gallons (225 L) barrel, prepare 22.5 L of potable water. The temperature of the water should be between 68–86°F (20–30°C). Dose at 0.5-2% weight to volume. Apply using a high-pressure spray system.

### USAGE

Prepare appropriate volume of water, accurately measure the correct weight of Oak Restorer-CWF. Slowly add the powder into the water mixing until a consistent solution is obtained. Initially the prepared solution will appear milky, but will soon clarify. Once the solution has clarified it is ready for use.

## ALL CLEANING AGENTS

Read all of the Material Safety Data Sheet (MSDS) and use prescribed personal protective equipment (PPE). **None of the cleaning or sanitation products offered by Scott Laboratories contain any chlorine based compounds.**

# STABILITY

The goal of stability is to retain clarity and aromatics in the finished wine. In enology, we can separate stability into three distinct areas:

- Microbiological Stability
- Chemical Stability
- Macromolecular Stability

Assessing stability can sometimes be challenging. Thankfully, there are many tools available to help determine and alleviate risk.

In order to obtain microbiological stability, we need to reduce the potential for microbial contamination, microbial growth, and the production of microbial metabolites (e.g. 4-ethyl phenols). Microbial stability can be achieved by either physical or chemical means. For microbial stability options, please review our Microbial Control, Cleaning and Filtration sections.

Macromolecular (or physical) instabilities can be problematic and unsightly. This type of instability is the result of interactions between grape proteins, grape polysaccharides and polyphenolics, and can lead to hazes in the final wine.

Chemical instabilities can be caused by metal ions, tartrate, or polyphenolic precipitation. Until recently, we have had limited tools to deal with such issues. However, there has been much research done leading to recent developments with regard to stability products. We are pleased to now offer a range of options to assist with potassium tartrate stabilization (mannoproteins), and polyphenolic precipitation (gum arabics).

## CHOOSING THE RIGHT STABILIZING AGENT

	GUM ARABIC		MANNO-PROTEIN	GUM ARABIC/MAN-NO-PROTEIN BLENDS	
	FLASHGUM R LIQUIDE	INO-NOGUM 300	CLARISTAR	ULTIMA SOFT	ULTIMA FRESH
PAGE	73	73	71	73	72
Reds	Highly Recommended	Highly Recommended	Recommended	Highly Recommended	Highly Recommended
Whites and Rosé	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Promote stability	Highly Recommended	Highly Recommended	Highly Recommended	Recommended	Recommended
Diminish bitterness	Highly Recommended	Highly Recommended		Highly Recommended	Highly Recommended
Diminish harsh tannins and astringency				Recommended	
Add perception of sweetness and softness	Highly Recommended			Highly Recommended	
Colloidal stability	Highly Recommended	Highly Recommended			
Tartrate (KHT) stability			Highly Recommended		
Aromatic stability			Highly Recommended	Recommended	

Highly Recommended  
Recommended

## CLARISTAR

Natural liquid mannoprotein preparation for tartrate stabilization

White, Rosé, Red

#17000 2.5 L  
#17001 20 L

NEW

Claristar is a specialty liquid mannoprotein product from Oenobrand for natural stabilization of wines. It is the result of a patented extraction and separation technique that isolates the fraction of mannoproteins from *S. cerevisiae* with the highest Tartrate Stability Index (TSI). When added to wine Claristar inhibits the nucleation and growth of potassium tartrate crystals. In addition to improved stability the sensory balance of red, white and rose wines are enhanced by the positive effect of the mannoproteins. Users note improved aromatics as well as smoothness on the palate.

Claristar has been available in Europe since 2007. Sold as a liquid, its highly purified mannoproteins are 100% soluble in wine. It can be added directly and homogenizes easily. Thanks to Claristar's instant potassium tartrate stabilization properties, wine can be treated immediately prior to bottling.

### RECOMMENDED DOSAGE

Common dosages are between 80 ml/hL and 100 ml/hL for white and rose wines, 70 ml/hL to 90 ml/hL for red wines.

To ensure efficacy of a Claristar addition for stability of any particular wine, bench trials **MUST** be run with laboratory analysis and verification. The amount of Claristar required will be unique to each wine. It is dependent upon a wine's individual characteristics (e.g. protective colloid levels, pH, alcohol, etc.) in addition to a user's chosen stability criteria. The wine submitted for bench trials **MUST** be the final blend. Claristar should be the final addition to any wine prior to filtration and bottling. Contact Scott Laboratories, Inc. for more information.

Note: Claristar is not appropriate for calcium tartrate stabilization problems.

### USAGE

#### WHITE AND ROSÉ

Claristar should be used on wines that are protein stable. It should be added post DE filtration (earth), but it can be added prior to sterile membrane filtration. Proper homogenization is essential.

#### RED

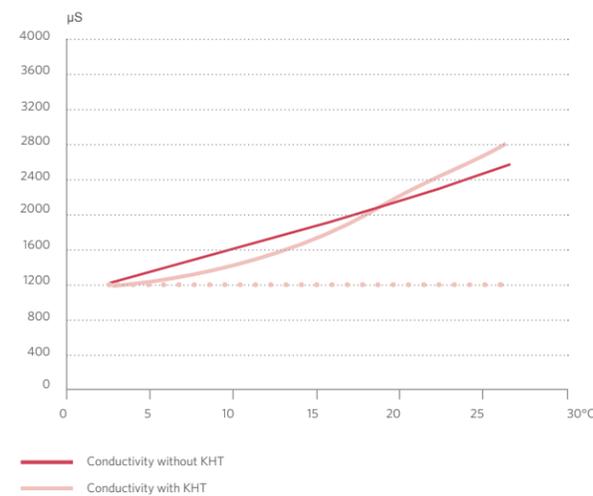
Claristar can be used on red wines 4-5 days before bottling if strict adherence to the use parameters are met. Please call Scott Laboratories to see if your wine qualifies.

### STORAGE

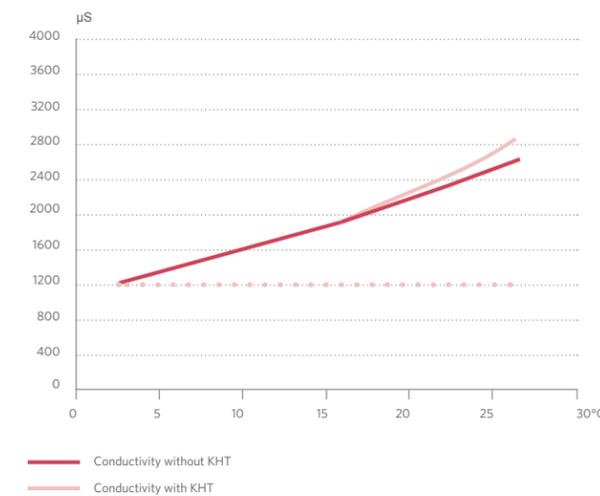
Dated expiration. Store in a cool, dry environment at under 10°C (50°F). Once opened, use within 15 days. Can be frozen once.

## CONFIRMATION OF CLARISTAR DOSAGE

GRAPH 1  
Analysis of saturation curve on untreated Napa Valley Chardonnay (unstable)



GRAPH 2  
Analysis of saturation curve, with 100 mL/hL Claristar



Drops in TSAT values have traditionally been used as a predictive evaluation for tartrate stability. In the case of Claristar the change in the TSAT curves themselves, between control and treated wines, are compared. While TSAT values may not drastically drop, the reduced

variance in curves before and after addition, signals improved stability. This relates to the rate of precipitation of crystals and the corresponding rate of dissolving crystals moving the two toward equilibrium.

## ARTICLE TARTRATE STABILITY

Tartaric acid and malic acid comprise the bulk of the acid in grapes. Tartaric acid (H<sub>2</sub>T) is stable in grape juice but is less soluble in an alcohol solution (wine). Tartaric acid is a weak acid that can dissociate to give H<sup>+</sup>(proton cation)+ HT<sup>-</sup>(bitartrate anion). The amount of H<sup>+</sup> is what pH measures.

The bitartrate anion (HT<sup>-</sup>) can combine with the potassium cation (K<sup>+</sup>) to form potassium bitartrate (KHT), which generally exists in a super-saturated state in wine. Cold temperatures and/or nucleation sites can cause it to fall out of solution and form the crystals that are often seen attached to corks in older or tartrate-unstable wines. It is reasonably predictable. Calcium (Ca<sup>++</sup>) can also combine with the tartrate anion (T<sup>-</sup>) to form calcium tartrate (CT), a different, but visually similar crystalline formation. CT is not predictable and will often precipitate spontaneously months after fermentation. Stabilization of KHT rather than CT is the focus of this article. Although KHT crystals are harmless and have no negative flavor impact, KHT stabilization is sought to avoid the consumer's perception of a wine flaw.

### STABILIZATION BY REMOVAL

Traditional tartrate stabilization involves removal of the unstable crystals or their precursors. The main methods used are **Chilling**, **Electrodialysis**, and **Ion Exchange**. If cold is used to achieve stabilization, the wine is chilled to near freezing to lower KHT solubility. Ideally, micro-pulverized KHT (cream of tartar) is added to provide nucleation sites for crystal formation. Once the tartrate crystals have formed, the wine is racked and/or cold filtered. This results in lower titratable acidity and may move the pH either up or down, depending on the initial pH. The main expense is electricity for extended cooling.

**Electrodialysis** gives perhaps the greatest control. The wine passes through charged membranes that substitute stable ions for those that could cause instabilities, such as K<sup>+</sup> and HT<sup>-</sup>. It lowers the titratable acidity and may or may not alter the pH, depending on which ions are exchanged. It requires a great deal of water and the salty effluent can be a problem for disposal.

**Ion Exchange** resin is used by some very large producers due to its low cost of operation and effectiveness. The wine is passed over charged resin which substitutes more stable ions (usually sodium, Na<sup>+</sup>) for the potassium cations. As with electrodialysis, disposal of salty effluent can be a problem.

### STABILIZATION BY INHIBITION

**Mannoprotein inhibition:** Many winemakers over the years have noticed that wines aged on the lees exhibit greater stability than those that are not so aged. It was discovered that certain mannoproteins (structural polysaccharides extracted from yeast cell walls) would coat the crystals and inhibit further growth. These mannoproteins can now be isolated and are used when a natural solution for tartrate crystallization inhibition is required. Analysis is required with use as too small an addition may result in a tartrate-unstable wine while too large an addition may create other instabilities.

**CMC inhibition:** Carboxymethyl-cellulose (CMC) is a man-made polymer of cellulose which has been used for many years as a food stabilizer and thickener. All CMC's are different depending on polymer size and degree of substitution, changes in which effect both efficacy and sensory perception. CMC is effective on white wine but can remove color from reds and rosés. CMC may also react with lysozyme and unstable proteins to create a haze. Overdosing may produce saltiness, lower filterability, turbidity and cause unwanted viscosity change. Underdosing may not achieve stability goals. Due to potential complications of use, CMC requires significant laboratory analysis to determine its effectiveness and dosage.

To ensure that a particular wine is a suitable candidate for CMC or mannoprotein addition, all manufacturer-mandated analysis, testing and usage protocols must be followed. This includes compliance with recommendations of designated consulting laboratories, such as Scott Laboratories. Please see our Laboratory page on 95 for more information.

Finally, it must be recognized by all that "stability" is an inexact and relative term. This is because the word can only accurately describe the condition of a particular wine at a specific point in time. As wines age, their chemistry changes. No stability method or analysis can provide an unqualified guarantee of stability over the long term.

### FLASHGUM R LIQUIDE



Gum arabic for colloidal protection

Red, White, Rosé, Cider, Mead

#15772 1 L

#15773 5 L

Flashgum R Liquide is a 25% gum arabic derived from Acacia seyal. This preparation offers both colloidal protection and the perception of sweet and soft characters on the palate. Gum arabic products can help reduce the risk of colloidal deposits in the bottle in wines bottled without filtration. Natural polysaccharides reduce astringency and increase feelings of volume and fullness in the mouth. Flashgum R Liquide can provide color protection in rosé and fruit wines.

#### RECOMMENDED DOSAGE

400-1200 ppm 40-120 mL/hL 1.5-4.5 L/1000 gal\* \*Bench trials recommended

#### USAGE

Flashgum R Liquide should be the last commercial product added to the wine. It is best to do inline additions 24-72 hours prior to the final pre-membrane and membrane filtrations. Filterability trials prior to membrane filtration are recommended. If using on wine that is not going to be filtered, add Flashgum R Liquide just prior to bottling.

#### STORAGE

Dated expiration. Store in a dry, odor-free environment at or below 25°C(77°F).

### INOGLUM 300



Gum arabic for colloidal stabilization

White, Rosé, Red, Fruit, Cider, Mead

#15793 1 L

#15794 5 L

Inogum 300 is a clear, 25% solution of purified liquid gum arabic derived from Acacia verek. Gum arabic products help reduce the risk of colloidal deposits collecting in the bottle in wines bottled without filtration. Its colloidal protection helps prevent precipitation of unstable color while preserving flavor and structure.

#### RECOMMENDED DOSAGE

400-700 ppm 40-70 mL/hL 1.5-2.65 L/1000 gal\* \*Bench trials recommended

#### USAGE

Inogum 300 should be the last commercial product added to a wine. Ideally it should be added to wine using a dosing pump. If the wine is to be filtered it is recommended that the additions be done 24-72 hours prior to the membrane filtration and that filterability trials be conducted. If the wine is not to be filtered Inogum 300 may be used immediately prior to bottling.

#### STORAGE

Dated expiration. Store in a dry, well-ventilated environment at temperatures less than 25°C(77°F).

### ULTIMA FRESH



Mannoprotein/gum arabic with positive impact on stability and perceived volume

White, Red

#17010 1 kg

NEW

UltiMA Fresh is the result of a three year research and development program at the IOC. UltiMA Fresh is a proprietary blend of specific mannoproteins together with gum arabics. It has been shown to have a volume enhancing effect on red and white wines, while also reducing perceptions of bitterness and acidity. Bench trials are highly recommended and allow the winemaker to fine tune use of UltiMA Fresh for optimal results. It is a fully soluble product. If the wine is not to be filtered, it may be used immediately prior to bottling. Gum arabic and mannoproteins both have some stabilizing effects on wine, though the addition of this product is not a replacement for good winemaking practice and thorough analysis.

#### RECOMMENDED DOSAGE

15-30 g/hL (1.2-2.4 lbs/1000 gal)\* \*Bench trials recommended

#### USAGE

UltiMA Fresh can be the last commercial product added to the wine. Ideally it should be added to the wine using a dosing pump. If the wine is to be filtered, it is recommended that the addition be done 24-72 hours before the membrane filtration and that filterability trials be conducted prior to that.

#### STORAGE

Dated expiration. Store in a dry, well ventilated environment with temperatures less than 25°C (77°F).

### ULTIMA SOFT



Mannoprotein/gum arabic with positive impact on stability and perceived softness and volume

White, Red

#17012 1 kg

NEW

UltiMA Soft is the result of a three year research and development program at the IOC. On white wines it can soften, enhance body, add to length, and lower astringency. On red wines, UltiMA Soft maintains fruity aromas while helping to round out the mid palate. If the wine is not to be filtered, this fully soluble product can be added immediately prior to bottling. Bench trials are recommended. Gum arabic and mannoproteins both have some stabilizing effects on wine, though the addition of this product is not a replacement for good winemaking practice and thorough analysis.

#### RECOMMENDED DOSAGE

15-30 g/hL (1.2-2.4 lbs/1000 gal) \*Bench trials recommended

#### USAGE

UltiMA Soft can be the last commercial product added to the wine. Ideally it should be added to the wine using a dosing pump. If the wine is to be filtered, it is recommended that the addition be done 24-72 hours before the membrane filtration and that filterability trials be conducted prior to that.

#### STORAGE

Dated expiration. Store in a dry, well ventilated environment at temperatures of less than 25°C (77°F).

# FILTRATION

The involvement of Scott Laboratories in wine filtration dates back to the 1940s. Today our program covers virtually every stage from juice clarification to membranes for bottling lines. Products are wine industry standards ranging from Seitz EK filter sheets to Velo machinery.

## SEITZ DEPTH FILTER SHEETS



Filter sheets remain one of the most popular options for winemakers today. Since 1887, Seitz has been THE industry standard for sterile sheet filtration. With over a century of innovation and research, Scott Laboratories is proud to stock Seitz sheets in a variety of grades and dimensions.

Available in: 20x20 cm, 40x40 cm, 60x60 cm

## SEITZ SUPRADISC II



The SUPRADisc II combines the filtration performance of Seitz depth filter sheets, the convenience of modular design, and the structural robustness of interlocking dual drainage plates. The Supradisc II is the only version of lenticular filter that is backflushable. It is robust enough to handle wet and also allows for storage between use.

Available in flat gasket and double O-ring configurations in 12" and 16" diameters.

## DEPTH FILTER CARTRIDGES



The Seitz Pre-cart PPII is an economic essential for the protection of expensive final membrane filters from premature clogging. Their high load capacity make them particularly suitable when residual solids are a concern.

The Pall Oenoclear II includes a dense polymer matrix which provides excellent yeast and colloidal reduction. It is designed for repeated regeneration for long service life. It is ideal for wine tanker filling, final polish filtration in the cellar and protection of downstream membrane filters.

## FINAL FILTER MEMBRANE CARTRIDGES



The Seitz Membra-Cart XL II provides microbiologically reliable filtration with optimal security due to tested organism retention and documented integrity testing. Titer reductions of  $10^9$  for bacteria (at 0.45 micron) and  $10^{10}$  for yeast (at 0.65 micron) are typical and represent the highest level of security in wine filtration.

The Pall Oenopure II cartridge is Pall's most recent and advanced solution for membrane filtration of wine. Its "laid over pleat" configuration provides enhanced surface and mechanical strength while assuring longer service life.

## FILTRATION MACHINERY



Scott Laboratories has offered filtration machinery to the North American wine industry since the 1960s. The current range extends from juice clarification (using flotation or lees filter technology) on to rotary drum, pressure leaf, traditional depth, stacked disc, crossflow and membrane filters. In particular Scott Laboratories has worked with the firm of Velo SpA since 1980. There are currently in the range of 1,500 Velo filters operating in the North America beverage industry.

Customers are encouraged to call and discuss their filtration needs with one of Scott Laboratories' specialists. With decades of both practical and technical experience, they can help customers accomplish their filtration goals in the most economic and appropriate way possible.

# ENZYMES

Enzymes are natural protein catalysts that facilitate and increase the rate of chemical reactions. Enological enzymes are used to accelerate natural reactions that would otherwise occur slowly in wine. Enzyme use can promote fruit and spice attributes while reducing sulfur off-odors and undesirable herbaceous and mineral characteristics. (D. Delteil, 2003, Personal Communication). For most enzymes, the addition to grapes as soon as possible helps with extraction of aroma precursors, reduces maceration time and helps increase juice yield.

## BASICS

Enzymes are a useful tool to optimize your grapes' potential. They perform best when remembering a few basics:

## TIMING

In general, enzymes should be added as early as possible on crushed grapes, juice or must to provide your fermentation with the natural components of the grapes. Enzymes that contain betaglucosidase (Lallzyme Beta and Scottzyme BG) are inhibited by sugars and should not be used prior to fermentation. Beta and BG are useful in releasing flavor and aroma compounds. Scottzyme KS is used after pressing to enhance clarification and filterability in wine.

## SO<sub>2</sub>

Enzyme activity is inhibited by SO<sub>2</sub>. In high concentrations (around 200 ppm) SO<sub>2</sub> will denature and inactivate the enzymes. SO<sub>2</sub> can be added after an enzyme addition has been adequately dispersed or vice versa, but do not add SO<sub>2</sub> and enzymes at the same time.

## BENTONITE

Bentonite will bind with enzymes and inactivate them, so the timing of additions is important. It is best to use bentonite after the enzyme activity has completed. If adding enzymes after using bentonite, make sure to rack wine off of the bentonite prior to adding enzymes.

## CONDITIONS

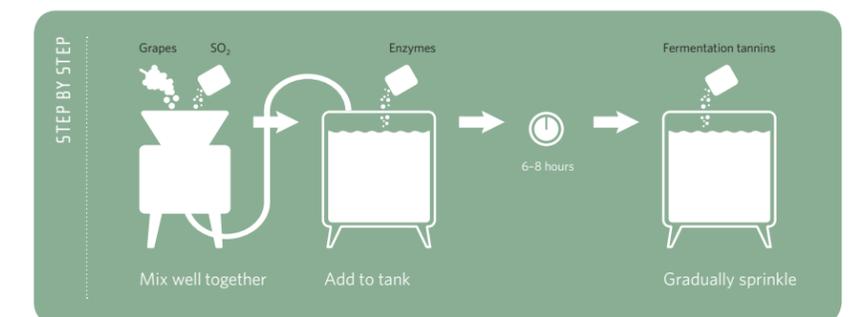
High alcohol, low temperature, high SO<sub>2</sub>, fining agent additions and the amount of movement in a tank can inhibit enzyme action. If conditions are not optimal for the enzymes, extra time may be required for the enzyme activity to be completed before proceeding with other additions.

## LIQUID AND GRANULAR/POWDERED

The enzymes are granular/powdered or liquid. The granular/powdered enzymes are marked with the symbol . The liquid enzymes are marked with the symbol .

## PROTOCOL

### TIMING OF ADDITIONS: SO<sub>2</sub>, ENZYMES AND TANNINS



Add SO<sub>2</sub> and mix well prior to adding enzymes. Tannins can be added 6-8 hours later. Yeast derivative nutrients (e.g. Opti-Red) can be added at any point during fermentation.

# CHOOSING THE RIGHT ENZYME

	LALLZYMES					SCOTTZYMES						
	BETA	CUVÉE BLANC	EX	EX-V	MMX	BG	CINN-FREE	COLOR PRO	COLOR X	HC	KS	PEC5L
PAGE	77	77	77	78	78	78	79	79	79	80	80	80
Reds			Highly Recommended	Highly Recommended	Highly Recommended	Recommended		Highly Recommended	Highly Recommended			
Whites and Rosé	Highly Recommended	Highly Recommended			Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended			Highly Recommended	Highly Recommended
Fruit, Cider and Mead					Highly Recommended	Highly Recommended		Highly Recommended		Highly Recommended	Highly Recommended	Highly Recommended
Aroma enhancement for aromatic white wines	Highly Recommended	Recommended			Recommended	Highly Recommended						
Macerating enzyme for fruit forward reds			Highly Recommended					Highly Recommended				
Macerating enzyme for premium reds				Highly Recommended				Highly Recommended	Highly Recommended			
Release of varietal aromas in whites	Highly Recommended	Highly Recommended			Recommended	Highly Recommended	Highly Recommended					
Useful for hard-to-press Concord, fruit										Highly Recommended		Highly Recommended
Gentle extraction		Highly Recommended	Highly Recommended					Highly Recommended	Highly Recommended			
Improved pressability		Highly Recommended						Highly Recommended	Recommended			Highly Recommended
Never use BEFORE pressing											Highly Recommended	
Enhanced settling								Highly Recommended	Highly Recommended		Highly Recommended	Highly Recommended
Improved clarification		Highly Recommended			Recommended			Highly Recommended	Highly Recommended		Highly Recommended	Highly Recommended
Increased yield		Recommended						Highly Recommended	Recommended	Highly Recommended		Highly Recommended
Reduced solids								Highly Recommended				
Improved filterability		Highly Recommended	Highly Recommended		Highly Recommended			Highly Recommended				
Use on botrytised wines					Highly Recommended						Recommended	
Contains betaglucanase					Highly Recommended							
Listed on 24.250.					Highly Recommended							

\*Note: The ingredients in MMX are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.250. For more information, please visit [www.TTB.gov](http://www.TTB.gov).

# LALLZYME

Lallemand Lallzymes have been an established tool for North American winemakers for two decades. Lallemand has used its worldwide network to develop enzymes for specific winemaking applications. Lallzymes are the result of in-depth analysis and testing at technical institutes and wineries on five continents. All Lallzymes are granular and most are sourced from *Aspergillus niger* fermentations (not sourced from genetically modified organisms). MMX is sourced from a non-GMO *Trichoderma harzianum* fermentation.

## BETA

 Aroma enhancement for white and rosé wines  
#16200 100 g  


Lallzyme Beta™ is a blend of pectinase and betaglucosidase for use in white wines with high levels of bound terpenes such as Gewürztraminer, Viognier and Muscat. The sequential actions of side activities cleave aroma precursors and enhance the varietal character of aromatic wines. The larger the reserve of aromatic precursors in the wine the greater the effect of the enzyme treatment. Lallzyme Beta has been formulated so that it will not lead to an over-expression of aromas. The glucosidase activity is inhibited by sugars. The wine should have less than 0.5% residual sugar for full enzyme activity. Bench trials are highly recommended before using.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
Not recommended	Not recommended	5-10 g/hL 190-379 g/1000 gal

### USAGE

Dissolve Lallzyme Beta in 10 times its weight in water, gently stir and allow to sit for a few minutes. Then add to wine. For use in wine only since the betaglucosidase activity is inhibited by glucose levels in juice.

### STORAGE

Dated expiration. Store dry enzyme at 25°C(77°F). Once rehydrated, use within a few hours.

## CUVÉE BLANC

 Macerating enzyme for white grapes  
#16203 100 g  


Lallzyme Cuvée Blanc™ was developed by Lallemand for use on white grapes during skin contact prior to pressing. It is a very specific blend of pectinases with glycosidase activity. Lallzyme Cuvée Blanc is used to enhance aromatic complexity, provide gentle juice extraction and fast clarification after pressing.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
20 g/ton	Not recommended	Not recommended

### USAGE

Dissolve Lallzyme Cuvée Blanc in 10 times its weight in water, gently stir and allow to sit for a few minutes. Then add to the grapes.

### STORAGE

Dated expiration. Store dry enzyme at 25°C(77°F). Once rehydrated, use within a few hours.

## EX

 Macerating enzyme for early-to-release reds  
#16204 100 g  
#16205 250 g  


Lallzyme EX™ is a blend of pectinase and hemicellulase specially formulated to improve color stability and enhance mouthfeel in red wines. Specific side activities contribute to the macerating action on the grape cell wall. This allows the progressive liberation of polyphenols and tannin bound polysaccharides. When using this enzyme, juice extraction from red grape skins is significantly increased and the filterability of the wine is improved. Lallzyme EX has been formulated to provide a gentle maceration, even in low-maturity grapes.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
15-30 g/ton	Not recommended	Not recommended

### USAGE

Dissolve Lallzyme EX in 10 times its weight in water, gently stir and allow to sit for a few minutes. Then add to the crushed grapes at the beginning of maceration or the onset of cold soak.

### STORAGE

Dated expiration. Store dry enzyme at 25°C(77°F). Once rehydrated, use within a few hours.

## EX-V

 Macerating enzyme for premium reds

#16206	100 g
#16208	500 g



Lallzyme EX-V™ is a pectinase with cellulase and hemicellulase side activities for red wines intended for aging. It has a specific action on both grape cell walls and cell membranes. This action allows for a rapid release of anthocyanins and a more efficient release of tannins leading to stable anthocyanin-tannin bonding. The end result of this bonding is a more structured wine with deep, stable color. Aromatic profile analysis indicates that Lallzyme EX-V increases the release of aromatic compounds while respecting the varietal characteristics of the grape.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
10-20 g/ton	Not recommended	Not recommended

### USAGE

Dissolve Lallzyme EX-V in 10 times its weight in water, gently stir and allow to sit for a few minutes. Then add to the crushed grapes at the beginning of maceration or the onset of cold soak.

### STORAGE

Dated expiration. Store dry enzyme at 25°C(77°F). Once rehydrated, use within a few hours.

## MMX

 Enzyme to improve filterability of *Botrytis* infected wines

#16207	100 g
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Lallzyme MMX™ is a betaglucanase and pectinase blend. Due to the synergistic activities of the glucanase and pectinase blend, Lallzyme MMX improves the filterability of botrytised wines. This enzyme blend was developed by Lallemand to improve the short maceration of wine on lees.

Lallzyme MMX contains betaglucanase activities derived from *Trichoderma harzianum*. Enzymes from this source are listed on 24.250.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
Not recommended	Not recommended	1-5 g/hL 40-190 g/1000 gal

### USAGE

Dissolve Lallzyme MMX in 10 times its weight in water, gently stir, allow to sit for a few minutes and then add to the wine.

### STORAGE

Dated expiration. Store dry enzyme at 25°C(77°F). Once rehydrated use within a few hours.

## SCOTTZYMES

All Scottzymes® except BG are liquids. All liquid Scottzymes are offered in 1 kg bottles and 25 kg totes. One kg of Scottzymes equals 890 mL while 25 kg totes are 22.25 liters. Scottzymes are the product of natural *Aspergillus niger* fermentations (not sourced from genetically modified organisms). They are Kosher (but not Kosher for Passover). To accurately dose liquid Scottzymes, first calculate the dosage then dilute to a 10% solution (v/v). See page 81 for instructions on how to make a 10% solution.

## BG

 Aroma releasing enzyme for white, red and fruit wines

#16176	1 kg
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Scottzyme® BG is a powdered pectinase with betaglucosidase activity for the release of bound terpenes. It is generally used in white wines, but may also be used in red and fruit wines for the release of aroma and flavor compounds. Scottzyme BG should be used only in wine, not must or juice. Scottzyme BG should only be used at the end of fermentation. The glucosidase activity is inhibited by sugars. The wine should have less than 0.5% residual sugar for proper enzyme activity. Bench trials are highly recommended before using.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
Not recommended	Not recommended	3-5 g/hL 114-190 g/1000 gal

### USAGE

Powdered enzymes tend to scatter across water or wine. It is best to add just enough cool 21-25°C(70-77°F) water to Scottzyme BG to create a paste. Then add more cool water to dissolve the enzyme completely. It is now ready to be added to the wine. Make sure you have gentle motion in the tank to disperse Scottzyme BG. Use only on wine because the glucosidase activity is inhibited by sugar.

### STORAGE

Store at room temperature for 1-2 years. Once opened, keep tightly sealed and dry. Once hydrated, use within a few hours.

## CINN-FREE

 Used in white must for release of varietal aromas

#16175	1 kg (890 mL)
#16165	25 kg (22.25 L)



Scottzyme® Cinn-Free is a purified pectinase with very low cinnamyl esterase activity which helps reduce the formation of vinyl phenols. It is used in white must for the release of varietal aromas and aromatic precursors. In addition to releasing desirable pectin-trapped aromas, Scottzyme Cinn-Free aids in pressability, yield, settling, clarification and filtration. It is recommended for aromatic varieties like Sauvignon Blanc, Viognier, Pinot Gris, Gewürztraminer, Riesling and Vignoles. It can also be used in varieties like Chardonnay to bring out the full aromatic potential of the grape.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
15-30 mL/ton	1.3-1.6 mL/hL 50-60 mL/1000 gal	Best used before fermentation

### USAGE

Dilute Scottzyme Cinn-Free to approximately a 10% solution in cool water. Sprinkle over the grapes before pressing or add to juice before the start of alcoholic fermentation. Best used before fermentation.

### STORAGE

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

## COLOR PRO

 Macerating enzyme for aged and early-to-market reds, whites

#16172	1 kg (890 mL)
#16162	25 kg (22.25 L)



Scottzyme® Color Pro is a specialty pectinase with protease side-activities. These side-activities are important for helping break down the cell walls of red grapes to gently extract more anthocyanins, polymeric phenols and tannins. This gentle extraction creates wines that are rounder in mouthfeel and bigger in structure, with improved color stability. Wines made with Color Pro tend to have increased tannins, improved clarity and reduced herbaceous or “veggie” character. Lower doses of Color Pro are recommended for red varieties that are underripe, low in anthocyanins or high in seed tannins. For “big” reds from ripe fruit with mature seeds, higher doses of Color Pro are recommended.

**Color Pro is also used in white winemaking for settling and clarifying juice.** The improved clarification helps lead to more compact lees, less fining, cleaner fermentation and easier filtration.

### REDS

#### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
60-100 mL/ton	Best used before fermentation	Best used before fermentation

#### USAGE

Dilute Scottzyme Color Pro to approximately a 10% solution in cool water. Sprinkle the solution over the crushed grapes or add during a pump-over before alcoholic fermentation. If adding to wine, gently mix a 10% solution into the tank for even dispersion. Best used before fermentation.

### WHITES

#### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
15-30 mL/ton	2-4 mL/hL 75-150 mL/1000 gal	2.6-5.3 mL/hL 100-200 mL/1000 gal

#### USAGE

Sprinkle a 10% solution over crushed grapes or add to juice before the start of alcoholic fermentation.

#### STORAGE

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

**CHOOSING COLOR PRO OR COLOR X?**  
It is important to know your grapes. Scottzymes will have little effect on overall color if your grapes are deficient in compounds contributing to color (anthocyanins, tannins, cofactors, etc.). Color X and Color Pro both facilitate the extraction and stabilization of compounds already in the grapes. If the grapes lack some of the pieces of this complex puzzle, the color effect due to the Scottzymes may be negligible. However, trials have shown changes in mouthfeel and structure even when color change has been minimal.

## COLOR X

 Macerating enzyme for heavier, more extracted reds

#16173	1 kg (890 mL)
#16163	25 kg (22.25 L)



Scottzyme® Color X is a unique pectinase with cellulase side-activities. These activities help release anthocyanins, polymeric phenols and tannins. In trials we have found the tannic extraction is coarser with Color X than with Color Pro. We therefore recommend using Color X when heavier tannic extraction is desired for longer aging. The color response of Color X is similar to Color Pro.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
60-100 mL/ton	Best used before fermentation	Best used before fermentation

#### USAGE

Dilute Scottzyme Color X to approximately a 10% solution in cool water. Sprinkle the solution over the crushed grapes or add during a pump-over before alcoholic fermentation. Best used before fermentation.

#### STORAGE

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

## HC

	Fruit
#16171	1 kg (890 mL)
#16161	25 kg (22.25 L)
	

Scottzyme® HC is a pectinase and hemicellulase blend designed to increase yield, reduce solids and improve filtration. It is a strong enzyme useful for hard-to-press or slimy grapes (such as Concord) and for pome (apple or pear) or stone (pitted) fruits. It is best used in conjunction with Scottzyme Pec5L.

### RECOMMENDED DOSAGE

Crushed Fruit	Juice	Wine
60-100 mL/ton	5.3-7.9 mL/hL	6.6-9.2 mL/hL
	200-300 mL/1000 gal	250-350 mL/1000 gal

### USAGE

Dilute Scottzyme HC to approximately a 10% solution in cool water. Sprinkle the solution over the crushed fruit or add during a tank mixing before alcoholic fermentation. If adding to wine, gently mix a 10% solution into the tank for even dispersion.

### STORAGE

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

## KS

	Blend of enzymes for enhanced settling and filtration
#16174	1 kg (890 mL)
#16164	25 kg (22.25 L)
	

Scottzyme® KS is a blend of enzymes designed to create a special formulation for difficult to settle or hard-to-filter juices or wines. Scottzyme KS is most effective when used early in processing. It should not, however, be used before pressing of either red or white grapes. It is never too late to use Scottzyme KS. Customers have reported very favorable results when used to solve “nightmare” filtrations before bottling.

### REDS

#### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
Not recommended	Not recommended	5.3-7.9 mL/hL
		200-300 mL/1000 gal

### USAGE

Dilute Scottzyme KS to approximately a 10% solution in cool water. Add to the wine **after** pressing during a pump-over or tank mixing. Do not use prior to pressing.

### WHITES

#### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
Not recommended	2.6-4.0 mL/hL	5.3-7.9 mL/hL
	100-150 mL/1000 gal	200-300 mL/1000 gal

### USAGE

Dilute Scottzyme KS to approximately a 10% solution in cool water. Add to the juice **after** pressing or to the wine after alcoholic fermentation during a tank mixing. Do not use prior to pressing.

### STORAGE

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

### WARNING

Never use Scottzyme KS before pressing (e.g. at the crusher for whites, or before or during red fermentation). Scottzyme KS has very aggressive enzymatic activities that will break down skins and create too many fine solids. After pressing, these activities will help with settling and the breakdown of sticky solids (even *Botrytis*). The goal is to make the juice or wine more manageable.

## PEC5L

	Enzyme for white and fruit for pressability, settling and clarification
#16170	1 kg (890 mL)
#16160	25 kg (22.25 L)
	

Scottzyme® Pec5L is a highly concentrated pectinase blend designed specifically for winemaking. It is used on crushed grapes for easier pressing and higher yields and in juice for improved settling, clarification and filtration. It is also useful for berries, pome and stone fruits. When adding to fruit, it is sometimes beneficial to use in conjunction with Scottzyme HC.

### RECOMMENDED DOSAGE

Crushed Grapes	Juice	Wine
10-20 mL/ton	1.0-1.3 mL/hL	1.3-1.6 mL/hL
	40-50 mL/1000 gal	50-60 mL/1000 gal

### USAGE

Dilute Scottzyme Pec5L to approximately a 10% solution in cool water. Sprinkle over the grapes/fruit before pressing or add to the juice before the start of alcoholic fermentation.

### STORAGE

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

## FREQUENTLY ASKED QUESTIONS

### WHAT IS THE BEST WAY TO ADD LIQUID ENZYMES?

Even distribution is important. First calculate the dosage then dilute Scottzymes to approximately a 10% solution (v/v) in cool water. Sprinkle the solution over the crushed grapes/fruit or during a pump-over before fermentation. If adding to juice or wine, gently mix a 10% solution into the tank for even dispersion.

### HOW DO I ADD POWDERED OR GRANULAR ENZYMES?

Granular enzymes need to be dissolved in 10 times their weight in water, gently stirred and allowed to sit for a few minutes. They are then ready to be added to juice or wine. Powdered enzymes tend to scatter across water or wine. It is best to add just enough cool 21-25°C(70-77°F) water to the enzyme to create a paste. Then add more cool water to dissolve the enzyme completely. It is now ready to be added to the tank. Make sure you have gentle motion in the tank to disperse the enzyme or use a dosing pump.

### HOW LONG WILL POWDERED/GANULAR ENZYMES REMAIN ACTIVE AFTER REHYDRATION?

Rehydrated powdered/granular enzymes should not be kept in liquid form for more than a few hours at room temperature. The liquid solution of these enzymes may be kept a few days at 4°C(39°F) in water acidified with tartaric acid to pH 3.5 with 50 mg/L of SO<sub>2</sub>.

### ARE ENZYMES DEACTIVATED BY SO<sub>2</sub>?

Yes, enzymes are inhibited by SO<sub>2</sub>. Deactivation occurs around 200 ppm. Do not add SO<sub>2</sub> and enzymes together. It is okay to add enzymes after the SO<sub>2</sub> is adequately dispersed or to add the SO<sub>2</sub> after the enzymes are adequately dispersed.

### I HAVE ALREADY ADDED BENTONITE. CAN I STILL USE ENZYMES?

You may still use enzymes but not until the wine has been racked off the bentonite. Bentonite inactivates enzymes. It is best to use bentonite after the enzyme treatment is complete.

### WHEN SHOULD I ADD SCOTTZYME COLOR PRO, SCOTTZYME COLOR X, LALLZYME EX OR LALLZYME EX-V?

Add at the crusher or the fermenter as soon as possible. Anthocyanins are water-soluble and are released as the grapes are crushed. Most of a red wine's color potential is achieved very early.

### WHY SHOULD I USE SCOTTZYME COLOR PRO ON WHITES?

Scottzyme Color Pro improves settling, fining and filterability of white wines.

### WHEN SHOULD I CHOOSE LALLZYME EX OR LALLZYME EX-V?

Lallzyme EX is recommended for fruit forward red or rosé wines. Lallzyme EX-V is formulated for premium, aged reds.

### WHAT SHOULD I DO IF THE OPTIMAL TIME TO ADD ENZYMES HAS PASSED?

Low temperatures, alcohol and SO<sub>2</sub> all inhibit enzyme activity, but the enzymes will still work. This is why recommended enzyme dosage levels for wine are higher than for juice. Reaction time will also increase when conditions are not optimal.

### I HAVE PROBLEMS SETTLING AND CLARIFYING MY LATE HARVEST WHITE WINES. WHEN SHOULD I TREAT WITH SCOTTZYME KS?

It is best to add Scottzyme KS after pressing and before fermentation. If added later, you will need a higher dose and a longer reaction time in the wine. If you know you have problems with a specific white wine, add Scottzyme KS to the juice tank. Preventative use is more effective and quicker.

Warning: Do not use Scottzyme KS before pressing. Never use Scottzyme KS on red grapes or must.

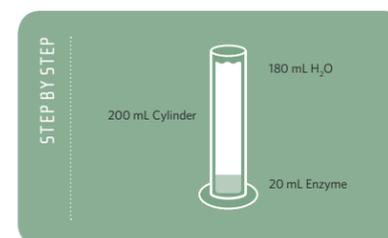
### I HAVE ENZYMES LEFT FROM LAST YEAR. ARE THEY STILL OK TO USE?

Leftover liquid Scottzymes should be tightly sealed and stored in a refrigerated environment. Granular enzymes should be kept in a dry, cool environment. If the dry enzymes get moisture in them, they should be thrown out. If kept properly, liquid enzymes should be good for at least one year with only a small activity loss. Granular enzymes will be good for several years.

### I HAD *BOTRYTIS* ON MY GRAPES THIS HARVEST AND I WANT TO USE A BETA-GLUCANASE ENZYME. DO YOU CARRY A BETA-GLUCANASE ENZYME?

Yes, Lallzyme MMX is a blend of betaglucanase and pectinase. It is currently listed on 24.250.

## PROTOCOL HOW TO MAKE A 10% SOLUTION



If using a dose of 20 mL/ton, mix 20 mL of liquid enzyme with approximately 180 mL of water.

# FINING AGENTS

Fining agents can be used on juice or wine to deal with a variety of issues. These include enhancement of stability and clarity, improved filterability and removal of undesirable characters and components. Fining can also unmask hidden flavors and aromas and reduce the risk of microbial spoilage. Some fining agents are single function while others can perform multiple tasks. Sometimes a combination of products is required to resolve a single problem.

Bench trials are always recommended prior to product use. Samples of fining agents for bench trials are available on request. Dosage for all fining agents for whatever purpose should be determined by such trials. Protocols should be carefully observed for bench trials and cellar additions should be prepared and used the same way. Refer to page 98 to calculate formulas.

Visit our website at [www.scottlab.com](http://www.scottlab.com) for specific product bench trial data sheets. Remember that the extent of fining can make a difference as to a wine's body, aroma, flavor and color. It can also impact the amount of filtration that will be necessary.

## BASICS TYPES OF FINING

### CLARIFICATION AND IMPROVE FILTERABILITY

Fining to clarify and improve filterability may involve the use of reactive substances and/or setting agents to eliminate undesirable substances. It can also be used to compliment and potentially reduce the need for mechanical clarification by centrifugation or filtration.

### IMPROVEMENT OF AROMA AND FLAVORS

Fining to improve aroma and flavors may involve issues like removing bitterness, reducing perceived oxidation and eliminating "moldy" or sulfur off-odors.

### NOTES:

Always prepare fining agents in water (not wine or diluted wine).

Addition by pumping using the Venturi effect is a very efficient way of dispersal. A Mazzei injector is a particularly effective tool for this purpose. Closed circulation after addition is also beneficial. Consult the manufacturer's recommendation prior to use.

Though most fining agents react rapidly when contact is made, varying tank sizes and addition methods mean that it is always prudent to give products time to work. Recommended minimum and maximum contact time for some of the most common fining products are shown as below.

PRODUCT	CONTACT TIME MINIMUM*	CONTACT TIME MAXIMUM
BENTOLACT S	7 days	2 weeks
CASEINE SOLUBLE	2 days	15 days
COLLE PERLE, INOCOLLE, INOCOLLE EXTRA N1	7 days	3 weeks
CRISTALLINE PLUS	2 weeks	4 weeks
POLYCACEL	10 days	3 weeks
POLYCEL	7 days	2 weeks
REDULESS	3 days	5 days
SPARKOLLOID, HOT AND COLD MIX	7 days	2 weeks

\*A taller tank requires longer contact time.

## CHOOSING THE RIGHT FINING AGENT

◆ Highly Recommended  
◊ Recommended  
*\*Hot Mix is for wine only.*  
*Cold Mix is for juice only.*

PAGE	CASEIN AND/OR BENTONITE FORMULATIONS				ISINGLASS	GELATIN			PVPP			SILICA GEL	SPARKOLLOID NF*	
	BENTOLACT S	CASEINE SOLUBLE	POLYCACEL	REDULESS	CRISTALLINE PLUS	COLLE PERLE	INOCOLLE	INOCOLLE EXTRA N1	POLYCACEL	POLYCEL	VINIPROTECT	GELOCOLLE	COLD MIX	HOT MIX
	84	84	87	87	85	85	86	86	87	87	88	85	84	86
Reds				◆		◆	◆	◆			◆	◆		◊
Whites and Rosé	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆
Fruit, Cider and Mead	◆	◆	◆		◆	◊	◊		◆	◊	◆	◆	◆	◆
Treat moldy juice ( <i>Botrytis</i> )	◆	◊	◆				◆		◆	◊	◆			
Remove bitterness or off-flavors	◆	◆	◊			◊	◊		◊	◊	◆			
Treat oxidized juice	◆	◆	◆						◆	◆	◆			
Treat oxidized wines		◆	◆						◆	◆				
Promote protein stability	◆													
Clarification	◆		◆		◆	◆	◆	◆	◆	◆		◆	◆	◆
Diminish bitterness	◆	◆	◆		◊	◊			◆	◆	◆			
Diminish harsh tannins and astringency						◆								
Diminish greenness						◆	◊				◆			
Soften hard-pressed wine						◆								
Help reduce microbial populations via settling						◆	◆							
Enhance aromatics			◊	◆			◆		◊					
Promote a uniform gentle tannin fining prior to aging							◊	◆						
Help unmask hidden aromatics			◊	◆		◊	◆		◊					
Improve wine filterability					◆						◆	◆		◆
Inhibit browning or pinking	◊	◆	◆						◆	◆	◊			
Help compact lees	◊					◊						◆	◆	◆
Remove haze left by other fining agents												◆		◆
Reduces sulfur defects				◆										
Preserve wine color			◊						◊	◊				

## BENTOLACT S

 Formulated for the preventative treatment of must prone to oxidation; helps prevent formation of undesirable off-characters

White, Rosé, Fruit

#15787	1 kg
#15788	5 kg
#15789	25 kg

Bentolact S is a proprietary IOC blend of soluble casein and bentonite. It is most effective when used early (e.g. during cold settling of juice). Bentolact S can help reduce bitterness associated with heavy press fractions or moldy grapes. The negative charge of bentonite attracts and precipitates positively charged colloidal and proteinaceous materials which can contribute to off-odors and haze. At the same time the casein will help remove phenolic compounds associated with bitterness and oxidation. Higher dosages may be used for poor quality juice. Bentolact S is supplied in dry form which is soluble in water. For best results, it should be mixed in the juice or wine during a pump-over or tank mixing.

### RECOMMENDED DOSAGE\*

**Juice**  
200-1000 ppm    20-100 g/hL    1.7-8.4 lb/1000 gal

**Wine**  
1000-2000 ppm    100-200 g/hL    8.4-16.7 lb/1000 gal

\*Bench trials recommended

### USAGE

Dissolve in 10 times its weight in cold water and mix vigorously to avoid any lumps. Allow the mixture to stand for 3 hours. Add to the juice or wine during a pump-over or a good mixing. Depending upon the wine, a Bentolact S addition may take up to 7 days to settle.

### STORAGE

Dated expiration. Store in a dry, well-ventilated environment at a temperature below 25°C(77°F). Once hydrated, Bentolact S should not be stored for more than 24 hours.

## CASEINE SOLUBLE

 To help prevent oxidation and for the removal of oxidized wine components

White, Rosé, Fruit, Cider

#15802	1 kg
#15803	5 kg

Caseine Soluble is used in both juice and wine for the treatment of oxidized phenolics and bitter compounds. In juice it can be used preventatively, while in wine it can diminish and remove off-compounds. Further, Caseine Soluble can help remove yellow color from oxidized wines.

### RECOMMENDED DOSAGE\*

**Juice**  
500-1000 ppm    50-100 g/hL    4.2-8.4 lb/1000 gal

**Wine**  
200-1000 ppm    20-100 g/hL    1.7-8.4 lb/1000 gal

\*Bench trials recommended

### USAGE

Mix the Caseine Soluble in approximately 10 times its weight of cold water. Allow the solution to stand for about 4 hours. Stir to remove any lumps. For juice, add the Caseine Soluble solution before settling or at the start of alcoholic fermentation. For wine, add the Caseine Soluble solution gradually during pumping over or via fining connection. Mix vigorously after adding the Caseine Soluble solution. Minimum contact time is 2 days, maximum is 15 days.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C(77°F). Once hydrated, Caseine Soluble will not keep for more than 48 hours.

## COLD MIX SPARKOLLOID NF

 For superior clarification of juice

White, Rosé, Fruit, Cider, Mead

#15036	25 lb
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Cold Mix Sparkolloid® NF was developed by Scott Laboratories to clarify and fine juice. It is a blend of polysaccharides with a carrier and has a strong positive charge. This positive charge neutralizes the repelling charge of particulate matter, allowing aggregation and formation of compact juice lees. Cold Mix Sparkolloid NF does not remove desirable color constituents and works well with pectolytic enzymes.

### RECOMMENDED DOSAGE

**Juice**  
125-250 ppm    12-24 g/hL    1.0-2.0 lb/1000 gal

### USAGE

Mix 1-2 gallons of water per pound of Cold Mix Sparkolloid NF. Slowly stir the Cold Mix Sparkolloid NF into the water. Agitate the blend with a high-speed mixer until all of the translucent globules of clarifier have been dissolved and the mixture is smooth and creamy. Add the mixture slowly to the juice and thoroughly combine. Let it settle one week or more, depending on the volume of juice involved. Afterwards, filter, preferably from the top of the tank. Juice generally separates and forms a clear supernatant within 48 hours. Once mixed and chilled (if the juice has been heated), juice should be left undisturbed without further mixing if natural settling is going to be the only separation method.

### STORAGE

Keep tightly sealed and dry. Shelf-life is 4 years at 18°C(65°F).

## COLLE PERLE

 Gelatin for treatment of astringent wines

Red, White, Fruit

#15798	1 L
#15799	5 L
#15800	20 L

Note: Maximum clarification is achieved after 1 week. This is when filtration is most productive. For wines intended for aging, a second racking 1 week after the first racking will produce the best results. It is not recommended to leave gelatins in wine for more than 30 days.

Colle Perle is a hydrolyzed gelatin solution at a concentration of 150 g/L. Primary uses are clarification and the removal of bitter tannins and phenolics. Colle Perle flocculates and settles well. Desirable aromas and flavors are retained while harsh characters are removed. It is particularly useful to optimize potential of hard pressed product. In white wines it can be used in conjunction with bentonite to compact lees.

### RECOMMENDED DOSAGE\*

**Juice, Wine**  
800-1500 ppm    80-150 mL/hL    3.0-5.7 L/1000 gal    \*Bench trials recommended

### USAGE

**Juice**  
Add at the beginning of cold settling and mix evenly and completely throughout the juice. When used in juice Colle Perle should be used in conjunction with bentonite or Gelocolle to improve settling. Racking should be done after 1 week.

### Wine in Barrels

Stir vigorously into the wine to ensure thorough distribution. Racking should be done after 1 week. Filtration is possible 48-72 hours after fining with Colle Perle.

### Wine in Tanks

Add gradually to the wine during a pump-over to ensure even distribution. Alternatively add through a racking valve while using a tank agitator for even distribution. Racking should be done after 1 week. Filtration is possible 48-72 hours after fining with Colle Perle.

### STORAGE

Dated expiration. Store in a dry, well-ventilated environment below 25°C(77°F).

## CRISTALLINE PLUS

 Isinglass clarification treatment

White, Rosé, Fruit

#15770	100 g
#15771	1 kg

Cristalline Plus is a blend of isinglass and citric acid stabilized with potassium metabisulfite. It has a high positive charge and can improve clarity and filterability even in very difficult wines (such as wines made with botrytised grapes). Cristalline Plus is not sensitive to cold temperatures and may be slow to complete settling.

### RECOMMENDED DOSAGE\*

15-30 ppm    1.5-3 g/hL    0.12-0.25 lb/1000 gal    \*Bench trials recommended

### USAGE

Dissolve Cristalline Plus in 150-200 times its weight in water (15-20°C/59-68°F). Allow to swell for 3 hours. Add additional water if solution is too viscous. Add homogenized solution to wine, taking care to mix well. Rack once lees are well settled.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C(77°F).

## GELOCOLLE

 Silica gel for improved settling

Red, White, Rosé, Fruit, Cider

#15782	1 L
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Gelocolle is an aqueous solution of suspended silica commonly used in conjunction with gelatins, isinglass and other organic fining agents. It helps compact lees and reduces the risk of overfining. It is also useful for hard-to-filter wines where it helps chelate proteins and other compounds.

### RECOMMENDED DOSAGE\*

200-1000 ppm    20-100 mL/hL    0.75-3.8 L/1000 gal    \*Bench trials recommended

Note: Use 1.0 mL of Gelocolle to 1.0 mL of gelatin.

### USAGE

Gelocolle should be added directly into the wine 1 hour **after** fining with organic fining agents. Mix thoroughly.

### STORAGE

Dated expiration. Store in a dry well-ventilated environment between 10-20°C(50-68°F). Gelocolle solidifies at temperatures of less than 0°C(32°F). This process is irreversible. Once opened, use immediately.

## HOT MIX SPARKOLLOID NF

	For superior clarification of wine
White, Red, Rosé, Fruit, Cider, Mead	
#15035	25 lb

Hot Mix Sparkolloid® NF is specially formulated to clarify wine without impacting aroma, body or flavor. It can be used after bentonite or carbon fining to help compact lees. Hot Mix Sparkolloid NF can be helpful in removing haze left by other fining agents and enhances filterability.

### RECOMMENDED DOSAGE\*

Wine	125-500 ppm	12-48 g/hL	1.0-4.0 lb/1000 gal	*Bench trials recommended
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### USAGE

Heat water to boiling [1-2 gallons of water per pound Hot Mix Sparkolloid NF (8-15 L/kg)]. Slowly stir in the Hot Mix Sparkolloid NF. Maintain temperature above 82°C(180°F) while agitating the mixture constantly until all of the translucent globules of clarifier have been dissolved and the mixture is smooth and creamy (approximately 20-30 minutes). While still hot, slowly add the mixture to the wine. This is easily accomplished by adding to a tank being mixed by a Guth agitator or by introducing the hot mixture into the line during a tank circulation. Let the wine settle 1 week or more, depending somewhat on the volume of wine involved. Then filter, preferably from the top of the tank.

### STORAGE

Keep tightly sealed and dry. Shelf-life is 4 years at 18°C(65°F).

## INOCOLLE

	Gelatin to enhance the bouquet of finished wines or for the treatment of moldy must
White, Rosé, Red, Fruit, Cider	
#15795	1 L
#15796	5 L
#15797	20 L

Note: Maximum clarification is achieved after 1 week. This is when filtration is most productive. For wines intended for aging, a second racking 1 week after the first racking will produce the best results. It is not recommended to leave gelatins in wine for more than 30 days.

Inocolle is a partially hydrolyzed gelatin solution at a concentration of 100 g/L. It softens wine while improving aromas and flavors. It can help clarify wine by removing both colloidal and unstable materials. Can be used for flotation. Moldy must may be improved by the addition of Inocolle.

### RECOMMENDED DOSAGE\*

White Wines, Rosé, Ciders or Light Colored Fruit Wines	300-600 ppm	30-60 mL/hL	1.1-2.2 L/1000 gal	*Bench trials recommended
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Red Wines	500-1000 ppm	50-100 mL/hL	1.9-3.8 L/1000 gal	*Bench trials recommended
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When used with Gelocolle	250-500 ppm	25-50 mL/hL	0.95-1.9 L/1000 gal	*Bench trials recommended
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### USAGE

**Juice**  
Introduce into juice gradually while mixing vigorously to assure even treatment. Racking should be done after 1 week. Do not adjust juice acidity with either tartaric or citric acid prior to treatment with Inocolle.

### Whites/Rosés

For enhanced settling and gentler fining introduce into wine 1 hour before adding Gelocolle. Mix vigorously to assure even treatment. Racking should be done after 1 week. Filtration is possible 48-72 hours after treating with Inocolle.

### Reds

Introduce gradually while mixing vigorously to assure even treatment. Racking should be done after 1 week. Filtration is possible 48-72 hours after treating with Inocolle.

### STORAGE

Dated expiration. Store in a dry, well-ventilated environment below 25°C(77°F).

## INOCOLLE EXTRA N1

	Gelatin for gentle fining of structured red wines
Red	
#15801	1 kg

Note: Maximum clarification is achieved after 1 week. This is when filtration is most productive. For wines to be aged, a second racking 1 week after the first racking will produce the best results. It is not recommended to leave gelatins in wine for more than 30 days.

Inocolle Extra N1 is a powdered proprietary formulation of high molecular weight gelatin protein. It can rapidly reduce turbidity, removing colloids which otherwise might precipitate later in the wine. Inocolle Extra N1 has an affinity for polyphenols and will enhance the aging potential of wine. Wines are polished while mature phenolic compounds associated with balance and structure are preserved.

### RECOMMENDED DOSAGE\*

Wine	50-100 ppm	5-10 g/hL	0.4-0.84 lb/1000 gal	*Bench trials recommended
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### USAGE

Mix Inocolle Extra N1 in 5 times its weight in warm water (35-40°C/95-104°F). Mix thoroughly. Introduce gradually into the wine making sure the temperature of the solution is maintained throughout the transfer. Mix vigorously to ensure even treatment. Racking should be done after 1 week.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C(77°F).

## POLYCACEL

	PVPP and casein for treatment of oxidized must or wine or for preventative treatment of browning and pinking
White, Rosé, Fruit	
#15785	1 kg
#15786	5 kg

Polycacel is an IOC blend of polyvinylpyrrolidone (PVPP), micropulverized cellulose and soluble casein for use on problem phenols associated with browning and pinking. Its proprietary formulation helps avoid the over-stripping sometimes associated with high doses of caseinates and PVPP. It can be used either preventatively in juice or in wine destined for prolonged tank storage. Wine flavors and aromas are enhanced while color is improved.

### RECOMMENDED DOSAGE\*

For Oxidized Juice	300-700 ppm	30-70 g/hL	2.5-5.8 lb/1000 gal
--------------------	-------------	------------	---------------------

For Protection of Wine	150-300 ppm	15-30 g/hL	1.25-2.5 lb/1000 gal
------------------------	-------------	------------	----------------------

\*Bench trials recommended

### USAGE

Several hours prior to use mix Polycacel into 20 times its weight in cool water (do not mix in juice or wine). Mix well and allow to sit for 2 hours. Add the mixture into the tank slowly; making sure the addition is thoroughly blended into the juice or wine being treated.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C(77°F).

## POLYCEL

	PVPP for treatment of pinking or browning
White, Rosé	
#15784	1 kg

Polycel is formulated to help prevent and/or treat compounds which cause pinking and browning. Polycel is polyvinylpyrrolidone (PVPP) and it complexes with polyphenols like catechins as well as other compounds associated with pinking and browning. Polycel may also help reduce problems with atypical aging. As it is insoluble in water and alcohol it precipitates out and leaves no residue. It can be used together with bentonite and/or casein.

### RECOMMENDED DOSAGE\*

For Oxidized Juice	400-800 ppm	40-80 g/hL	3.3-6.7 lb/1000 gal
--------------------	-------------	------------	---------------------

For Preventative Treatment of Wine	150-300 ppm	15-30 g/hL	1.25-2.5 lb/1000 gal
------------------------------------	-------------	------------	----------------------

For Curative Treatment of Wine	300-500 ppm	30-50 g/hL	2.5-4.2 lb/1000 gal
--------------------------------	-------------	------------	---------------------

\*Bench trials recommended

### USAGE

Mix Polycel into 20 times its weight in cool water (do not use wine or juice). Mix well and allow to sit for 1 hour. Add the mixture to the tank slowly, making sure the addition is thoroughly blended into the juice or wine being treated. Depending upon the wine, Polycel may take up to a week to settle out. PVPP is intended as a processing aid. Wines made with it must be racked or filtered afterwards.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C(77°F).

## REDULESS

	Reduces sulfur off aromas
Red, White, Rosé	
#15115	2.5 kg

Reduleless is a proprietary fining product from Lallemand for the reduction of sulfur off aromas such as H<sub>2</sub>S and dimethyl sulfide. Its formulation includes bentonite together with other natural elements which are rich in copper. Reduleless can naturally enhance roundness while treating sulfur problems. It has also been shown to reduce phenol related defects. It is particularly useful with sulfur prone varieties (e.g. Syrah, Carignane, Pinot Noir, Chardonnay).

### RECOMMENDED DOSAGE

10-15 g/hL	0.8-1.2 lb/1000 gal
------------	---------------------

### USAGE

Mix Reduleless in 10 times its weight in water. Add immediately to the tank. If prepared in advance, re-suspend the product prior to its addition to the tank. Gently mix and rack off or filter after 72 hours. The maximum potential copper contribution when used according to the recommendation is 0.02 ppm.

### STORAGE

Store at room temperature, away from direct sunlight and strong odors. It can be stored for up to 4 years from production date.

## VINIPROTECT



PVPP blend for treatment of oxygen sensitive juice and wine

White, Rosé, Fruit

#15790	1 kg
#15791	5 kg
#15792	20 kg

Viniprotect is a proprietary IOC blend of polyvinylpyrrolidone (PVPP) and bentonite. It was specifically formulated to help minimize problems associated with the oxidation of polyphenols including color, bitterness and herbaceousness in oxygen sensitive juice. These characteristics are significantly mitigated with the use of Viniprotect. PVPP is intended as a processing aid. Wines made with it must be racked or filtered afterwards. Viniprotect has also been known to help correct sensory off-aromas.

### RECOMMENDED DOSAGE\*

**Juice**  
200-1000 ppm    20-100 g/hL    1.7-8.3 lb/1000 gal    \*Bench trials recommended

### USAGE

Mix Viniprotect into 10 times its weight in cool water (do not mix in juice or wine). Allow to soak for 1 hour. Then add the mixture into the tank slowly; making sure the solution is thoroughly blended into the juice.

### STORAGE

Dated expiration. Store in a dry, odor-free environment below 25°C(77°F).

## MAZZEI INJECTOR



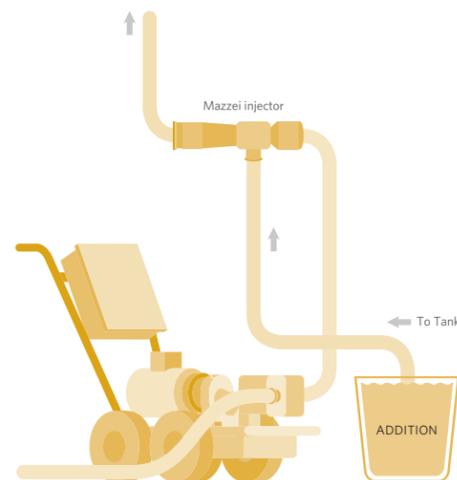
Please contact Scott Laboratories, Inc. for pricing.

The Mazzei injector is a simple venturi device which makes it easy to aerate fermenting musts and can also be used for liquid injection.

### USAGE

To energize a red fermentation with a healthy dose of oxygen, connect the Mazzei injector on the discharge side of your pump which is set to pump over a red fermenter. The injector will draw large amounts of air and mix it well during the process.

To add liquids to a process, connect the Mazzei injector on the discharge side of your pump which is set to recirculate a tank, as you would for a pump over, then drop a short suction hose connected to the suction port of the Mazzei, into the vessel containing your mixed addition (fining agent, carbon, tannin, anything liquid). When the pump is running the venturi will draw from that vessel at a rate you determine with a throttling valve. No need for a stand-alone dosing machine. No hauling buckets up to the top of the tank. Additions can be made safely from the cellar floor.



## FREQUENTLY ASKED QUESTIONS

### DO I NEED TO RUN BENCH TRIALS BEFORE I USE A FINING AGENT?

Yes, bench trials are essential to determine proper dosing and efficiency. Each fining product works under a different mechanism and will react to each wine differently. Bench trials and cellar additions should be prepared and used the same way (same temperature, same mixing style, etc.). If bench trials are not performed, the winemaker may risk under or over-finishing and could ruin the wine. Take the time to find the right dose; your wine will thank you.

### WHAT ARE THE MAIN FACTORS THAT INFLUENCE HOW WELL FINING WORKS?

Fining can be a delicate operation. Product preparation and addition, product concentration, temperature, product age, pH, metal content and previous fining treatments are all factors that can influence the effectiveness of fining. It is important to follow the manufacturer's instructions and maintain accuracy when using fining products.

### MY WINE IS ASTRINGENT. WHAT FINING AGENT SHOULD I USE TO REDUCE THE ASTRINGENCY?

Gelatins are a good choice for the reduction of astringency. Gelatins can target harsh tannins and phenolics. Another way to reduce astringency is to add polymerized aging tannins. Bench trials are highly recommended for gelatins and aging tannins prior to use.

### I DETECT BITTERNESS IN THE FINISH OF MY WINE. WHAT CAN I USE TO REMOVE IT?

Often a bentonite and casein blend (Bentolact S) is a fast and easy way to reduce bitterness. If you have already protein stabilized with bentonite, try adding a small amount (25 ppm) of the Scott' Tan FT Blanc Soft to eliminate the bitterness. The Bentolact S will precipitate the bitter molecules while the tannin will mask bitterness. Bench trials are recommended.

### MY WINE HAS "OFF" SULFUR AROMAS. WHAT CAN BE DONE TO CORRECT THIS?

Reduless is a good option. Its formulation is copper-rich and is useful in reducing H<sub>2</sub>S, dimethyl sulfide and other sulfur compounds. Phenolic defects can also be diminished.

### WHAT CAN I DO FOR A WINE THAT IS OXIDIZED?

Depending on the degree of oxidation, it may be necessary to use more than one product. Run bench trials with Caseine Soluble, Polycacel, Polycel or Viniprotect. Oxidation is easier to prevent than treat. To protect organoleptic soundness, prevent oxidation by adding Bentolact S or Scott' Tan FT Blanc on white grapes together with adequate SO<sub>2</sub>.

### MY WINE IS CLOUDY, WHAT CAN I USE TO TRY TO FIX IT?

First, check for microbial contamination. If there is a microbial problem, consider SO<sub>2</sub>, No Brett Inside and lysozyme additions (as appropriate) plus filtration. If microbes are not found, run bench trials with Hot Mix Sparkolloid NF, Cristalline Plus (isinglass) or gelatin. Sometimes the use of enzymes can eliminate wine cloudiness. Bench trials with Scottzyme KS or Scottzyme Pec5L may also prove useful.

### I WANT TO COMPACT THE LEES. WHICH PRODUCT IS BEST?

Run bench trials with Hot Mix Sparkolloid NF, Cristalline Plus and gelatin. To encourage faster sedimentation, colloidal silica (Gelocolle) can be used after gelatin fining.

### WHAT IS SPARKOLLOID NF?

Both types of Sparkolloid (Hot Mix NF and Cold Mix NF) are proprietary blends of polysaccharides in neutral carriers. Both exhibit a strong positive charge that neutralizes and complexes with clouding particles. Developed in-house, Cold Mix is for juice and Hot Mix is for wine. Both are powerful fining agents available at a minimal cost.

### WHAT IS ISINGLASS? WHEN SHOULD I USE IT?

Isinglass (Cristalline Plus) is used especially for applications with white and rosé wines. Made from the swim bladders of fish, this fining agent is proven to enhance clarity and brilliance even in wines made from botrytised grapes.

### WHICH FINING AGENTS REACT WITH LYSOZYME?

Carbon, silica sol, oak chips and tannin will bind and precipitate lysozyme with a resulting decrease in activity. Bentonite will bind with and inactivate lysozyme.

### WHICH FINING AGENTS DO NOT REACT WITH LYSOZYME?

Gelatin, potassium caseinate and pectinase do not affect lysozyme activity. In fact, pectinase treatment will help maintain lysozyme activity by breaking down phenolic compounds that can bind lysozyme.

### WHAT IS THE BEST WAY TO ADD FINING AGENTS?

There are several ways to add fining agents. Add the fining agent to the tank while mixing with a Guth agitator, dosing into a recirculation pump setup with a stand-alone dosing machine or with a Mazzei injector.

For more information on any of these products, please visit [www.scottlab.com](http://www.scottlab.com) or call (707) 765-6666.

### ARE ALL GELATIN PRODUCTS THE SAME?

No, today's gelatin products offer a wide range of options. The gelatins we offer are derived from porcine by-products. They are refined, purified and then separated into specific fractions by capillary electrophoresis. Positively charged and colloidal in nature, gelatins require tannins for agglomeration and precipitation. Gelatins can be used to change wine structure or to enhance aroma and flavor. Timing of gelatin additions is critical to achieve the best results. Removing immature tannins and anthocyanins too early can upset the future balance and structure of the wine.

### WHAT ARE SOME OF THE OTHER BENEFITS OF FINING WITH GELATIN?

Fining with gelatin has been shown to significantly lower yeast and bacterial populations such as *Brettanomyces* and *Acetobacter* (Murat and Dumeau, 2003).

# HYBRIDS AND NON-VINIFERA

Due to challenging weather conditions and, to a lesser extent, disease pressure, much of North America east of the Rockies is planted with either French-American hybrids (e.g. Maréchal Foch, Chambourcin, Seyval, Traminette) or native American varieties (e.g. Norton, Muscadine, Niagara).

Native American varieties tend to have very strong fruit flavors and aromas compared to European cultivars. This is especially true of Muscadine and Labrusca varieties. The combination of the strong fruit and high acid in many varieties creates wines that are often best when balanced by the addition of sugar. Of the native varieties, Norton is the most successful in producing a dry wine with flavors and aromas which come close to those of *Vitis vinifera*.

French-American hybrid varieties are crosses between *Vitis vinifera* and one or more American varieties. Depending on the cross, the

overt fruitiness from the American side can be muted to a greater or lesser degree. Cultural methods in the vineyard can affect this fruit expression, as can the degree of ripeness at harvest. The expression of fruit characteristics can also be influenced by the strain of yeast used to ferment the wine. Yeast can enhance or mute flavors and aromas. Some yeast strains contain genes that can convert flavorless precursors into aromatic elements, while others produce enzymes that cleave glycosidic bonds and release aromatic terpenes into the wine. Yeast can also produce high levels of polysaccharides which can increase mouthfeel, balance harshness and acidity (within reason) and add to the colloidal stability of the wine.

In the last few years, new strains of yeast have shown promise with hybrids and native American varieties.

Some of these are listed on the following charts.

## RED WINE YEAST STRAINS

- Yeast Strain Type
- 🔥 Highly Recommended
- 🔥 Recommended

	Yeast Strain Type										
	3001	71B	BM 4X4	BRL 97	CLOS	CSM	ICV D254	NT 202	RBS 133	RC212	
PAGE	12	12	14	14	14	14	15	18	19	19	
<b><i>S. cerevisiae cerevisiae</i></b>	○	○		○	○	○	○			○	
<b>A hybrid yeast strain</b>								○			
<b>A blend of yeast strains</b>			○								
Chambourcin	🔥		🔥	🔥		🔥		🔥	🔥	🔥	
Frontenac		🔥	🔥			🔥		🔥	🔥	🔥	
Maréchal Foch	🔥			🔥							
Marquette		🔥	🔥		🔥	🔥	🔥			🔥	
Noiret				🔥	🔥			🔥			
Norton	🔥			🔥	🔥		🔥	🔥	🔥		
St. Croix					🔥			🔥			
Mitigates underdeveloped phenolic ripeness			🔥			🔥			🔥		
Enhances berry fruit	🔥	🔥			🔥	🔥	🔥			🔥	
Diminishes vegetal characters		🔥				🔥					
Increases mid-palate balance			🔥	🔥			🔥				
Enhances complexity	🔥				🔥			🔥			
Enhances mouthfeel		🔥	🔥	🔥		🔥	🔥	🔥			
High producer of polysaccharides			🔥				🔥				
Promotes color stability			🔥	🔥							
Promotes bright fruit and berry characteristics	🔥				🔥					🔥	
MLF Compatibility	AVERAGE	VERY GOOD	BELOW AVERAGE	AVERAGE	VERY GOOD	AVERAGE	VERY GOOD	VERY GOOD	GOOD	GOOD	

## WHITE WINE YEAST STRAINS

- Yeast Strain Type
- 🔥 Highly Recommended
- 🔥 Recommended

	Yeast Strain Type										
	58W3	71B	ALCHEMY 1	CY3079	ICV OPALE	QA23	STEINBERGER	SVG	VIN 13	VIN 2000	
PAGE	12	12	12	15	18	18	19	20	20	20	
<b><i>S. cerevisiae cerevisiae</i></b>	○	○		○	○		○	○			
<b><i>S. cerevisiae bayanus</i></b>						○					
<b>A hybrid yeast strain</b>									○	○	
<b>A blend of yeast strains</b>			○								
Chardonnay			🔥	🔥	🔥	🔥				🔥	🔥
Frontenac Gris	🔥	🔥			🔥	🔥					
La Crescent	🔥	🔥	🔥			🔥	🔥	🔥	🔥	🔥	
Muscadine	🔥					🔥				🔥	
Seyval Blanc			🔥			🔥		🔥			
Traminette	🔥		🔥			🔥	🔥		🔥		
Vidal Blanc			🔥		🔥						
Vignoles	🔥		🔥		🔥	🔥			🔥	🔥	
Ester producer to boost fruit and floral	🔥		🔥							🔥	🔥
Enhances grapefruit and tropical aromas, aromatic thiol converter			🔥				🔥		🔥	🔥	
Vigorous; temperature control is advised			🔥							🔥	
Barrel fermentation	🔥					🔥					🔥
Sur lie aging						🔥					
Accentuates citrus aromas						🔥					
Enhances mouthfeel						🔥	🔥				
Slightly reduces malic content		🔥					🔥			🔥	
Brings out floral notes	🔥							🔥	🔥	🔥	
Enhances aromas in high-terpene varieties	🔥						🔥				
High ester producer	🔥									🔥	🔥
Promotes flavors of banana and fruit											🔥
MLF Compatibility	AVERAGE	VERY GOOD	—	GOOD	POOR	VERY GOOD	AVERAGE	GOOD	GOOD	GOOD	

## ARTICLE CHAMBOURCIN

Chambourcin is an interspecific French-American hybrid produced by Joannes Seyve and first released in 1963. Its parentage is uncertain since Seyve died leaving no record, although the French side is believed to be of Rhône origins. It is moderately vigorous with late budbreak and late ripening, requiring a long growing season. Information on cold-hardiness varies. Some literature says it is tender below -5°F(-20.5°C), while others say that it is moderately hardy down to -20°F(-29°C). In the United States it is planted from Pennsylvania south to North Carolina as well as west through Ohio and Indiana to southern Illinois and Missouri. It can also be found in coastal areas of northern New South Wales, Australia.

When fully ripe, Chambourcin can produce a deeply colored wine with aromas reminiscent of Pinot Noir and sufficient tannin for aging at least 10 years. Where climate is limiting due to cool weather or a short season, the wine can lack tannin and body and have vegetal characteristics. In such cases, the wine should be pressed early to remove it from unripe solids. The body can then be helped by aggressive additions of enological tannin combined with inactivated yeast (e.g., Noblesse, Opti-Red), both of which may also help to tone down vegetal elements in the wine.

At its best, Chambourcin is Pinot Noir-like in character. Yeasts normally associated with Pinot, such as 3001, RC212 and BRL97 work quite well with it. If the grapes are not fully mature and risk producing a vegetal wine or a wine with no body, BM 4x4 can increase mid-palate, NT202 can produce richer, more mature flavors, and CSM can tone down vegetal notes.

## ARTICLE SPARKLING WINES FROM HYBRID AND AMERICAN CULTIVARS

In the United States, native American grapes (*Vitis labrusca*, *V. aestivalis*, *Muscadinia*, etc.) have been used in winemaking for years due to their ability to deal with specific weather conditions, pests, and fungal pressure. When phylloxera decimated *V. vinifera* vineyards in the 1800's, French-American hybrids were created in the hopes of imparting American resistance and strength to the European cultivars. In more recent years, research has expanded at institutions such as Cornell University and the University of Minnesota to develop hybrid cultivars that can deal with the abbreviated growing seasons and severe winter conditions of the Midwest and northern states.

The naturally high acid of many hybrids, combined with often low levels of ripeness due to growing conditions, mean the base wines are often high acid and low in tannin but with distinctive fruit flavors and aromas. These characteristics provide an excellent foundation for fine sparkling wines.

The first commercial sparkling wine in the United States was a traditional method wine made from the native Catawba (*V. Labrusca*) in Ohio in the 1840's. Michigan, Ohio, Indiana, Illinois, Missouri, Iowa, Nebraska and Kansas are among the states now commercially producing traditional method and Charmat method sparkling wine from hybrid and American varieties of grapes. Among the cultivars used are Frontenac, Chambourcin, Vidal Blanc, Chardonel, Vignoles, La Crescent, Cayuga, Catawba and Brianna.

### RESOURCES:

Dami, I., Bordelon, B., Ferree, D., Brown, M., Ellis, M., Williams, R., Doohan, D. 2005. Midwest Grape Production Guide, Bulletin 919. Ohio State University Extension.

Smiley, L.A., Domoto, P., Nonnecke, G., Miller, W.W. 2008. "A Review of Cold Climate Grape Cultivars." Iowa State University.

Domoto, P. 2008. Grape Cultivars for consideration in Iowa.

On: <http://viticulture.hort.iastate.edu/info/pdf/cultivars08.pdf>

At Iowa State University, Dr. Murli Dharmadhikari is convinced that the region is ideal for sparkling wine production. He has sponsored numerous seminars and two symposia on sparkling wine production, including a recent one co-sponsored by the Viticulture and Enology Science and Technology Alliance ("VESTA").

For more information on sparkling wine production, please visit our website at [www.scottlab.com](http://www.scottlab.com).

# SPECIALTY WINES

## FRUIT WINE, HARD CIDER AND MEAD PRODUCTION

Making wine from sources other than grapes can be quite different and can pose many challenges. Numerous tools used in grape fermentation can also be utilized in fruit, cider or mead fermentation. These tools can help the winemaker create a better product and ultimately enhance product longevity. The following information has been compiled to highlight our recommendations.

### BASICS

#### YEAST

Using a selected yeast strain can maximize the positive attributes that come with a "known" strain (e.g. mouthfeel, complexity, flavor profile, fermentation kinetics), while avoiding off-flavors, bad aromas and poor fermentation characteristics that may come with a "wild", unknown strain. The key to strain choice is matching the right strain to the chosen wine style and fermentation conditions. See pages 8-11 for specific strain attributes. Proper rehydration of the selected yeast strain is essential. See page 7 for details.

#### NUTRIENTS

Fruit wines and mead are notorious for having low nutrient content. Proper nutrition for both yeast and malolactic bacteria is essential to ensure good flavor and aroma profiles. It can also help to avoid stuck or prolonged fermentations and H<sub>2</sub>S and VA problems.

#### MALOLACTIC BACTERIA

Malolactic fermentation can help soften wines made from fruit with high malic acid content. Using a "known" strain can again maximize chosen attributes. If the winemaker's goal is to reduce acid without adding flavor/aroma characteristics, then a neutral strain should be used. If flavor enhancement and complexity are desired, then the choice might be MBR 31. Many fruit wines have unbalanced acid profiles and can lean toward a low pH. Be sure to choose a strain that falls within the parameters of your wine.

#### ENZYMES

All fresh fruits contain pectin in varying amounts. Pectin can hold small particles in suspension and create a cloudy wine if the excess pectin is not removed. Pectolytic enzymes (Scottzyme Pec5L) can break up the large pectin molecules into smaller, less troublesome ones. Some enological enzymes can also help improve fruit yield, filterability, pressability and settling in wine. Try Scottzyme Pec5L alone or in conjunction with Scottzyme HC on berries, stone and pome fruits to enhance pressability and to improve clarity and settling. Scottzyme HC contains hemicellulase activity to help increase yield, reduce solids and improve filtration. If you are experiencing a nightmare filtration or have compromised fruit, consider using Scottzyme KS. Use Scottzyme KS only **after** pressing. Try Scottzyme BG or Lallzyme Beta to release bound terpenes. Use them only after the residual sugar level is below 0.5%. Bench trials are essential to determine the correct dosage. Two weeks after enzyme addition, it is acceptable to ameliorate the wine to the desired sugar level.

#### TANNINS

Tannins give wine its characteristic structure and can contribute to its longevity. Some types of fruit contain very little natural tannin, which can make producing a well-balanced wine difficult. Enological tannins can be added to enhance flavor and aroma characteristics and complexity. They may also reduce the risk of oxidation and to help stabilize wine color. Try FT Blanc Soft to give a perception of sweetness without adding sugar. Add FT Rouge or FT Rouge Soft to help enhance complexity and stabilize wine color.

#### FINING AGENTS

Typically, fining agents are used to enhance clarity in fruit wine, mead and cider. Fining agents can also help with settling, stability and oxidation. Before adding any fining agent to your wine, be sure to run a laboratory bench trial to determine the correct dosage. To remove excess astringency or to enhance wine bouquet, try the gelatins Colle Perle or Inocolle. Bentolact S can remove excess protein, improve stability and reduce bitterness. Try Hot Mix Sparkolloid NF to gently clarify and brighten the wine. Add Crystalline Plus (isinglass) to brighten and clarify both red and white wine. Caseine Soluble (casein) can treat oxidation and help prevent further browning. Redules is naturally rich in copper and may help decrease sulfur and phenol related defects.

#### SULFUR DIOXIDE

Sulfur dioxide is used to inhibit the growth of microorganisms and to help reduce the risk of oxidation. Inodose SO<sub>2</sub> Granules and Tablets are easy to use and are already measured into specific doses for your convenience. See page 63 for dosing information.

#### YEAST DERIVATIVE NUTRIENTS

Opti-WHITE, OptiMUM WHITE and Booster Blanc are natural yeast derivatives. Use them at the onset of fermentation to increase mouthfeel, help avoid browning and protect natural fresh aromas during aging. Add near the end of fermentation to simulate extended lees aging. Opti-RED and Booster Rouge are natural yeast derivatives high in polyphenol reactive polysaccharides. Add at the onset of fermentation to enhance mouthfeel and to help stabilize color. Noblesse can be used to improve the perception of fruit and roundness and softness in the finish. It may be added at the onset of fermentation or near the end of fermentation. See pages 37-41 for more information.

Please contact us for a copy of our Cider & Perry brochure for a complete list of offerings.

## CHOOSING THE RIGHT PRODUCT FOR SPECIALTY WINES

 Highly Recommended  
 Recommended

YEAST	FRUIT	CIDER	MEAD	PAGE
71B				12
ICV D47				15
DV10				16
EC1118				16
K1 (V1116)				16
M2				17
ICV OPALE				18
QA23				18
R2				18
VIN 13				20
W15				21

### NUTRIENTS

FERMAID A				34
FERMAID K				34
FERMAID O				35
GO-FERM				33
GO-FERM PROTECT EVOLUTION				33

### MALOLACTIC BACTERIA

ALPHA				53
IB (INOACTER)				58
MBR 31				54
PN4				54

### ENZYMES

BETA				77
BG				78
HC				80
KS				80
PEC5L				80

### TANNINS

	FRUIT	CIDER	MEAD	PAGE
FT BLANC				45
FT BLANC SOFT				45
FT ROUGE				44
FT ROUGE SOFT				44

### FINING AGENTS

BENTOLACT S				84
CASEINE SOLUBLE				84
COLLE PERLE				85
CRISTALLINE PLUS				85
FLASHGUM R LIQUIDE				73
GELOCOLLE				85
HOT MIX SPARKOLLOID NF				86
INOCOLLE				86
INOGUM 300				73
POLYCACEL				87
REDULESS				87
VINIPROTECT				88

### SULFUR DIOXIDE

INODOSE GRANULES				63
INODOSE TABLETS				63

### YEAST DERIVATIVE NUTRIENTS

BOOSTER BLANC				38
BOOSTER ROUGE				38
ICV NOBLESSE				39
OPTIMUM WHITE				39
OPTI-RED				37
OPTI-WHITE				40

# PORTFOLIO

## LABORATORY

Our predecessor, Berkeley Yeast Laboratory, opened in 1933 as both a commercial laboratory for the execution of analytical requests, and also a research facility to address the specific issues that greatly affect the North American industry. Julius Fessler, the company founder, was awarded the ASE (now ASEV) Merit Award in 1958 for such contributions. Continuing the tradition of both service and regionally-specific innovation has been central to our laboratory's mission ever since. Much of our daily work centers upon the enological hurdles and challenges that impact our industry today. This focus is shared with a continuing emphasis upon our analytical service offerings. Many of our analyses address specific troubleshooting or decision-making scenarios such as stuck fermentation, stability analysis and beyond. Based on numerous trials and internal research, our laboratory is poised to offer the highest level of support for our numerous products.

## FERMENTATION ANALYSIS PACKAGES

### STUCK & SLUGGISH FERMENTATION PACKAGE

Volume needed: 375 ml sample

When primary fermentations turn sluggish or stick, there are multiple factors that may be in play. This analysis set will help to identify if any of the basic chemistry parameters are out of balance.

### STUCK & SLUGGISH ML PACKAGE

Volume needed: 375 ml sample

When malolactic fermentations are unexpectedly slowing or have stopped completely, there are many possible inhibiting factors. This analysis set will help to identify if any of the basic chemistry parameters are out of balance. A Quick Malic Assay helps to determine if the wine has the potential to complete malolactic fermentation with specifically selected malolactic bacteria strains.

## STABILITY ANALYSIS PACKAGES

### SHORT TARTRATE STABILITY

Volume needed: four 750 ml samples

This analysis will help determine which tartrate stabilization product is compatible with the given wine and at which dosage rate.

### IN-DEPTH TARTRATE STABILITY

Volume needed: four 750 ml samples

This analysis will help determine which tartrate stabilization product is compatible with the given wine, and at which dosage rate. In addition, the in-depth analysis will assist in avoiding any unforeseen filtration issues.

## EQUIPMENT CRUSH PAD EQUIPMENT & DESIGN

Grape receiving and processing equipment has finally come of age. The quality-oriented winery now looks upon this part of winemaking as the first opportunity to preserve and improve what has arrived from the vineyard.

Employing the right equipment is essential to this, and innovative technology makes it easy to achieve. The correct layout of equipment can also influence the quality. Quiet, easy-to-use machinery, positioned for optimal access by the operator, makes the work pleasant and rewarding.

We are available to suggest modular or fixed crushpad designs to provide gentle grape handling and timely and efficient production. Flexibility of use and easy cleaning and maintenance are key. For wineries of small and medium capacity, the modular design of our equipment allows you to quickly reconfigure the layout to suit your changing needs, as well as clean and store the machines when harvest is over. We have many layout designs which may already apply to your conditions, or we can create a customized layout for your needs.

ARMBRUSTER  
ROTOVIB



VAUCHER BEGUET  
AUTOMATED BERRY SORTER



WILLMES  
SIGMA PRESS



## PACKAGING EQUIPMENT

The combined experience and technical knowledge of Scott Laboratories and our international suppliers provides a unique project management possibilities for our customers. The combined decades of experience give us the capability to provide effective solutions to a wide range of complex bottling line problems. We can provide services such as bottling line "turn-key" solutions, line integration, alternative solutions to existing problems and overall project management.

The primary challenge of project management is to meet all of the engineering project goals. With the numerous resources available through Scott Laboratories and its suppliers, typical constraints such as scope, time and budget can all be managed by one vendor. This eliminates the need to hire an additional management company to oversee and manage your project.

AN MBF SYNCHROFILL  
MONOBLOC



PE  
LABELER



For a complete list and more information about our Crush Pad and Packaging Equipment, please visit our website at [www.scottlab.com](http://www.scottlab.com).

## PACKAGING CORKS & WIREHOODS

Scott Laboratories is the senior North American vendor of cork closures and can trace its involvement in cork back to the 1970s.

### THE SCOTT DIFFERENCE

- The only independent and fully North American-owned member of the Cork Quality Council. We do not have ownership ties with any cork suppliers. This allows us to protect customer interests first and not supplier interest.
- Founding member of the Cork Quality Council
- First firm in the world to complete bale-by-bale SPME testing of entire cork inventory
- First firm in North America to bag corks under SO<sub>2</sub>
- First moisture controlled cork warehouse
- 33-year presence in Portugal
- SPME testing capabilities in both the USA and Portugal
- ISO certified lab in Portugal
- Sustainably harvested cork

In early 2012, Scott Labs opened its new cork processing plant in Petaluma. Since 1977 cork has been an important component of the Scott Labs' portfolio. Further, as founding members of the Cork Quality Council, ensuring quality and consistency has always been essential. Our new, modern facility is complete with critical quality assurance tools, such as AiroCide units and ozone protection. The facility also boasts a dedicated sensory evaluation room available to customers who wish to do sensory analysis.

STERISUN  
CORKS



NATURAL  
CORKS



ONE + ONE  
CORKS



COLMATED  
CORKS



BAR AND BULB  
TOP



CHAMPAGNE  
CORKS



WIREHOODS



For a complete list and more information about our Corks and Wirehoods, please visit our website at [www.scottlab.com](http://www.scottlab.com).

# GENERAL TOOLS

## CALCULATIONS AND CONVERSIONS

### VOLUME CONVERSIONS

mL = milliliter; fl oz = fluid ounce;  
gal = gallon; L = liter, hL = hectoliter

$$1 \text{ mL} = 0.035 \text{ fl oz}$$

$$1 \text{ fl oz} = 30 \text{ mL}$$

$$1 \text{ L} = 1000 \text{ mL}$$

$$1 \text{ L} = 0.2642 \text{ gal}$$

$$1 \text{ gal} = 3785 \text{ mL}$$

$$1 \text{ gal} = 3.785 \text{ L}$$

$$1 \text{ hL} = 100 \text{ L}$$

$$1 \text{ hL} = 26.4 \text{ gal}$$

### MASS CONVERSIONS

mg = milligram; g = gram; kg = kilogram;  
lb = pound

$$1 \text{ kg} = 1000 \text{ g}$$

$$1 \text{ kg} = 2.205 \text{ lb}$$

$$1 \text{ g} = 1000 \text{ mg}$$

$$1 \text{ lb} = 453.6 \text{ g}$$

$$1 \text{ lb} = 0.4536 \text{ kg}$$

$$1 \text{ metric ton} = 1000 \text{ kg}$$

$$1 \text{ metric ton} = 2205 \text{ lb}$$

$$1 \text{ US ton} = 2000 \text{ lb}$$

$$1 \text{ US ton} = 907 \text{ kg}$$

### INTERNET CONVERSION TOOLS

[www.onlineconversion.com](http://www.onlineconversion.com)

[www.joshmadison.com/software/convert-for-windows/](http://www.joshmadison.com/software/convert-for-windows/)

### TEMPERATURE CONVERSIONS

F° = Degree Fahrenheit C° to F° = (C° x 9/5) + 32	F°	0	32	40	50	60	70	80	90	100	110	120
C° = Degree Celsius F° to C° = (F° - 32) x (5/9)	C°	-18	0	4	10	16	21	27	32	38	44	49

### OTHER CONVERSIONS

$$1 \text{ lb}/1000 \text{ gal} = 454 \text{ g}/1000 \text{ gal} = 0.454 \text{ kg}/1000 \text{ gal} = 120 \text{ mg}/\text{L} = 27.2 \text{ g}/\text{barrel}^* = 0.120 \text{ g}/\text{l}$$

$$1 \text{ kg}/\text{hL} = 1000 \text{ g}/\text{hL} = 10,000 \text{ mg}/\text{L} = 2.271 \text{ kg}/\text{barrel}^* = 10 \text{ g}/\text{L}$$

$$1 \text{ ppm} = 1 \text{ mg}/\text{L} \quad \text{*barrel} = 60 \text{ gal} = 227.1 \text{ L}$$

$$1^\circ \text{Brix} = 1\% \text{ sugar (wt/vol)}$$

### BENCH TRIAL CALCULATOR

We recommend performing bench trials with many of our products including lysozyme, tannins, enzymes and fining agents. This calculator will help determine the amount of any given stock solution to achieve a range of concentrations in various-sized sample bottles.

#### For Powdered Products (Lysovin, Tannins, Fining Agents, etc.)

$$\text{mLs of stock solution to add per sample bottle} = \frac{(\text{sample size in mLs}) \times (\text{desired concentration in ppm}) \times (0.0001)}{\% \text{ concentration (w/v) of stock solution}}$$

#### For Liquid Products (Scottzymes, Gelatins, etc.)

$$\text{mLs of stock solution to add per sample bottle} = \frac{(\text{sample size in mLs}) \times (\text{desired concentration in mLs}/1000 \text{ gal}) \times (0.000026)}{\% \text{ concentration (v/v) of stock solution}}$$

For example: If you have a 10% stock solution of Color Pro and wish to create a 150 mL/1000 gal dose in a 375 mL sample bottle you would calculate:

$$\text{mLs of stock solution to add per sample bottle} = \frac{(375) \times (150) \times (0.000026)}{10} = 0.146 \text{ mL}$$

Therefore, you would need to add 0.146 mL of a 10% Color Pro stock solution to a 375 mL bottle to represent a concentration of 150 mL/1000 gal.

## PRODUCT STORAGE AND STABILITY GUIDELINES

PRODUCT	SHELF-LIFE (UN-OPENED) DATED EXPIRATION @	RECOMMENDED STORAGE (OPENED)
ACTIVE DRIED YEAST	20°C(68°F)	Use immediately
BENTOLACT S	25°C(77°F)	Dry: Tightly sealed; dry Rehydrated: should not be stored more than 24 hours.
BIODIVA	4°C(40°F)	Use immediately
CASEINE SOLUBLE	25°C(77°F)	Dry: Tightly sealed; dry Rehydrated: should not be stored more than 48 hours.
CLARISTAR	10°C(50°F)	Use immediately
COLLE PERLE	25°C(77°F)	Tightly sealed
CRISTALLINE PLUS	25°C(77°F)	Tightly sealed; dry
EXOTICS SPH	5-15°C(41-59°F)	Use immediately
GUM ARABICS	25°C(77°F)	Tightly sealed
GELCOLLE	10-20°C(50-68°F)	Use immediately
INOCOLLE	25°C(77°F)	Tightly sealed
INOCOLLE EXTRA N1	25°C(77°F)	Tightly sealed; dry
INODOSE GRANULES & TABLETS	25°C(77°F)	Use immediately
LALLZYMES	25°C(77°F)	Dry: General Storage Rehydrated: Use within a few hours
LYSO-EASY	18°C(65°F)	Use immediately
LYSOVIN	Dry: 5-10 years @ 18°C(65°F) Rehydrated: 22% stock solution—refrigerated—retains 90% activity after 12 months	Dry: General Storage Rehydrated: Refrigerate
MALOLACTIC BACTERIA	Short term: @ 4°C(40°F) Long term: @ -18°C(0°F)	Use immediately
MANNOPROTEINS	25°C(77°F)	Tightly sealed
POLYCACEL	25°C(77°F)	Tightly sealed; dry
POLYCEL	25°C(77°F)	Tightly sealed; dry
PRODESSERT	4°C(40°F)	Use immediately
PROELIF	4°C(40°F)	Use immediately
PROMALIC	4°C(40°F)	Use immediately
PRORESTART	4°C(40°F)	Use immediately
SCOTTZYMES	1-2 years: Store liquid forms: @ 4°C(40°F) Store dry forms: @ 18-24°C(60-77°F)	Liquid: Tightly sealed; refrigerate Dry: Tightly sealed; dry environment
SPARKOLLOID NF (HOT & COLD MIX)	4 years @ 18°C(65°F)	Tightly sealed; dry
TANNINS	18°C(65°F)	Tightly sealed; dry
VELCORIN	20-30°C(68-86°F)	Not recommended
VINIPROTECT	25°C(77°F)	Tightly sealed; dry
YEAST NUTRIENTS YEAST DERIVATIVE NUTRIENTS ML NUTRIENTS	18°C(65°F)	Tightly sealed; dry

Note: Most products have an expiration date on the package. Please check the product and then use storage guidelines above.

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# ORDER FORM 2013

**PLEASE PRINT CLEARLY**

**Please Note** All pricing for sale within United States is FOB Petaluma.  
 For large orders, please call for a price quotation and order early to ensure product availability.  
 Maximum credit card order is \$3000.  
 We accept Visa, Mastercard and American Express.  
 Credit application available online at [www.scottlab.com](http://www.scottlab.com).

**NUMBER OF PAGES FAXED** \_\_\_\_\_

**COMPANY NAME** \_\_\_\_\_ **CUSTOMER NUMBER** \_\_\_\_\_

**CUSTOMER NAME** \_\_\_\_\_ **CUSTOMER SIGNATURE** \_\_\_\_\_

**BILL TO ADDRESS** \_\_\_\_\_

**SHIP TO ADDRESS** \_\_\_\_\_

**TELEPHONE NUMBER** \_\_\_\_\_ **FAX NUMBER** \_\_\_\_\_

**PURCHASE ORDER NUMBER** \_\_\_\_\_ **E-MAIL ADDRESS** \_\_\_\_\_

**CREDIT CARD NUMBER** \_\_\_\_\_ **EXPIRATION DATE (MM/YY)** / **CVV CODE** \_\_\_\_\_

**NAME ON CARD** \_\_\_\_\_ **SIGNATURE** \_\_\_\_\_

**SHIP VIA UPS**  GROUND  2 DAY  1 DAY

**FEDEX**  SAVER  2 DAY  1 DAY

**OTHER** \_\_\_\_\_

**TO SUBMIT ORDERS TO SCOTT LABORATORIES INC. (U.S.A.)**

**Call** Scott Laboratories Inc. at 707-765-6666  
**Fax** Scott Laboratories Inc. at 707-765-6674  
**Mail to** Scott Laboratories Inc. at P.O. Box 4559, Petaluma, California 94955-4559  
**E-Mail to** [fermentation@scottlab.com](mailto:fermentation@scottlab.com)  
 Editable PDF now available on our website [www.scottlab.com](http://www.scottlab.com)

**TO SUBMIT ORDERS TO SCOTT LABORATORIES LTD. (CANADA)**

**Call** Scott Laboratories Ltd. at 905-839-9463  
**Fax** Scott Laboratories Ltd. at 905-839-0738  
**Mail to** Scott Laboratories Ltd. at 950 Brock Rd. South, Unit 1, Pickering, Ontario L1W 2A1

**RETURN POLICY**

**RETURN POLICY FOR FERMENTATION AND FILTRATION PRODUCTS**  
 We offer credits if products are returned within 15 days of shipment. Please call Scott Laboratories prior to return for authorization. Once we receive your returned items we will issue a credit to your account. Please note that we are not responsible for perishable items that have not been stored properly by the customer. If you are returning items for any reason, the following conditions apply:

- Sealed units must be unopened and undamaged upon return
- Goods that have been marked or labeled will not be accepted and no credit will be issued.
- Damage claims must be reported within 5 working days of receipt of your order
- Original packing must be retained for shipping company inspection of shipping damage claims
- Sorry, but we do not accept returns on malolactic bacteria.
- A 20% restocking fee will be applied to all returns.
- Customer to pay return freight costs.

NOTE: To avoid problems, all packages should be opened immediately upon receipt and contents should be checked against the packing slip. Scott Laboratories should be informed immediately of any discrepancies.

PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
<b>CLEANING AGENTS</b>						
69	18500	CLEANSKIN-K	5 kg			
69	18504	DESTAINEX-LF	5 kg			
69	18508	OAK RESTORER-CWF	5 kg			
<b>ENCAPSULATED YEAST</b>						
23	15150	PRODESSERT	1 kg			
24	15571	PROELIF	1 kg			
25	15572	PROMALIC	1 kg			
25	15154	PRORESTART	1 kg			
24	15158	PROMESH BARREL BAG	—			
24	15159	PROMESH TANK BAG	—			
<b>SPECIALTY YEAST STRAINS</b>						
22	15213	EXOTICS SPH	250 g			
22	15685	BIODIVA	125 g			
<b>PREMIUM YEAST</b>						
12	15134	43	500 g			
12	15140	43	10 kg			
12	15682	3001	500 g			
12	15630	58W3	500 g			
12	15631	58W3	10 kg			
12	15059	71B	500 g			
12	15078	71B	10 kg			
12	15174	ALCHEMY I	1000 g			
13	15177	ALCHEMY II	1000 g			
13	15632	ASSMANSHAUSEN (AMH)	500 g			
13	15633	ASSMANSHAUSEN (AMH)	10 kg			
13	15117	BA11	500 g			
13	15234	BC (BAYANUS)	500 g			
13	15235	BC (BAYANUS)	10 kg			
13	15634	BDX	500 g			
13	15635	BDX	10 kg			
13	15064	BM45	500 g			
13	15066	BM45	10 kg			
14	15176	BM 4X4	500 g			
14	15200	BM 4X4	10 kg			
14	15669	BRG	500 g			
14	15670	BRG	10 kg			
14	15102	BRL97	500 g			
14	15205	BRL97	10 kg			
14	15201	CLOS	500 g			
14	15204	CLOS	10 kg			
14	15640	CROSS EVOLUTION	500 g			
14	15638	CSM	500 g			
14	15639	CSM	10 kg			
15	15061	CY3079	500 g			
15	15082	CY3079	10 kg			
15	15143	D21 (ICV)	500 g			
15	15163	D21 (ICV)	10 kg			

PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
15	15642	D47 (ICV)	500 g			
15	15643	D47 (ICV)	10 kg			
15	15125	D80 (ICV)	500 g			
15	15133	D80 (ICV)	10 kg			
15	15094	D254 (ICV)	500 g			
15	15021	D254 (ICV)	10 kg			
16	15062	DV10	500 g			
16	15106	DV10	10 kg			
16	15053	EC1118 (PRISE DE MOUSSE)	500 g			
16	15076	EC1118 (PRISE DE MOUSSE)	10 kg			
16	15214	ELIXIR	500 g			
16	15101	GRE (ICV)	500 g			
16	15142	GRE (ICV)	10 kg			
16	15063	K1 (V1116)	500 g			
16	15077	K1 (V1116)	10 kg			
16	15072	L2056	500 g			
16	15180	L2056	10 kg			
17	15644	L2226	500 g			
17	15645	L2226	10 kg			
17	15648	M2	500 g			
17	15649	M2	10 kg			
17	15080	M69	500 g			
17	15650	MT	500 g			
17	15651	MT	10 kg			
17	15184	NT 50	1000 g			
17	15190	NT 112	1000 g			
18	15185	NT 116	1000 g			
18	15191	NT 202	1000 g			
18	15068	OPALE (ICV)	500 g			
18	15652	QA23	500 g			
18	15653	QA23	10 kg			
18	15071	R2	500 g			
18	15056	RA17	500 g			
19	15687	RBS 133	500 g			
19	15057	RC212	500 g			
19	15097	RC212	10 kg			
19	15171	RHÔNE 4600	500 g			
19	15130	R-HST	500 g			
19	15665	RP15	500 g			
19	15666	RP15	10 kg			
19	15084	STEINBERGER (DGI 228)	500 g			
19	15086	STEINBERGER (DGI 228)	10 kg			
20	15144	SVG	500 g			
20	15164	SVG	10 kg			
20	15657	SYRAH	500 g			
20	15658	SYRAH	10 kg			
20	15091	T73	500 g			
20	15183	VIN 13	1000 g			
20	15193	VIN 13	5 kg			

PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
20	15195	VIN 2000	1000 g			
21	15173	VRB	500 g			
21	15118	W15	500 g			
21	15119	W15	10 kg			
21	15192	WE 372	1000 g			

**VI-A-DRY YEAST**

21	15081	CEG (EPERNAY II)	500 g			
21	15093	CEG (EPERNAY II)	10 kg			
21	15060	MONTRACHET (DAVIS 522)	500 g			
21	15074	MONTRACHET (DAVIS 522)	10 kg			
21	15085	PM (PRISE DE MOUSSE)	500 g			
21	15083	PM (PRISE DE MOUSSE)	10 kg			

**YEAST NUTRIENTS; NATURAL YEAST DERIVATIVE NUTRIENTS; MALOLACTIC NUTRIENTS**

59	15681	ACTI-ML	1 kg			
38	15179	BOOSTER BLANC	2.5 kg			
38	15169	BOOSTER ROUGE	2.5 kg			
34	15805	DAP	5 kg			
34	15070A	FERMAID A	10 kg			
34	15073	FERMAID K	2.5 kg			
34	15070	FERMAID K	10 kg			
34	15070K	FERMAID K (KOSHER)	10 kg			
35	15067	FERMAID O	2.5 kg			
35	15107	FERMAID O	10 kg			
33	15149	GO-FERM	1 kg			
33	15135	GO-FERM	2.5 kg			
33	15161	GO-FERM	10 kg			
33	15103	GO-FERM PROTECT EVOLUTION	2.5 kg			
34	15804	INOCEL	1 kg			
59	15218	ML RED BOOST	1 kg			
39	15105	NOBLESSE (ICV)	2.5 kg			
35	15679	NUTRIENT VIT END	2.5 kg			
59	15141	OPTI'MALO PLUS	1 kg			
59	15217	OPTI'ML BLANC	1 kg			
39	15198	OPTIMUM WHITE	1 kg			
39	15202	OPTIMUM WHITE	2.5 kg			
39	15148	OPTI-RED	1 kg			
39	15138	OPTI-RED	2.5 kg			
39	15211	OPTI-RED	10 kg			
40	15165	OPTI-WHITE	1 kg			
40	15136	OPTI-WHITE	2.5 kg			
40	15216	OPTI-WHITE	10 kg			
36	15887	PHOSPHATE TITRES	1 kg			
36	15888	PHOSPHATE TITRES	5 kg			
40	15662	REDSTYLE	2.5 kg			
36	15100	SIY 33 (FERMAID 2133)	10 kg			
36	15069	SIY CELL HULLS (YEAST HULLS)	1 lb			
36	15069	SIY CELL HULLS (YEAST HULLS)	44 lb bag			

PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
<b>SCOTT'TAN TANNINS</b>						
49	15970	BOLD	500 g			
47	15956	COMPLEX	1 kg			
47	15958	ESTATE	1 kg			
49	15971	FINESSE	500 g			
45	15954	FT BLANC	1 kg			
45	15955	FT BLANC SOFT	1 kg			
44	15968	FT COLORMAX	1 kg			
44	15950	FT ROUGE	1 kg			
44	15951	FT ROUGE	5 kg			
44	15952	FT ROUGE SOFT	1 kg			
44	15953	FT ROUGE SOFT	5 kg			
47	15960	REFRESH	500 g			
48	15962	RICHE	500 g			
48	15963	RICHE EXTRA	500 g			
46	15964	UVA'TAN	500 g			
46	15965	UVA'TAN SOFT	500 g			

**MALOLACTIC BACTERIA**

55	15609	1-STEP ALPHA	25 hL			
55	15610	1-STEP ALPHA	100 hL			
55	15611	1-STEP ALPHA	500 hL			
55	15612	1-STEP ALPHA	1000 hL			
55	15029	1-STEP VP41	100 hL			
55	15058	1-STEP VP41	500 hL			
55	15054	1-STEP VP41	1000 hL			
53	15601	ALPHA	2.5 hL			
53	15602	ALPHA	25 hL			
53	15603	ALPHA	250 hL			
53	15604	BETA	2.5 hL			
53	15605	BETA	25 hL			
53	15606	BETA	250 hL			
54	15647	BETA CO-INC	25 hL			
54	15108	ELIOS 1 (ICV)	25 hL			
54	15109	ELIOS 1 (ICV)	250 hL			
58	15024	IB (INOACTER)	25 hL			
54	15022	MBR 31	2.5 hL			
54	15032	MBR 31	25 hL			
54	15127	MBR 31	250 hL			
58	15027	MT01	25 hL			
54	15607	PN4	25 hL			
54	15608	PN4	250 hL			
54	15048	VP41	2.5 hL			
54	15042	VP41	25 hL			
54	15044	VP41	250 hL			

PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
<b>MICROBIAL CONTROL</b>						
62	16405	LYSO-EASY	250 mL			
62	16406	LYSO-EASY	1 L			
62	16407	LYSO-EASY	5 L			
62	16402	LYSOVIN	500 g			
62	16400	LYSOVIN	1 kg			
62	16401	LYSOVIN	5 kg			
64	16410	NO BRETT INSIDE	100 g			
63	15777	2 g SO <sub>2</sub> INODOSE GRANULES	(40/box)	1-4		
63	15777	2 g SO <sub>2</sub> INODOSE GRANULES	(40/box)	5-19		
63	15777	2 g SO <sub>2</sub> INODOSE GRANULES	(40/box)	20+		
63	15778	5 g SO <sub>2</sub> INODOSE GRANULES	(25/box)	1-4		
63	15778	5 g SO <sub>2</sub> INODOSE GRANULES	(25/box)	5-19		
63	15778	5 g SO <sub>2</sub> INODOSE GRANULES	(25/box)	20+		
63	15779	10 g SO <sub>2</sub> INODOSE GRANULES	(15/box)	1-4		
63	15779	10 g SO <sub>2</sub> INODOSE GRANULES	(15/box)	5-19		
63	15779	10 g SO <sub>2</sub> INODOSE GRANULES	(15/box)	20+		
63	15780	100 g SO <sub>2</sub> INODOSE GRANULES		1-19		
63	15780	100 g SO <sub>2</sub> INODOSE GRANULES		20-59		
63	15780	100 g SO <sub>2</sub> INODOSE GRANULES		60+		
63	15781	400 g SO <sub>2</sub> INODOSE GRANULES		1-14		
63	15781	400 g SO <sub>2</sub> INODOSE GRANULES		15+		
63	15775	2 g SO <sub>2</sub> INODOSE TABLETS	(42/box)	1-4		
63	15775	2 g SO <sub>2</sub> INODOSE TABLETS	(42/box)	5-19		
63	15775	2 g SO <sub>2</sub> INODOSE TABLETS	(42/box)	20+		
63	15776	5 g SO <sub>2</sub> INODOSE TABLETS	(48/box)	1-4		
63	15776	5 g SO <sub>2</sub> INODOSE TABLETS	(48/box)	5-19		
63	15776	5 g SO <sub>2</sub> INODOSE TABLETS	(48/box)	20+		
<b>ENZYMES</b>						
77	16200	LALLZYME BETA	100 g			
77	16203	LALLZYME CUVÉE BLANC	100 g			
77	16204	LALLZYME EX	100 g			
77	16205	LALLZYME EX	250 g			
78	16206	LALLZYME EX-V	100 g			
78	16208	LALLZYME EX-V	500 g			
78	16207	LALLZYME MMX	100 g			
78	16176	SCOTTZYME BG	1 kg			
79	16175	SCOTTZYME CINN-FREE	1 kg			
79	16165	SCOTTZYME CINN-FREE	25 kg			
79	16172	SCOTTZYME COLOR PRO	1 kg			
79	16162	SCOTTZYME COLOR PRO	25 kg			
79	16173	SCOTTZYME COLOR X	1 kg			
79	16163	SCOTTZYME COLOR X	25 kg			
80	16171	SCOTTZYME HC	1 kg			
80	16161	SCOTTZYME HC	25 kg			

One liquid kilo of Scottzyme enzymes is approximately 890 mL.

PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
80	16174	SCOTTZYME KS	1 kg			
80	16164	SCOTTZYME KS	25 kg			
80	16170	SCOTTZYME PEC5L	1 kg			
80	16160	SCOTTZYME PEC5L	25 kg			

One liquid kilo of Scottzyme enzymes is approximately 890 mL.

<b>FINING, CLARIFYING AND STABILITY PRODUCTS</b>						
PAGE	PRODUCT #	PRODUCT	SIZE	QUANTITY	PRICE (\$)	SHIP DATE
84	15787	BENTOLACT S	1 kg			
84	15788	BENTOLACT S	5 kg			
84	15789	BENTOLACT S	25 kg			
84	15802	CASEINE SOLUBLE	1 kg			
84	15803	CASEINE SOLUBLE	5 kg			
71	17000	CLARISTAR	2.5 L			
71	17001	CLARISTAR	25 L			
85	15798	COLLE PERLE	1 L			
85	15799	COLLE PERLE	5 L			
85	15800	COLLE PERLE	20 L			
85	15770	CRISTALLINE PLUS	100 g			
85	15771	CRISTALLINE PLUS	1 kg			
72	15772	FLASHGUM R LIQUIDE	1 L			
72	15773	FLASHGUM R LIQUIDE	5 L			
85	15782	GELCOLLE	1 L			
86	15795	INOCOLLE	1 L			
86	15796	INOCOLLE	5 L			
86	15797	INOCOLLE	20 L			
86	15801	INOCOLLE EXTRA N1	1 kg			
73	15793	INOGUM 300	1 L			
73	15794	INOGUM 300	5 L			
87	15785	POLYCACEL	1 kg			
87	15786	POLYCACEL	5 kg			
87	15784	POLYCEL	1 kg			
87	15115	REDULESS	2.5 kg			
84	15036	SPARKOLLOID COLD MIX NF	25 lb/box			
86	15035	SPARKOLLOID HOT MIX NF	25 lb/box			
73	17010	ULTIMA FRESH	1 kg			
73	17012	ULTIMA SOFT	1 kg			
88	15790	VINIPROTECT	1 kg			
88	15791	VINIPROTECT	5 kg			
88	15792	VINIPROTECT	20 kg			





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