2015 FERMENTATION HANDBOOK

SCOTT LABORATORIES

WELCOME

THE HANDBOOK TURNS 20

2015 marks our twentieth issue. The first one was mailed out in 1996 and had eight pages and two staples. It was a simple catalog entitled “Fermentation Supplies”. Beginning with the second issue, however, changes began. In 1998 we re-christened it as “The Handbook”. The name change was important. The idea was to reflect the idea that the publication was more than simply product listings. New issues began to include articles, protocols, and an array of other useful information that winemakers need on a day-to-day basis.

This year’s Handbook is part of that tradition. Though the staples are long gone (and there are more than one hundred pages), the philosophy remains. The Handbook should be more than a catalog. It should provide essential information. It is our goal that it be a reference tool used throughout the year. Hopefully we have succeeded.

The cover of this year’s Handbook was chosen to reflect flavors and aromas that we associate with wine. They represent components of wine’s complexity. Sometimes achieving the best wine possible means “hands off”. At other times it means active cellar intervention. In every case, however, it means knowing the needs and potential of the fruit and optimizing it. This is the essence of winemaking.

As with most of the past 19 editions, we have new products to introduce in these pages.

This year we offer two new fermentation tannins, FT Rouge Berry and FT Blanc Citrus. Also new is O-MEGA®, a malolactic strain that is adapted for high alcohol wines and lower cellar temperatures. Finally, Rapidase Clear Extreme is a new granular enzyme for hard-to-settle varieties. It has been found to be particularly useful with hybrid grapes.

In addition to product information you will also find protocols, selection charts, and helpful articles. Included among the articles are one on LalVigne® (a new foliar spray from Lallemand that is used in the vineyard), another on strategies for optimal nutrient health, and finally, a step-by-step guide on preparing wine for bottling. We hope these articles provide some new and useful information.

In closing, it must be noted that 2015 marks the retirement of Robert Fithian. Bob joined Scott Laboratories Inc.’s staff in 1984 and has been a fixture here ever since. As Vice President in charge of our packaging material sales, he has been a key player in company growth. Thankfully, Bob remains on our Board of Directors. We plan to rely on his wise counsel for some time to come.

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 directed 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) 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.

SUPPLIERS

Lallemand

www.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 in Scott's library. After some discussion, Lallemand agreed to try. Two strains were produced that first year. This relationship is now in its 42nd 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 reflect Lallemand's commitment to the wine industry, here and around the world.

Anchor

www.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 near Durban. 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 involving 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

www.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 two decades to follow, Bioseutica's lysozyme and Lysovin have become accepted components in American winemakers' tool kits.

LANXESS

www.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 and for Canadian winemakers in 2013.

IOC

www.ioc.eu.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 to 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 product lines expanded together with the territory covered. Although the IOC has maintained its roots in Champagne (with locations in Epernay, Bar-sur-Seine and Cormontreuil), it also has locations in Chablis, Nuits St. Georges, the Côtes Chalonnaise and in the Côtes du Rhône near Châteauneuf-du-Pape. The IOC offers a variety of wine processing products including gelatins, caseinates, and a range of other items.

Proenol

www.proenol.com

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. They are 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.

Oenobrands

www.oenobrands.com

Though Oenobrands is relatively new to the Scott portfolio, it comes with a distinguished pedigree. Supported by its world renowned parent companies (DSM Food Specialties and Anchor BioTechnologies), Oenobrands 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, Oenobrands seeks to take the best from both. Thinking "outside the box" is encouraged. The results are revolutionary products from brands such as DSM, Rapidase and Claristar.

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 safer and more effective alternatives to caustics for cleaning stainless steel and other surfaces.

The ingredients in AiRD products combine traceability with 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 safer, more convenient, and more environmentally sound fashion.

NEW PRODUCTS

FT Blanc Citrus
Tannin
For promotion of fruity aromas
Page 45

FT Rouge Berry
Tannin
For promotion of red berry notes
Page 46

O-MEGA®
Malolactic Bacteria
O. oeni for high alcohol wines and lower cellar temperatures
Page 62

Rapidase Clear Extreme
Enzyme
For hard to settle Hybrid and American grapes
Page 57

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 82 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 fruit 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_2

The effectiveness of SO_2 is directly related to the pH. SO_2 additions should never be standardized. They must ALWAYS be adjusted according to the pH and conditions of the fruit. Additional SO_2 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

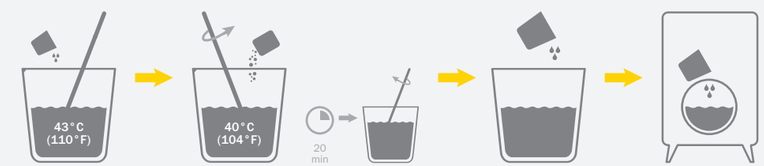
What will the fermentation temperature be? Choose a yeast strain that fits within the determined temperature range. Do not stress your yeast by keeping it at the lowest or highest end of its temperature tolerance range.

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



Step 1
Add Go-Ferm or Go-Ferm Protect Evolution to warm water.

Step 2
Cool, add yeast, stir, let stand for 20 minutes, stir.

Stir

Step 3
Atemperate. Repeat if necessary.

Step 4
Inoculate.

Visit www.scottlab.com for a video animation of this protocol.

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, atemperation 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 34 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 atemperation step may need repeating for very low temperature must/juice. Each atemperation step should last about 15-20 minutes. For every 10°C(18°F) temperature difference between the must/juice and the yeast slurry, an atemperation 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 atemperation 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.

**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

○ Yeast Strain Type
● Highly Recommended
◊ Recommended
M Mouthfeel
EVC Enhanced Varietal Character
Mod Moderate
Ntrl Neutral
Snstv Sensitive

	43	58W3	71B	Alchemy I	Alchemy II	Assmanshausen (AMH)	BA11	BC (Bayanus)	BM45	BM 4x4	BRG	Cross Evolution	CVW5	CY3079	ICV D21	ICV D47	ICV D254	DV10	EC1118
Page	12	12	12	12	12	13	13	13	13	13	13	14	15	15	15	15	15	16	16
S. cerevisiae cerevisiae		○	○			○	○		○		○			○	○	○	○		
S. cerevisiae bayanus	○							○					○					○	○
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[1]	18%+	14%	14%	15.5%	15.5%	15%	16%	17%	15%	15%	15%	15%	15%	15%	16%	14%	16%	17%	18%
Relative Nitrogen Needs[2]	Low	Med	Low	Med	Med	Low	High	Low	High	High	Med	Low	Low	High	Med	Low	Med	Low	Low
Temp. Range (°F)[3]	55-95	54-77	59-85	56-61	56-61	68-86	50-77	59-86	64-82	64-82	64-88	58-68	57-82	59-80	61-82	59-68	54-82	50-95	50-86
Fermentation Speed	Fast	Mod	Mod	Fast	Fast	Slow	Mod	Fast	Mod	Mod	Mod	Mod	Fast	Mod	Mod	Mod	Mod	Fast	Fast
Competitive Factor	Ntrl	Yes	Snstv	Yes	Yes	Snstv	Snstv	Snstv	Yes	Yes	Ntrl	Yes	Yes	Snstv	Yes	Yes	Ntrl	Yes	Yes
Sensory Effect	Ntrl	EVC Esters M	Esters	EVC Esters	EVC Esters	EVC	Esters M	Ntrl	EVC M	EVC M	EVC	EVC M	Esters	EVC M	EVC M	EVC M	EVC M	Ntrl	Ntrl
MLF Compatibility	Good	Average	Very Good	—	—	Very Good	Below Average	Good	Below Average	Below Average	Average	Average	Average	Good	Average	Good	Very Good	Good	Average

[1] The alcohol tolerance column indicates performance possibilities in good circumstances and conditions. Alcohol tolerance may vary as circumstances and conditions vary.

[2] Relative nitrogen needs refer to how much nitrogen one strain requires relative to the other strains on this chart.

[3] 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
● Highly Recommended
◊ Recommended
M Mouthfeel
EVC Enhanced Varietal Character
Mod Moderate
Ntrl Neutral
Snstv Sensitive

	Elixir	Exotics SPH	Fermichamp	ICV GRE	K1 (V1116)	M2	NT 116	ICV OKAY	ICV Opale	QA23	R2	Rhône 4600	R-HST	Steinberger (DGI 228)	SVG	VIN 13	VIN 2000	W15
Page	16	22	16	16	16	17	17	18	18	18	19	19	20	20	20	20	21	21
S. cerevisiae cerevisiae				○	○	○		○	○			○	○	○	○			○
S. cerevisiae bayanus			○							○	○							
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[1]	15%	15%	17%	15%	18%	15%	15.5%	16%	14%	16%	16%	15%	15%	13%	15%	16.5%	15.5%	16%
Relative Nitrogen Needs[2]	Med	Med	Low	High	Low	High	Med	Low	Med	Low	High	Low	Med	—	Med	Low	Low	High
Temp. Range (°F)[3]	57-77	61-68	59-86	59-82	50-95	59-86	56-83	54-86	59-86	59-90	41-90	56-72	50-86	59-77	61-79	54-61	55-61	50-81
Fermentation Speed	Slow	Mod	Mod	Mod	Fast	Mod	Fast	Mod	Mod	Fast	Mod	Mod	Mod	Slow	Mod	Fast	Mod	Mod
Competitive Factor	Snstv	Yes	Ntrl	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Snstv	Yes	Yes	Yes	Yes
Sensory Effect	EVC Esters	EVC M	Ntrl	EVC M	Esters	Esters M	Esters	Esters	EVC Esters	EVC	Esters	Esters	Ntrl M	Ntrl	EVC	EVC Esters	EVC Esters	EVC M
MLF Compatibility	—	Very Good	Good	Good	Poor	Good	Good	Very Good	Poor	Very Good	Good	Good	Average	Average	Good	Good	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 90–92 for more information on yeast choices for hybrid and non-*vinifera* grapes.

RED WINE YEAST STRAINS

○ Yeast Strain Type
● Highly Recommended
◐ Recommended
M Mouthfeel
EVC Enhanced Varietal Character
Mod Moderate
Ntrl Neutral
Snstv Sensitive

	43	3001	71B	Assmanshausen (AMH)	BC (Bayanus)	BDX	BM45	BM 4X4	BRG	BRL97	Cepage Merlot	CLOS	CSM	CVRP	ICV D21	ICV D80	ICV D254	Fermichamp	ICV GRE
Page	12	12	12	13	13	13	13	13	13	14	14	14	14	14	15	15	15	16	16
S. cerevisiae cerevisiae		○	○	○		○	○		○	○	○	○	○	○	○	○	○		○
S. cerevisiae bayanus	○				○													○	
Yeast blend								○											
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[1]	18%+	15%	14%	15%	17%	16%	15%	15%	15%	16%	14.5%	17%	14%	16%	16%	16%	16%	17%	15%
Relative Nitrogen Needs[2]	Low	Med	Low	Low	Low	Med	High	High	Med	Med	—	Med	High	Med	Med	High	Med	Low	High
Temp. Range (°F)[3]	55-95	54-90	59-85	68-86	59-86	64-86	64-82	64-82	64-88	62-85	77-86	57-90	59-90	64-86	61-82	59-82	54-82	59-86	59-82
Fermentation Speed	Fast	Mod	Mod	Slow	Fast	Mod	Mod	Mod	Mod	Mod	Fast	Fast	Mod	Mod	Mod	Mod	Mod	Mod	Mod
Competitive Factor	Ntrl	Yes	Snstv	Snstv	Snstv	Snstv	Yes	Yes	Ntrl	Yes	Ntrl	Yes	Yes	Yes	Yes	Yes	Ntrl	Ntrl	Yes
Sensory Effect	Ntrl	EVC	Esters	EVC	Ntrl	EVC M	EVC M	EVC M	EVC M	EVC	M	EVC M	EVC	EVC M	EVC M	EVC M	EVC M	Ntrl	EVC M
MLF Compatibility	Good	Average	Very Good	—	—	Average	Below Average	Below Average	Average	Average	—	Very Good	Average	Very Good	Average	Average	Very Good	Good	Good

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○ Yeast Strain Type
● Highly Recommended
◐ Recommended
M Mouthfeel
EVC Enhanced Varietal Character
Mod Moderate
Ntrl Neutral
Snstv Sensitive

	L2226	M2	MT	NT 50	NT 112	NT 116	NT 202	ICV OKAY	RA17	RBS 133	RC212	Rhône 2056	Rhône 4600	RP15	Syrah	T73	VRB	W15
Page	17	17	17	17	17	17	18	18	19	19	19	19	19	20	20	20	21	21
S. cerevisiae cerevisiae	○	○	○					○	○	○	○	○	○	○	○		○	○
S. cerevisiae bayanus																○		
Yeast hybrid				○	○	○	○											
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[1]	17%	15%	15%	15.5%	16%	15.5%	15%	16%	15%	16%	16%	16%	15%	17%	16%	16%	17%	16%
Relative Nitrogen Needs[2]	High	High	Med	Med	Med	Med	Med	Low	High	Med	Med	Med	Low	Med	Med	Low	Med	High
Temp. Range (°F)[3]	59-82	59-86	59-90	57-83	76-83	56-83	68-83	54-86	61-84	61-82	68-90	59-82	56-72	68-86	59-90	65-95	58-80	50-81
Fermentation Speed	Fast	Mod	Mod	Fast	Fast	Fast	Fast	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod
Competitive Factor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Snstv	Yes	Ntrl	Yes	Yes	Yes	Yes	Yes	Ntrl	Yes
Sensory Effect	EVC M	Esters M	EVC M	EVC Esters	EVC	EVC	EVC Esters	Esters	EVC	EVC	EVC	Esters	Esters	EVC	EVC	Esters M	EVC M	EVC M
MLF Compatibility	Below Average	Good	Average	Good	Below Average	Good	Very 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 90–92 for more information on yeast choices for hybrid and non-*vinifera* grapes.

PREMIUM YEAST STRAINS

43

S. cerevisiae · *bayanus*

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

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · *cerevisiae*

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 microflora. Careful rehydration with Go-Ferm or Go-Ferm Protect Evolution and early inoculation will help Lalvin 71B® dominate in competitive conditions.

3001

S. cerevisiae · *cerevisiae*

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_2 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

S. cerevisiae · blend

Sauvignon Blanc, Chardonnay, Chenin Blanc, Riesling, Pinot Gris, Seyval Blanc

#15174 g

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

S. cerevisiae · blend

Sauvignon Blanc, French Columbard, 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_2 producer with medium nitrogren requirements.

Assmanshausen (AMH)

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · *cerevisiae*

Riesling, Viognier, Sauvignon Blanc, Pinot Blanc, Pinot Gris, Gewürztraminer, Sparkling Base, Rosé

#15117 500 g

Selected in 1997 near the Estação Vitivinicola 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)

S. cerevisiae · *bayanus*

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_2 and VA producer. It is fructophilic and often used to restart stuck or sluggish fermentations.

BDX

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · *cerevisiae*

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_2S 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

S. cerevisiae · 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

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · cerevisiae

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.

Cepage Merlot

S. cerevisiae · cerevisiae

Merlot, Sangiovese, Grenache, Tempranillo

#17106 500 g

Selected in Bordeaux as an ideal yeast strain for Merlot by ITV (Institut Technique du Vin) France in collaboration with Conseil Interprofessionnel du Vin de Bordeaux (CIVB-Bordeaux).

Collection Cepage Merlot has a short to medium lag phase, rapid and steady kinetics and naturally low volatile acid production. Mouthfeel is enhanced by high glycerol production.

While enhancing aromatic notes of cherry, raspberry, blackberry, plum and spices in Bordeaux varieties, Cepage Merlot also produces excellent results on Sangiovese, Grenache and Tempranillo.

Clos

S. cerevisiae · cerevisiae

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

S. cerevisiae · hybrid

Chardonnay, Gewürztraminer, Pinot Blanc, Marsanne, Rousanne, Riesling, Sauvignon Blanc, Rosé

#15640 500 g
#15641 10 kg

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

S. cerevisiae · cerevisiae

Cabernet Sauvignon, Cabernet Franc, Merlot, Mourvedre

#15638 500 g
#15639 10 kg

Selected by the ITV Bordeaux in France in cooperation with the CIVB-Bordeaux.

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.

CVRP

S. cerevisiae · cerevisiae

Cabernet Franc, Cabernet Sauvignon, Merlot, Petite Sirah, Tempranillo

#15208 10 kg

Selected from the Lallemand yeast collection for its high polysaccharide production. It is the highest polysaccharide producer in the Lallemand yeast collection.

Wines made from CVRP are characterized by enhanced mouthfeel, roundness, soft tannins and enhanced varietal character. Ideal for big reds.

Good compatibility with malolactic bacteria.

CVW5

S. cerevisiae · bayanus

Chardonnay, Chenin Blanc, French Colombard, Pinot Gris, Sémillon

#15210 10 kg

Selected from the Lallemand yeast collection, CVW5 is a daughter strain of the Lalvin EC1118.

Works well under low temperatures and low turbidity. Very high ester producer and has the lowest nitrogen demand in the Lallemand yeast collection. CVW5 produces low levels of VA and SO_2.

Strong fermenter even under difficult conditions.

May also be used for making sparkling wine and fruit wines.

CY3079

S. cerevisiae · cerevisiae

Chardonnay, Pinot Blanc, Chardonel

#15061 500 g
#15082 10 kg

Isolated by the Bureau Interprofessional 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_2S 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

S. cerevisiae · cerevisiae

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

S. cerevisiae · cerevisiae

Chardonnay, Sémillon, 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 varietals.

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

S. cerevisiae · cerevisiae

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

S. cerevisiae · cerevisiae

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

S. cerevisiae · *bayanus*

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_2S and SO_2 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)

S. cerevisiae · *bayanus*

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_2 (up to 50 ppm) and, as a result, may inhibit malolactic fermentation.

Elixir

S. cerevisiae · 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_2, H_2S 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.

Fermichamp

S. cerevisiae · *bayanus*

Restart Stuck Fermentations

#17143 500 g
#17144 5 kg

Selected in Alsace by INRA of Narbonne, France.

Fermichamp has an excellent capacity to metabolize fructose, making it a good choice for restarting stuck fermentations.

High alcohol tolerance to 17% (v/v). As a preventative measure, it can be added towards the end of high initial Brix fermentations.

Does not produce secondary aromas. Fermichamp also helps preserve the varietal character of the must when restarting a stuck fermentation.

ICV GRE

S. cerevisiae · *cerevisiae*

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)

S. cerevisiae · *cerevisiae*

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.

Lalvin C

S. cerevisiae · *bayanus*

For use in cool climate wines high in malic acid, cider, fruit wines, restarting stuck fermentations, and secondary fermentation in sparkling wines

#15689 500 g

For product description, please see page 90.

L2226

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · *cerevisiae*

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.

MT

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · 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

S. cerevisiae · 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_2 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
#15226 10 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.

THE IMPORTANCE OF KNOWING YOUR SUGARS

An important but often overlooked factor during fermentation is the sugar ratio of the must or wine. Glucose and fructose are the main fermentable sugars present in grapes. These sugars are present in roughly equal proportions at the beginning of fermentation, although ratios do vary by must. During fermentation, *S. cerevisiae* yeasts ferment glucose faster than fructose.

Yeast strains naturally vary in their ability to consume fructose. The preferential uptake of glucose can lead to unbalanced levels of the non-preferred fructose (up to 1:10 glucose:fructose). As glucose is consumed the fermentation rate decreases. Unbalanced sugars, low nitrogen, high fermentation temperatures and rising alcohol levels can all stress yeast and lead to increased VA, SO_2 production, off-aromas and flavors, as well as stuck and/or sluggish fermentations. The effects are cumulative.

Choosing the correct yeast strain for success is important. Considering the fructophilic nature of certain strains can help alleviate fermentation problems due to unbalanced sugars. Some strains with greater fructophilic characteristics include:

NT202 for fruit forward reds with higher alcohol potential. It is MLF friendly.

Uvaferm 43 for general use in difficult restarts

K1(V1116) for restarts as well as for primary fermentation of ester driven white wines

NT 202

S. cerevisiae · hybrid

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

#15191 1 kg
#15227 10 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 OKAY

S. cerevisiae · *cerevisiae*

Sauvignon Blanc, Viognier, Rosé, Syrah

#15221 500 g
#15222 10 kg

Selected in collaboration with the INRA, SupAgro Montpellier, the ICV and Lallemand for its ability to produce very low levels of SO_2 and H_2S.

Lalvin ICV OKAY™ has a very short lag phase, low nutrient requirements and alcohol tolerance to 16% (v/v). Very low production of acetaldehyde.

Recommended for fresh and aromatic wines. Very good compatibility with malolactic fermentation.

ICV Opale

S. cerevisiae · *cerevisiae*

Chardonnay, Sauvignon Blanc, Rosé

#15068 500 g

ICV Opale is a 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_2 and, as a result, may inhibit malolactic fermentation.

QA23

S. cerevisiae · *bayanus*

Chardonnay, Sauvignon Blanc, Sémillon, Chardonel, 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_2S, 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, Zinfandel

#15687 500 g

Selected in collaboration with the Universitá 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 using 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_2S 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 2056

S. cerevisiae · *cerevisiae*

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_2 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.

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_2 tolerance.

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

SVG

S. cerevisiae · *cerevisiae*

Sauvignon Blanc, Pinot Gris, Riesling, Hybrids

#15144 500 g

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

S. cerevisiae · *cerevisiae*

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_2S and SO_2.

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

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

T73

S. cerevisiae · *bayanus*

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 Rhône 2056.

VIN 13

S. cerevisiae · hybrid

Restart Stuck Fermentations, Sauvignon Blanc, Chenin Blanc, Riesling, Viognier, Chardonnay, Rosé, Gewürztraminer

#15183 1 kg
#15228 10 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

S. cerevisiae · hybrid

Chenin Blanc, Chardonnay, Sauvignon Blanc, Viognier, Chardonel

#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_2 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

S. cerevisiae · *cerevisiae*

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

S. cerevisiae · *cerevisiae*

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_2S 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.

Yeast Usage and Storage

For yeast usage, please see protocol on page 7.
Yeast should be used immediately once opened. Store unopened at 20°C(68°F).

VI-A-DRY YEAST STRAINS

CEG (Epernay II)

S. cerevisiae · *cerevisiae*

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)

S. cerevisiae · *cerevisiae*

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_2 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)

S. cerevisiae · *bayanus*

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_2S producer.

Has high SO_2 and alcohol tolerances.

SPECIALTY YEAST STRAINS

Exotics SPH

S. cerevisiae and *S. paradoxus* hybrid

Chardonnay, Viognier, Chenin Blanc, Marsanne, Rousanne, 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 parents, 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_2 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). Use immediately once opened.

TESTIMONIAL

"This is my second harvest fermenting Chardonnay with Anchor Exotics SPH. In comparison, tank and barrel fermentations display intense tropical fruit aromas and flavors, complemented by expansive mouthfeel. This yeast strain alone has given my Chardonnay a definite advantage."

Nick Ferrante
Ferrante Winery & Vineyard

Biodiva

Torulaspora delbrueckii

Chardonnay, Semillon, Syrah and Pinot Noir

#15685 125 g

The *Torulaspora delbrueckii* isolate Biodiva was initially sold in North American in a kit (Level²TD) 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, Rhône 2056, QA23, and VRB. Biodiva MUST be used in conjunction with a *S. cerevisiae* strain.

Following an inoculation of Biodiva (*Torulaspora 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
Please visit our website for full usage instructions, as Biodiva is rehydrated at a lower temperature than *Saccharomyces*.

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* 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.

Several 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, and ProRestart for restarting sluggish or stuck primary fermentations.

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® 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_2 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.*

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)	**Calcium**	≤	80 mg/L
Free SO_2	≤	15 mg/L	**Protein Stability**	=	stable
pH	≥	3.0	**Tartrate Stability**	=	stable
Free Assimilable Nitrogen	≥	100 mg/L	**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 www.scottlab.com*

ProRestart

Encapsulated yeast to restart sluggish or stuck fermentations

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

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_2	<	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_2, 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.
See page 25 for Rehydration Protocol of ProRestart.

Storage

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

ProMalic

Encapsulated yeast for naturally lowering juice acidity

Due to a short shelf-life, ProMalic is available by special order only. If interested, please contact us to order.
All orders MUST be placed by July 15, 2015.

For more information on ProMalic, please visit our website at www.scottlab.com.

ProMesh Bags

For use with ProDessert, ProRestart and ProMalic

#15158 ProMesh barrel
#15159 ProMesh tank bag

Barrel Bags

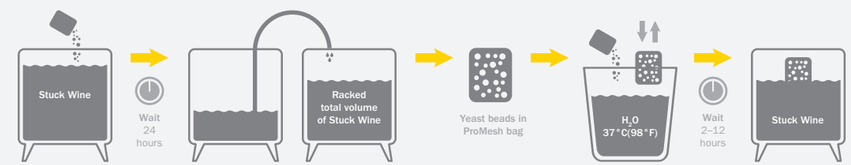
For ProDessert use 2 bags/barrel containing 109 g/bag.
One kilogram of beads will treat 260 gallons, or 4 barrels.

For 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).

PROTOCOL
RECOMMENDED METHOD TO REHYDRATE PRORESTART



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.

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.
3. Place the beads in the ProMesh nylon bags before rehydrating. See ProMesh bags 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

4. 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

5. 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).
6. 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.
7. Bags should be gently shaken several times a day to release accumulated CO_2. The wine must be stirred daily without aeration.
8. Leave the beads in the wine until the desired degree of fermentation is achieved.

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.

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 68)*.

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 A, Fermaid K or Fermaid O) 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 68)*.
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 the recommended rate. 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), Fermichamp 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 rehydration nutrient/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, atemperation 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

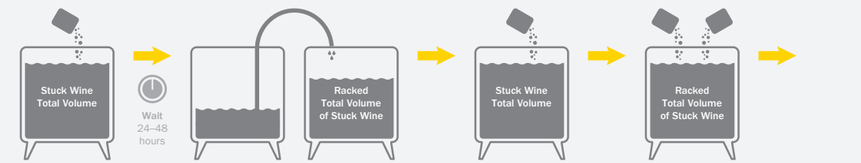
10. Add 10% of stuck wine to the Mother Restart Tank and wait 20-30 minutes. (Example: For 1000 gal stuck wine, add 100 gal wine.)
11. Add 20% of stuck wine to the Mother Restart Tank and wait 20-30 minutes. (Example: For 1000 gal stuck wine, add 200 gal wine.)

12a, 12b, 12c. Repeat step 11.

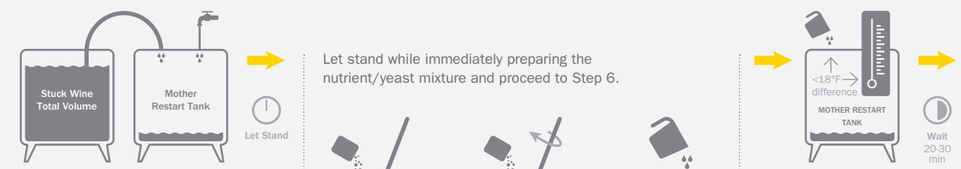
13. Add any remaining wine to the Mother Restart Tank.

Visit www.scottlab.com for a video animation of this protocol.

For Wines Stuck at >3°Brix
Build-up for Stuck Wine

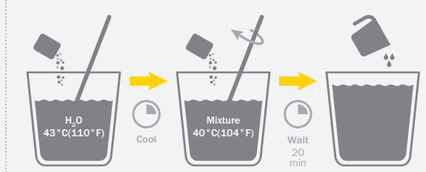


Step 1 Add yeast hulls
Step 2 Rack off yeast hulls
Step 3 Add yeast hulls
Step 4 Add chosen Fermaid and lysozyme



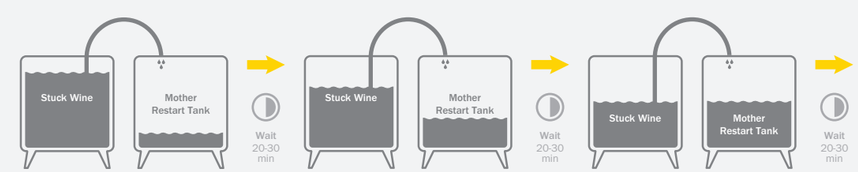
Step 5 Mix 5% of stuck wine and equal amount of H_2O

Let stand while immediately preparing the nutrient/yeast mixture and proceed to Step 6.

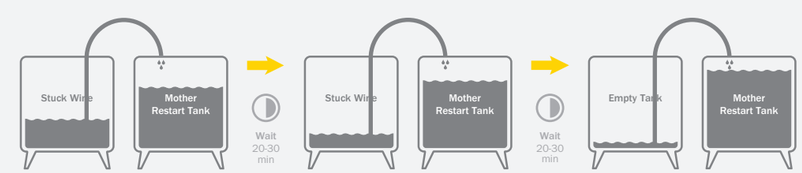


Step 6 Add rehydration nutrient
Step 7 Add yeast (slowly), stir
Step 8 Atemperate
Step 9 Add mixture

Inoculation of Stuck Wine



Step 10 Add 10% of stuck wine to starter culture
Step 11 Add 20% of stuck wine to starter culture
Step 12a Add another 20% of the stuck wine



Step 12b Add another 20% of the stuck wine
Step 12c Add another 20% of the stuck wine
Step 13 Add any remaining 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.

ARTICLE

LALVIGNE

LalVigne® is a new product line from Lallemand's worldwide research and development network. It provides new, innovative and natural options to viticulturists and winemakers that were unknown until now.

WHAT IS IT?

LalVigne is an organic yeast derivative product that is applied in the vineyard as foliar spray at veraison. The yeasts used in its production were sourced from the Lallemand wine yeast collection. A single vineyard treatment with a LalVigne spray consists of two applications. The first is done at 5% veraison and the second 10–12 days later.

LalVigne is easily suspended in water and applied using a spray rig or hand sprayer. In warmer wine regions ideal conditions for spraying are before the heat of the day. In the cooler regions, a window of 24 hours between rains is needed to get maximum effect. Intermittent rain after this point will not affect the efficacy of the product.

WHY USE IT?

All winegrowers face the harvest challenge of achieving phenolic and enological maturity at the same time. Application of LalVigne has been shown to encourage the concentration of aroma precursors in grapes and it can have a noted impact on the timing of the phenolic maturity.

Cool Climate Scenario

In cooler climates, phenolic maturity can be difficult to reach. Complicating factors can include the onset of rain, early frosts, the grape variety itself, and vines susceptible to *Botrytis*. In many cases, the harvest date ends up being determined by external factors and not by grape maturity.

A 2014 Washington State trial involved treating a Merlot vineyard with LalVigne. In this trial, the winemaker picked the treated vineyard six days earlier than the control block. Picking was done based upon the winemaker's judgment about the flavor and perceived phenolic maturity of the grapes. Wines made from the treated and control blocks demonstrated strong similarities, despite the large disparity in harvest dates. The opportunity for the winemaker to harvest a week earlier and achieve the "same" wine greatly reduces the risk of quality loss, due to unforeseen weather conditions.

Warm Climate Scenario

In warm climates, optimal sugar levels are often reached far in advance of other critical factors such as phenolic maturity. This means that the harvest date is often chosen primarily due to potential alcohol levels rather than other wine quality parameters.

Trials were done on Merlot and Cabernet Sauvignon in one of the warmer growing regions in California.

For both varieties, the control and treated blocks were picked at the same time. The decisions to pick were based on sugar levels. Blind sensory tastings showed differences in color, mouthfeel and aromas, with tasters preferring the wines that were treated with LalVigne. The vineyards yielded 10 tons/acre, thereby allowing the winery to improve maturity on vines with heavy yields.

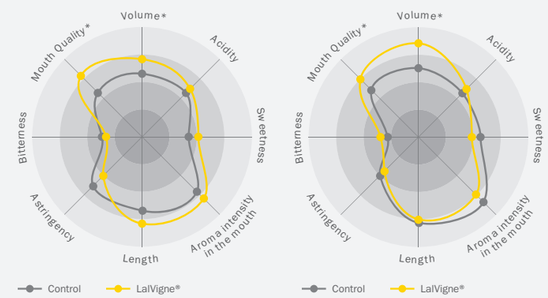
WHERE IS IT USED?

For the last several years, Lallemand has been conducting trials with LalVigne sprays in vineyards all over the world. The goal was not only to establish efficacy, but also to gauge enological impacts that may not have been observed in the lab.

Observed Impact on Mouthfeel and Volume

The trial below (Figure 1) was conducted on Merlot and Syrah vines in Languedoc in 2012. A tasting was done by 20 professionals at the Centre de Viticulture et d'Oenologie de Midi-Pyrénées. In the LalVigne treated Merlot and Syrah, an increase in mouthfeel and volume was observed. The Merlot also showed an increase in aromatic intensity.

Figure 1: Langeudoc Trial 2012



Trial in Merlot Languedoc 2012

Tasting done at Centre de Viticulture et d'Oenologie de Midi-Perénées; 20 tasters

Trial in Syrah Languedoc 2012

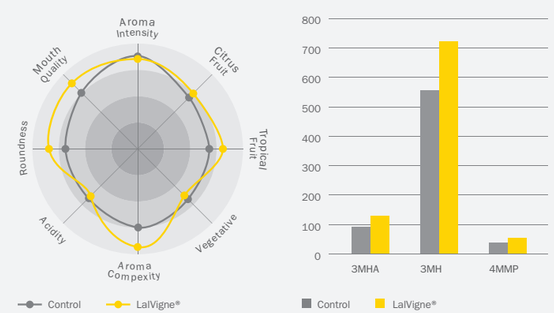
More volume and better quality in the mouth*=significance of 5%

Observed Impact on Aromatic Intensity

A Sauvignon Blanc trial done in Spain in 2012 (Figure 2) was tasted by a panel of 20 professional winemakers. The wine made from the LalVigne treated vineyard scored better in mouthfeel, roundness and aroma complexity.

In 2013, trials were done on Sauvignon Blanc in the Southern Hemisphere. Laboratory analysis on the LalVigne treated samples showed an increase in thiols.

Figure 2: Sauvignon Blanc Trials



Trial in Spain 2012

Aroma complexity and mouth quality. Tasting panel of 20 winemakers.

Trial in Southern Hemisphere 2013

Volatile thiols analysis on final wines (ng/L)

Observed Impact on Green Characters (IBMP)

The natural decrease of methoxypyrazine (3-isobutyl-2-methoxypyrazine) or IBMP, during the ripening phase is a good indicator of aromatic and phenolic ripeness for grapes. It has been observed that virtually all the IBMP present in grapes ends-up in finished red wines, regardless of winemaking practices. Thus, vineyard practices have a huge impact on finished wines.

Trials from the 2014 U.S. harvest were tested for differences in IBMP. It was observed that wines from the LalVigne treated vineyards showed a trend toward lower levels of IBMP. Furthermore, as we increase our trials, the trend seems to be that a greater reduction of IBMP is occurring when the baseline amount of IBMP is higher. Figure 3 below illustrates this.

Figure 3: Observed Impact on IBMP

Reduction of IBMP after treatment with LalVigne

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 re-quirements 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 kine-tics 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 is also a consideration.

Oxygen
When adding more oxygen to the must, nitrogen is captured faster and more is needed when compared to fermentations taking place under anaerobic conditions (white wine).

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

YEAST NUTRIENT YAN CONTRIBUTION

Nutrient	Dose 20 g/hL (1.7 lb/1000 gal)	Dose 25 g/hL (2 lb /1000 gal)	Dose 30 g/hL (2.5 lb /1000 gal)	YAN Source
Anchorferm	2 mgN/L	2.5 mgN/L	Not recommended	Organic nitrogen from autolyzed yeast
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 0		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

**This dosage exceeds the legal limit of thiamin.*

CHOOSING THE CORRECT YEAST NUTRIENT

● Highly Recommended

Note: With the exceptions of Fermaid K and Fermaid K (Kosher), all ingredients of the products shown in the nutrient section of this handbook 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.

	Anchorferm	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	35	35	35	35	36	36	34	34	36	36	37	37	37
OMRI Listed						●	●			●			
Contains organic nitrogen	●		●	●	●	●	●	●		●		●	●
Contains DAP		●	●	●	●						●		
Contains thiamin	●										●		
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, β-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 $4x10^6$ cells/mL. If yeast inoculations are at recommended levels, they should then be able to suppress indigenous microorganisms 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 25 g/hL rate is respected, the yeast will be stronger, grow more rapidly, and the fermentations will finish faster.

Note:

a. 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).

b. 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 50 g/hL (4.25 lb/1000 gallons).

If Go-Ferm or Go-Ferm Protect Evolution are used, any increase in yeast inoculation should be matched by an increase in these nutrients. Respect a ratio of 1 part yeast to 1.25 parts Go-Ferm or Go-Ferm Protect Evolution.

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, 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 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 winemaking increase the chances for successful fermentations. This can result in wines with more positive aromatics and focused structure.

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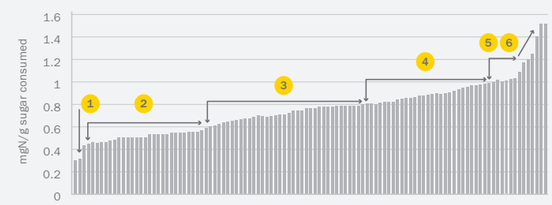
ARTICLE

NUTRIENT NOTES AND STRATEGY

Yeast have specific nutritional requirements. We know the individual nutritional needs of the yeast in our portfolio and classify them as low, medium or high nitrogen requiring strains. These categories are somewhat arbitrary. By using the graph below (Figure 1) we can put a numerical value to these terms and determine what the strain's nitrogen requirements are. For example, the graph below shows that for a juice/must that contains 250 g/L initial sugar, the low nitrogen requiring strains need 150ppm YAN, medium 200ppm, and medium high 225ppm. Strains classed as high YAN requiring need ~300ppm to consume this level of fermentable sugar.

Figure 1: **Yeast comparison regarding nitrogen needs**



In the graph above, group 1 is very low nitrogen requiring strains, group 2 is low nitrogen requiring strains, group 3 is medium, group 4 is medium high, and group 5 is high. Group 6 is *S. bayanus* (not *S. bayanus cerevisiae* e.g. EC-1118 and QA23). Only a few of the *S. bayanus* strains are used in enology due to their limited tolerance to ethanol.

To calculate the specific needs of your chosen strain, the following calculation can be applied (don't forget the other essential nutritional factors when you do your additions):

- Low N requiring strains = Sugar (g/L) x 0.75 is the upper range, the actual range is 0.5-0.75)
- Medium = Sugar (g/L) x 0.90
- Medium high = Sugar (g/L) x 1.1
- High = Sugar (g/L) x 1.25

Factors beyond the yeast strain's genetic needs that should be considered include initial fermentable sugar, temperature of fermentation, pH, pre-fermentation process decisions, grape quality and general hygiene of the facility. These variables will influence how much YAN is required to complete a dry fermentation with minimal sensory deviations. The YAN is influenced in the following ways:

pH: At pH 3 only 70% of ammonia can be utilized compared with >90% at pH 4. This can modify the handling of acidic whites or high pH reds.

Temperature: The warmer the temperature of the ferment, the more nitrogen is required as the cells are growing and metabolizing faster.

Oxygen availability: Yeast available O_2 results in faster nitrogen capture, therefore more YAN is required.

Nitrogen source: Nitrogen from amino acids is a more efficient form of nitrogen for cell metabolism and aromatic production than straight ammonia (DAP) or glutamate.

Vitamin and mineral deficiency: Vitamins and minerals can be consumed very quickly (in less than 3 hours) by the native flora, binding of must components (organic acids and polyphenolic compounds) or by the deactivation of thiamin by SO_2 additions in excess of 50ppm. Such deficiencies will negate the benefits of ample YAN and are a critical consideration in nutrition management.

Due to the complex interactions of the yeast, grapes and winemaking parameters, some of which are mentioned above, specific YAN recommendations are not available for each strain. Using the general recommendations in the chart below we can compensate for many of the variables.

Remember to use rehydration nutrients for protection and stimulation of yeast cells and fermentation supplements for cell nourishment. These are also important steps.

YEAST PROTECTION AND NUTRITION — RECOMMENDED ADDITION RATES

Juice/Must YAN	**Step 1** Yeast Rehydration*	**Step 2** Fermentation Nutrition	
		Start of Alcoholic Fermentation	⅓ 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) or 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) or 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) or 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)** or 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_2, 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_2. By adding these bio-available nutrients at the rehydration stage yeast cells benefit most directly. Cell viability and vitality are 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.

Recommended Dosage

30 g/hL 2.5 lb/1000 gal

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

Usage

1. Mix Go-Ferm in 20 times its weight in clean 43°C(110°F) water. For every 1 kg (2.2 lb) Go-Ferm, use approximately 5 gallons (20 L) of water.
2. Let the mixture cool to 40°C(104°F) then add the selected active dried yeast.
3. Let stand for 20 minutes.
4. 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. Atemperate 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.

Go-Ferm Protect Evolution

Next generation yeast rehydration nutrient for challenging conditions; OMRI listed

#15103 2.5 kg

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 sugar depletion.

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

Recommended Dosage

30 g/hL 2.5 lb/1000 gal

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

Usage

1. Mix 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 Protect Evolution, use approximately 5 gallons (20 L) of water.
2. Let the mixture cool to 40°C(104°F) then add the selected active dried yeast.
3. Let stand for 20 minutes.
4. 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. Atemperate 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.

Anchorferm

Yeast nutrient for Anchor yeast to maximize aromatics

#15147 10 kg

Anchorferm is a yeast nutrient containing specific inactivated yeast and thiamin. When using Anchor yeasts in cool ferments, Anchorferm can maximize aromatic potential. Anchorferm can also help alleviate issues due to *Botrytis*, and high Brix must/juice. The yeast population is kept healthier and the potential for VA and off-sulfur aromas is limited.
Anchorferm is not to be considered a primary nutrient source and should be used in conjunction with other nitrogen sources.

Recommended Dosage

20 g/hL 1.6 lb/1000 gal

Usage

Anchorferm may be added at any time during fermentation. For best results, add 20 g/hL at 1/3 sugar depletion.

To avoid CO_2 release and overflowing of fermentation vessels, Anchorferm should be mixed with water or juice to create a slurry. 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.

*This product contains thiamin. When dosed at the recommended 20 g/hL dosage, it is under 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. If using Anchorferm, any nutrient additions cannot contain thiamin, or there is a risk of being over the TTB legal limit for thiamin.

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 30–41 are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.246. For more information please visit www.TTB.gov. 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.*

Fermaid K (Kosher)*

Kosher certified complex 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 30–41 are listed by the TTB as acceptable in good commercial winemaking practice in CFR 24.246. For more information please visit www.TTB.gov. 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.*

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

Usage
In order to avoid CO_2 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 ⅓ 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 hydro-chloride = 0.60 mg/L (0.005 lb/1000 gal) of wine or juice. 21 CFR 184.1875.*

SIY 33 (Fermaid 2133)

Autolyzed yeast

#15100 12.5 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 ⅓ 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_2 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_2 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.

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	39	39	39	40	40	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							●

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.

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.

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_2, allowing the winemaker to potentially lower their SO_2 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 ⅓ 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 ⅓ 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 ⅓ of the 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 Reduless.

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

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 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.

BASICS

Fermentation Tannins

Tannins are used in wines from all winemaking 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 helpful tools when fine-tuning a wine. Some winemakers 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.

A FERMENTATION TANNIN PRIMER

Name	Composition	Properties	Uses
FT Rouge	Proanthocyanidins + Ellagic tannin (oak and chestnut hardwood)	· Highly reactive with proteins · Promotes color stability · Enhances structure and aging potential · Strong anti-oxidant	**Red and fruit wine** · Help stabilize color, enhance structure. · Inhibit laccase (botrytised grapes) and protect anthocyanins in grapes from rot.
FT Rouge Soft	Proanthocyanidins + Ellagic tannin (oak)	· Reactive with proteins · Promotes color stability · Enhances structure and aging potential · Anti-oxidant	**Red and fruit wine** · Help stabilize color, enhance structure. · Inhibit laccase (botrytised grapes) and protect anthocyanins in grapes from rot.
FT ColorMax	Specially processed catechin tannin	· Promotes color stability · Goes easily into solution	**Red and fruit wine** · Intended for use in tandem with FT Rouge. · Helps stabilize color.
Uva'Tan	Proanthocyanidins (from grape skins and seeds)	· Reactive with proteins · May compensate for poor tannin structure from grapes · Promotes color stability	**Red, White and Rosé wine** · Help stabilize color · Enhances structure and aging potential
Uva'Tan Soft	Proanthocyanidins (solely from grape skins)	· Reactive with proteins · Promotes color stability · Provides softness	**Red, White and Rosé wine** · Help stabilize color · Enhances structure while reducing potential astringency
FT Blanc	Gallotannin (Oak gall nut)	· Reactive with proteins · Complexes with oxidizable molecules, preventing browning.	**White, Rosé, cider and fruit wine** · Improve clarification and structure · Minimize reductive odors · Inhibit laccase (botrytised grapes)
FT Blanc Soft	Gallotannin (Oak gall nut)	· Reactive with proteins · Complexes with oxidizable molecules, preventing browning.	**White, Rosé, cider and fruit wine** · Improve clarification and structure · Minimize reductive odors · Inhibit laccase (botrytised grapes) · Enhance mouthfeel.
FT Rouge Berry	Condensed tannin from red berry fruit	· Promotes color stability · Prevents oxidation of primary aromas	**Red and Rosé** · Red berry characters
FT Blanc Citrus	Condensed tannin from citrus wood and gallic tannins	· Protects must and wine from wine oxidation	**White, Rosé, cider** Used in combination with yeast strains with ß-glycosidase activity, will allow for the development of enhanced and intense aromas such as lemon, grapefruit, apple, and white flowers

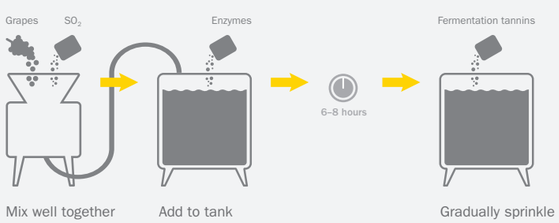
CHOOSING THE RIGHT TANNINS

● Highly Recommended
○ Recommended

	Fermentation							Ferm/ Cellaring		Cellaring			Finishing		OTT	
	FT Blanc Citrus	FT ColorMax	FT Blanc	FT Blanc Soft	FT Rouge	FT Rouge Soft	FT Rouge Berry	Uva'Tan	Uva'Tan Soft	Complex	Estate	Refresh	Riche	Riche Extra	Bold	Finesse
Page	45	45	45	45	46	46	46	47	47	48	48	48	49	49	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_2, ENZYMES AND TANNINS



Add SO_2 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.

New FT Blanc Citrus

Promotes the expression of fruity aromas
White, Rosé, Cider
#15975 5 kg

New in 2015, Scott'Tan™ FT Blanc Citrus is a mixture of condensed tannins extracted from citrus wood and gallic tannins. The use of FT Blanc Citrus during the course of alcoholic fermentation, and in combination with yeast strains with a marked beta-glycosidase activity (such as Alchemy II, 71B, VIN 2000, NT 116, Rhône 4600, VIN 13, QA23 and 58W3), allows for the development of enhanced aromatic potential. The resulting wines may present more intense aromas of lemon, grapefruit, apple and white flowers, which complement varietal aromas and those produced during fermentation. Scott'Tan FT Blanc Citrus also protects the must and wine from oxidation.

Recommended Dosage

White, Cider
20–150 ppm 2–15 g/hL 0.17–1.25 lb/1000 gal

Rosé Must
50–150 ppm 5–15 g/hL 0.42–1.2 lb/1000 gal

Usage

In order to benefit from the effect of the sensory aromatic precursors produced from the tannin, FT Blanc Citrus should be added during alcoholic fermentation, within 24-48 hours after yeast inoculation. Dissolve in ten times its weight in water or must and add during a punch-down or pump-over.

Storage

Dated expiration. Unopened: store the product in a dry, cool and well-ventilated place. Opened package: carefully reseal and store for use in the same harvest year.

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 ⅓ sugar depletion. If a cold soak has been done, add FT ColorMax during the first pump-over.

Storage

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

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_2. In protein rich varieties, such as Sauvignon Blanc, FT Blanc can help remove proteins. In some wines it will also contribute notes of minerality.

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.

FT Blanc and FT Blanc Soft

Recommended Dosage

White/Rosé Juice
50–150 ppm 5–15 g/hL 0.42–1.2 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

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*

Usage

Add FT Blanc or 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 or FT Blanc Soft is made post-fermentation, we recommend waiting 3-6 weeks after the tannin addition before racking, fining, filtering or bottling.

Storage

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

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.

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.

FT Rouge and FT Rouge Soft

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 or 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 or 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 or FT Rouge Soft is made post-fermentation, we recommend waiting 3-6 weeks after the tannin addition before racking, fining, filtering or bottling.

Storage

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

New FT Rouge Berry

Promotion of red berry notes

Rosé, Red

#15972 1 kg
#15973 5 kg

Scott'Tan™ FT Rouge Berry is a mixture of condensed tannins extracted from wood of red berry fruit. The use of FT Rouge Berry in combination with yeast strains with a marked beta-glycosidase activity such as 71B, ICV GRE, NT 116, and Rhône 4600, allows for the development of enhanced red berry characters. The resulting wines may present intense aromas of cherry, strawberry, and blueberry, which complement varietal aromas produced during fermentation. FT Rouge Berry can also promote the stabilization of color and prevent oxidation of the primary aromas.

Recommended Dosage

Rosé Must
20-150 ppm 2-15 g/hL 0.17-1.2 lbs/1000 gal

Red Must
50-200 ppm 5-20 g/hL 0.42-1.6 lbs/1000 gal

Usage

Add FT Rouge Berry at the first pump-over or punch-down, or 24-48 hours after yeast inoculation. Dissolve in ten times its weight in water before adding.

Storage

Dated expiration. Unopened, store in a cool, dry, well-ventilated area. Once opened, carefully reseal and use in the same harvest year.

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. Following organoleptic evaluations, two to three further additions can be made subsequent to rackings. 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 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. Following organoleptic evaluations, two to three further additions can be made subsequent to rackings. 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.

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. Following organoleptic evaluations, 2–3 further additions can be made subsequent to rackings. First additions should be made at least 3-6 weeks before bottling to allow for polymerization and settling.

Storage

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

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. Following organoleptic evaluations, 2–3 further additions can be made subsequent to rackings. First additions should be made at least 3-6 weeks before bottling to allow for polymerization and settling.

Storage

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

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/cellaring tannin is a strong antioxidant. 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.

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

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
30-150 ppm 3–15 g/hL 0.25-1.2 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

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
30-150 ppm 3–15 g/hL 0.25-1.2 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_2 interfere with my additions?
Using all three products together is fine, but timing is important! High SO_2 content can inhibit enzyme activity. Do not add SO_2 and enzymes at the same time. It is okay to add enzymes after the SO_2 is adequately dispersed OR to add SO_2 after the enzymes are adequately dispersed. Follow with a tannin addition six to eight hours later. When enzymes are not being used, add SO_2 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_2 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 providing 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 of Tannin Estate or Tannin Refresh 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.

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_2
Enzyme activity is inhibited by SO_2. In high concentrations (around 200 ppm) SO_2 will denature and inactivate the enzymes. SO_2 can be added after an enzyme addition has been adequately dispersed or vice versa, but do not add SO_2 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_2, 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 liquid enzymes are marked with the symbol 💧. The granular/powdered enzymes are marked with the symbol 🌰.

CHOOSING THE RIGHT ENZYMES

● Highly Recommended
○ 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. All other enzymes are listed in CFR 24.246.*

	Lallzymes					Scottzymes							Rapidase	
	Beta	Cuvée Blanc	EX	EX-V	MMX	BG	Cinn-Free	Color Pro	Color X	HC	KS	Pec5L	Clear Extreme	Extra Press
Page	53	53	53	53	54	55	55	56	55	56	56	57	57	57
Reds			●	●	●	○		●	●		○			
Whites and Rosé	●	●			●	●	●	●		○	●	●		●
Fruit, Cider and Mead					●	●		●		●	●	●		
Hybrids and non-*vinifera*													●	
Aroma enhancement for aromatic white wines	●	○			○	●	○							
Macerating enzyme for fruit forward reds			●					●						
Macerating enzyme for premium reds				●				●	●					
Release of varietal aromas in whites	●	●			○	●	●							
Hard-to-press grapes (e.g. Concords, Muscat, Thompsons), fruit										●		●		●
Gentle extraction		●	●				●	●						
Improved pressability		●					●	○				●		●
Never use BEFORE pressing											●		●	
Enhanced settling							●	●			●	●	●	●
Improved clarification		●			○		●	●			●	●	●	●
Increased yield		○					●	○		●		●		●
Reduced solids							●	●		●	●	●	●	●
Improved filterability		●	●		●		●	●		●	●	●	●	●
Use on botrytised wines					●						○			
Contains betaglucanase					●									
Listed in CFR 24.250.					●									

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

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 in CFR 24.250.

Recommended Dosage

Crushed Grapes	Juice
Not recommended	Not recommended

Wine
1-5 g/hL 40-190 g/1000 gal

Usage

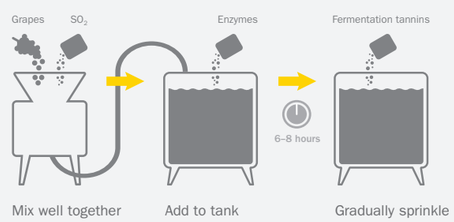
Dissolve Lallzyme MMX in 10 times its weight in water, gently stir, allow to sit for a few minutes and then add to the wine.

Storage

Dated expiration. Store dry enzyme at 25°C(77°F). Once rehydrated use within a few hours.

PROTOCOL

TIMING OF ADDITIONS: SO_2, ENZYMES AND TANNINS



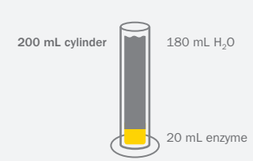
Add SO_2 and mix well prior to adding enzymes. Tannins can be added 6-8 hours later. *Please see FAQs on page 58 for more information.* Yeast derivative nutrients (e.g. Opti-Red) can be added at any point during fermentation.

SCOTTZYME

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). The 25 kg totes are Kosher (but not Kosher for Passover). The 1 kg bottles are not Kosher. To accurately dose liquid Scottzymes, first calculate the dosage then dilute to a 10% solution (v/v). *See the protocol below on how to make a 10% solution.*

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.

BG

Aroma releasing enzyme for white, red and fruit wines

#16176 1 kg

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
Not recommended	Not recommended

Wine
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 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.

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. Trials, however, have shown changes in mouthfeel and structure even when color change has been minimal.

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 Concords) 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 200-300 mL/1000 gal	6.6-9.2 mL/hL 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.

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 100-150 mL/1000 gal	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 juice **after** pressing or to the wine after alcoholic fermentation during a tank mixing. Do not use prior to pressing.

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 40-50 mL/1000 gal	1.3-1.6 mL/hL 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.

HC, KS, and Pec5L

Storage

Store at 4°C(40°F) for 1-2 years. Keep tightly sealed and refrigerated once opened.

RAPIDASE

New Clear Extreme

Hard to settle Hybrid and American grapes

#16257 100g

Hybrid and American grape varieties may be difficult to clarify due to unique grape characteristics and the cool climate conditions for processing. Rapidase Clear Extreme can be used after pressing to help preserve aromatic freshness, reduce viscosity, improve juice clarity, help compact lees and speed up clarification even in difficult conditions (low temperature, low pH, hard to settle varieties). Rapidase Clear Extreme will remain active from 6–50°C(43–122°F).

Recommended dosage (dependent on temperature):

6–10°C(43–50°F)	4 g/hL	152 g/1000gal
10–12°C(50–54°F)	2 g/hL	76 g/1000gal
Above 12°C(54°F)	1 g/hL	38 g/1000gal

Settling time less than 6 hours above

10˚C(50°F)	3 g/hL	114 g/1000gal

Usage

Dissolve Rapidase Clear Extreme in 10 times its weight in water, stir gently, allow to sit for a few minutes. Then add to the juice right after pressing.

Storage

Dated expiration. Store refrigerated at 4–8°C(40–45°F).

Extra Press

Macerating enzyme to improve pressability of white grapes

#16254 20 kg

Rapidase Extra Press is a macerating enzyme for white grapes. It is a liquid pectolytic enzyme with essential side activities that help weaken berry cell walls to facilitate juice release and to reduce viscosity. Use for improving pressability on hard-to-press varieties such as Muscat and Thompson Seedless, as well as on slipskin varieties such as Niagara.

Recommended Dosage

Crushed Grapes
10-50 mL/ton (1-1.2 mL/hL)

Juice
Best before fermentation

Wine
Best before fermentation

Usage

Dilute Rapidase Extra Press in 10 times its weight in must or water prior to addition. Then add to the grapes while filling the press.

Storage

Dated expiration. Store in the refrigerator at 4-8°C(40-45°F).

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/granular 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_2.

Are enzymes deactivated by SO_2?
Yes, enzymes are inhibited by SO_2. Deactivation occurs around 200 ppm. Do not add SO_2 and enzymes together. It is okay to add enzymes after the SO_2 is adequately dispersed or to add the SO_2 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_2 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 betaglucanase enzyme. Do you carry a betaglucanase enzyme?
Yes, Lallzyme MMX is a blend of betaglucanase and pectinase. It is currently listed in CFR 24.250.

How long should I leave the enzyme on white grapes before pressing?
In general, waiting 2-12 hours before pressing should be enough time for the enzyme to work.

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_2, 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_2, VA, residual sugar, malic acid and alcohol level. Creating an optimal environment for malolactic bacteria includes:

Temperature	Alcohol Level	pH
Between 20-25°C(68-77°F).	Below 13% (v/v).	Above 3.4.

SO_2
Free SO_2 below 10 ppm, total SO_2 below 25 ppm.

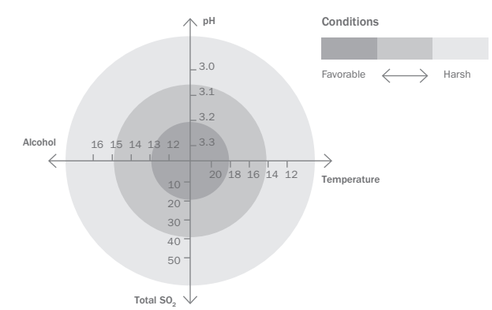
Volatile Acidity (VA)
If the pH is high, other bacteria strains may already be growing causing an elevated VA. The wine should be monitored for unwanted bacteria.

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



Note: When selecting a bacteria culture, take note that limiting conditions have a compounding inhibitory effect. For example, if low pH is combined with high SO_2, conditions in a wine will be more antagonistic to the bacteria than low pH alone.

CHOOSING THE RIGHT MALOLACTIC BACTERIA

● Highly Recommended
○ Recommended

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 (MBR)							Co-Inoculation	1-Step		Nutrients			
		Alpha	Beta	ICV Elios 1	MBR 31	O-MEGA	PN4	VP41	Beta Co-Inoc	1-Step Alpha	1-Step VP41	Acti-ML	Opti'Malo Plus	Opti'ML Blanc	ML Red Boost
Page		61	61	61	61	62	62	62	63	63	63	65	65	65	65
Reds		●	●	●	●	●	●	●	●	●	●	●	●		●
Whites and Rosé		●	●		●	●	○	●	●	●	●	●	●	●	
Fruit, Cider and Mead		○			●		●				○	●	●		
Higher alcohol tolerance		●		●		●	●	●		●	●				
Lower pH tolerance					●		●								
Higher SO_2 tolerance			●				●	●	●		●				
Lower temperature tolerance		●			●	●									
Low nutrient demand		●				●		●		●	●				
Medium nutrient demand				●	●		●								
High nutrient demand			●						●						
Higher diacetyl production		○	●		●		●			○					
Impact on mouthfeel fullness		●		○		○		●		●	●				
Impact on mouthfeel structure		○		●				○		○	○				
Impact on fruitiness			●	○	●	●	○		●						
Restart stuck or sluggish MLF										●	●				
Bacteria rehydration nutrient												●			
Nutrient for difficult red MLF's															●
Nutrient for difficult white MLF's														●	
General ML Nutrient													●		
Alcohol (% v/v)		<15.5%	<15.0	<15.5	<14.0	<16.0	<16.0	<16.0	<15.0	<15.5	<16.0				
pH		>3.2	>3.2	>3.4	>3.1	>3.1	>3.0	>3.1	>3.2	>3.2	>3.1				
Total SO_2 (mg/L)		<50	<60	<50	<45	<60	<60	<60	<60	<50	<60				
Temperature °C(°F)		>14° (57°)	>14° (57°)	>18° (64°)	>13° (55°)	>14° (57°)	>14° (57°)	>16° (61°)	>14° (57°)	>14° (57°)	>16° (61°)				
Typical fermentation kinetics	Start	Fast	Slow	Mod	Slow	Fast	Mod	Mod	Slow	Fast	Mod				
	Finish	Slow	Fast	Mod	Fast	Fast	Fast	Mod	Fast	Slow	Mod				

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.

Alpha

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.

This strain is pH tolerant to 3.2, total SO_2 to 50 ppm, temperature to 14C°(57°F) and alcohol to 15.5%.

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

O. oeni adapted to high SO_2; 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_2 to 60 ppm, temperature down 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.

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.

ICV Elios 1

O. oeni 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_2 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

O. oeni 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, though not below 13°C(55°F). It is alcohol tolerant to 14.0% and total SO_2 to 45 ppm.

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.

New O-MEGA

O. oeni adapted to high alcohol and cooler cellar temperatures

White, Red

#15615 25hL (660 gal) dose
#15616 250hL (6,600 gal) dose

Selected in the south of France by the IFV in Burgundy for its ability to complete MLF in a wide range of applications.

O-MEGA® can perform in cool temperatures (down to 14°C/57°F) and higher alcohols (up to 16% v/v) with very low VA production.

Due to a late attack of citric acid, there is a very low level of diacetyl produced, making it suitable for fruit-forward wines. Using this bacteria in reds helps stabilize color because of the slow degradation of acetaldehyde.

TESTIMONIAL

"In harvest of 2014 we did trials with Lallemand's O-MEGA® malolactic bacteria strain on an Oakville Chardonnay. The malic was 3.25 g/L at harvest. Primary fermentation was very straightforward. We finished with 14.3% v/v EtOH, a pH of 3.6 and a VA of 0.23g/L. The lot was then split in two on October 23rd and half the barrels were inoculated with Beta and the other half with O-MEGA. Both lots also received 25 g/hL of Opti'Malo Plus at the time of ML inoculation.

Both lots finished ML on November 25th. They had virtually same VA (at 0.34 g/L), and the same malics (at 0.05 g/L). The diacetyl levels, however, were distinctly different. For the Beta it was 11.5 mg/L while for the O-MEGA it was 3.0 mg/L.

From a straight functionality perspective, it's easy to understand the practicality of O-MEGA. It is fast and "to the point" with very low volatile acidity.

From an organoleptic standpoint, O-MEGA has lower levels of diacetyl and gave its wines viscosity on the palate. O-MEGA increases the brioche-y nose of the wine while still respecting the fruit."

Enrico Bertoz
Assistant Winemaker
Flora Springs Winery

PN4

O. oeni adapted to difficult conditions of pH, alcohol and SO_2

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_2 levels up to 60 ppm. Known for its fast fermentation kinetics.

Especially suitable for spicy and structured Pinot Noir wines.

VP41

O. oeni adapted to high SO_2 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_2 level of 50-60 ppm. At 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

O. oeni for use in co-inoculation

White, Red

#15617 25hL (660 gal) dose

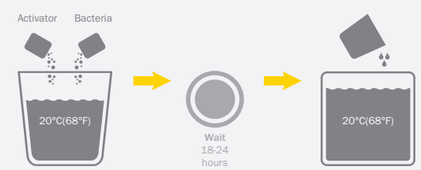
Specifically selected by Lallemand for reliable performance in co-inoculation of wines with pH >3.2. Not recommended for use in a sequential MLF.

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_2 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.

PROTOCOL
ADDING 1-STEP CULTURES TO WINE



Rehydration
H_2O, wait 20 minutes, add equal volume of wine

Inoculation

Please see 1-Step procedure in more detail at www.scottlab.com.

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.

The 1-Step cultures can also be used to restart a stuck or sluggish MLF.

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

Please see our website (www.scottlab.com) for the protocol.

1-Step Alpha

O. oeni 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 acclimitization procedure.

Known strain that has proven effective at alcohol levels up to 15.5% (v/v), pH above 3.2, total SO_2 up to 50 ppm, and temperature down to 14°C(57°F).

1-Step VP41

O. oeni adapted to high SO_2 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, total SO_2 up to 60 ppm, and temperature down to 16°C(61°F).

STANDARD ML FREEZE DRIED BUILD-UP CULTURES

When using these standard 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 (Inobacter)

O. oeni adapted for sparkling wines; neutral sensory effect	IOC
Sparkling, White, Red	
#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	LALLEMAND
Sparkling, White, Red	
#15027 25-35 hL (660-925 gal)	

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

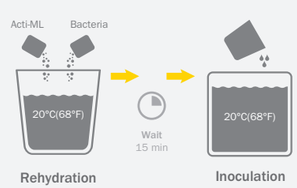
Characterized by very low VA and diacetyl production resulting from a lack of citrate permease activity.

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_2, polyphenols, medium chain fatty acids and nutritional levels all affect malolactic bacteria growth and activity. Low temperatures can inhibit malolactic bacteria. High temperatures (above 77°F) and high levels of alcohol or SO_2 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.).

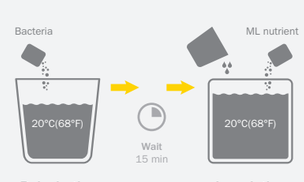
PROTOCOLS

ADDING ACTI-ML TO WINE



Add Acti-ML to the rehydration water prior to adding the bacteria.

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



Add Opti'Malo Plus or Opti ML'Blanc to the wine just before adding the bacteria.

Add ML Red Boost 24 hours prior to adding the bacteria.

Acti-ML

Bacteria rehydration nutrient	LALLEMAND
#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 20°C(68°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	LALLEMAND
#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 just before adding the malolactic bacteria. 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	LALLEMAND
#15217 1 kg	

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.

Recommended Dosage

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

Usage

Suspend in small amount of water or wine and then add directly to the wine just 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	LALLEMAND
#15218 1 kg	

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.

Recommended Dosage

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

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 (-18°C/0°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 SO2, 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)*.

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_2 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_2 levels, pH, alcohol, temperature constraints as well as malic acid concentration *(see chart on page 60)*.

Why does the TSO_2 need to be measured when choosing the correct strain of bacteria?
SO_2 can be bound to acetaldehyde. Bacteria can break that bond and liberate free SO_2, 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. Due to 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.

If I am doing a co-inoculation, which bacteria nutrient do I need? When should I add it, and how much should I add?
As long as you have a good nutrient strategy and add complex nutrients for your primary fermentation, additional ML nutrients aren't always necessary.

If wine conditions are very difficult: low pH (<3.2), high alcohol (>15.5 % v/v), high SO_2 (>45 mg/L total or 5 mg/L free SO_2), and MLF has not started at the end of alcoholic fermentation (increase in L-lactic acid >0.2 g/L), ML nutrient additions are recommended: 20 g/hL of ML Red Boost for structured red wines or 20 g/hL Opti'ML Blanc for white wines.

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

● Highly Recommended	Lysozyme		SO_2		Chitosan	DMDC
	Lyso-Easy	Lysovin	Inodose Granules	Inodose Tablets	No Brett Inside	Velcorin
Page	68	68	69	69	70	70
Reds	●	●	●	●	●	●
Whites and Rosé	●	●	●	●	●	●
Fruit, Cider and Mead	●	●	●	●	●	●
Protection from indigenous yeast			●	●		
Control gram positive bacteria (LAB)	●	●	●	●		
Control gram negative bacteria *(Acetobacter)*			●	●		
Inhibit oxidation of grapes and juice			●	●		
Control spoilage yeast *(Brettanomyces)*			●	●	●	●
Protection during stuck and sluggish fermentations	●	●				
Delay MLF	●	●				
Helps prevent refermentation in bottle			●	●		●

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.

It is important to note that lysozyme requires a minimum seven day contact time to allow the enzyme to work.

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. One mL of Lyso-Easy contains 0.22 g granular 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.

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
Inhibit Growth of LAB in Must and Juice 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
Protection During Stuck and Sluggish Fermentations To encourage yeast growth in the absence of SO_2 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
Delay MLF/Post-MLF Stabilization To protect wine without the negative effects of SO_2, 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	Add immediately after MLF completion
Inhibit MLF when Blending Partial and Complete ML Wines		●	●	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_2 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)
#15780 100 g
#15781 400 g

Note: Volume discounts are available. See order form on pages 106-107 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_2. Inodose Granules come in pre-measured packs. A pack of Inodose Granules 100, for example, will release 100 grams of pure SO_2. Inodose Granules are perfect for SO_2 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 pages 106-107 for details.

Inodose Tablets are a blend of potassium metabisulfite and potassium bicarbonate. They are packaged in 2 g and 5 g dosage levels. As they dissolve into must or wine, the tablets release a precise dose of SO_2. 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_2 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:

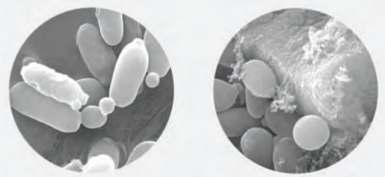
- In gondolas or picking bins to inhibit oxidation of grapes and juice, especially from *Botrytis* or mold.
- During transport of must or juice.
- To inhibit indigenous yeast and bacteria.
- In tanks before fermentation and directly into barrels after malolactic fermentation.
- To make sulfite additions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

Inodose Granules and Tablets Conversion Chart—PPM of Total Sulfur Dioxide

SO_2 Dose	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
100 g	100,000	26,420	440	264	26.4
400 g	400,000	105,680	1,761	1,057	106

Note: The SO_2 products contribute 2 g or 5 g of pure SO_2 when added to the wine. Because they are blends of KMBS and potassium bicarbonate, the tablets and granules actually weigh more than what they contribute in SO_2.

NO BRETT INSIDE



Before
Scanning Electron Micrograph x 20,000 magnification *Brettanomyces* cells prior to being treated with No Brett Inside.

After
Scanning Electron Micrograph x 20,000 magnification *Brettanomyces* cells treated with 4 g/hL of No Brett Inside. Image shows *Brettanomyces* cells attached to the surface of the Chitosan.

Images courtesy of Biljana Petrova and Dr. Charles G. Edwards, Washington State University, Pullman, WA

No Brett Inside

Brettanomyces spp. control agent

#16410 100g

No Brett Inside® is a commercial preparation of Chitosan that was introduced by Lallemand and is 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

40-80 ppm 4-8 g/hL 0.33-0.67 lb/1000 gal 9-18 g/60 gallon barrel

Usage

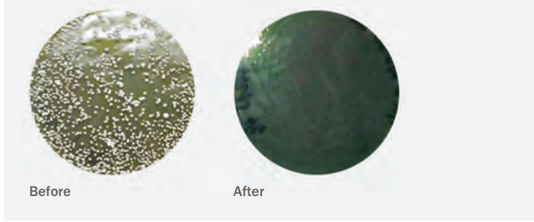
Suspend No Brett Inside in 5 times its weight in cool water (No Brett Inside is insoluble, so it will not go into solution). No Brett Inside can be added during a pump-over or tank/barrel mixings insuring a homogenous addition. Leave the No Brett Inside in contact with the wine for 10 days and then conduct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

To determine the effectiveness of your addition, a period of 20–30 days post-racking should be respected before microbial analysis. 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).

VELCORIN



Before **After**

Velcorin

Yeast inhibitor; microbial control agent

#18000 3 kg

For more information on Velcorin and dosing machines, please contact Rebekka deKramer at Scott Laboratories, Inc.

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, non-alcoholic wine, and cider, as well as juice, juice sparklers, sports drinks and ready-to-drink teas. Since 2013, Velcorin is also approved for use in wine made in Canada. 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.

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, 4-ethylguaiacol, 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 U.S. $74,000.

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_2. 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 Inodose granules?
No, use the entire packet for a single dose of SO_2. The formulation (therefore dosage), can be affected if the granules absorb any moisture.

Can I break the Inodose 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.

I added a 5 g granule sachet of $S0_2$ to my 60 gallon barrel. Does this mean I have 22 ppm of free $S0_2$?
You have 22 ppm total $S0_2$ added. The amount of free depends on pH, residual sugar, solids, etc.

No Brett Inside

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 and 4-ethylguiacol).

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 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 labeling is required in the United States or Canada.

Is Velcorin-treated wine approved in countries other than the U.S. and Canada?
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. 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.*

A clean cellar is one of the basic keys to producing and maintaining quality wines. AiRD products achieve hygiene goals while saving time, water and energy. Our mantra is "Work smarter, not harder"!

Cleaning [klee-ning] *n.*
The removal of soils from wine contact surfaces through the use of appropriate agents under recommended conditions

Sanitation [san-i-tey-shun] *n.*
The reduction of (viable) populations of micro-organisms.

BENEFITS OF AIRD PRODUCTS

- Significant water savings since no citric rinse is required.
- Specially formulated products for the wine industry.
- Innovative *BUILT FORMULA* for more effective cleaning.
- Effective at low doses over wide temperature ranges.
- Non-dusting product.
- No chlorine, other halogens, phosphates, silicates or fillers.
- Do not require hazardous shipping.
- Safer and less environmental impact than bulk chemical cleaners.

CHOOSING THE CORRECT WINERY HYGIENE PRODUCT

● Highly Recommended
◊ Recommended

	Cleaning Agents					
	Cleanskin-K	Destainex	Destainex-LF	Oak Restorer-CW	Oak Restorer-HW	Wineglass
Page	73	73	73	74	74	74
Dosage	0.5–4% w/v	0.5–1.5% w/v	0.5–1.5% w/v	0.5-2.0% w/v	0.5-2.0% w/v	
Water temperature for use	68–140°F 20–60°C	104–140°F 40–60°C	104–140°F 40–60°C	68–89°F 20–30°C	104–140°F 40–60°C	
pH (1% solution)	~11.3	~10.5–10.9	~10.8	~10.65	~9.6	
Removes tartrates	●	◊	◊	●	●	
Removes color	◊	●	●	●	●	
Microbial neutralizing		◊	◊	●	●	
General purpose cleaning	◊	●	●			
Barrel cleaning				●	●	
Cellar/Tasting Glassware						●

CLEANING AGENTS

All Cleaning Agents

Dosage Rates

0.5% w/v	0.5 g/100mL	5 g/L	19 g/gal	0.67 oz/gal
1% w/v	1 g/100mL	10 g/L	38 g/gal	1.34 oz/gal
1.5% w/v	1.5 g/100m	15 g/L	57 g/gal	2.0 oz/gal
2% w/v	2 g/100mL	20 g/L	76 g/gal	2.68 oz/gal
4% w/v	4 g/100mL	40 g/L	151 g/gal	5.36 oz/gal

Cleanskin-K

Multi-purpose cleaner and tartrate remover
Tanks and Equipment
#18500 5 kg

Cleanskin-K is a 100% active, water soluble, multi-purpose potassium-based cleaning product for use in the winery. This carbonate formulation uses the power of oxygen to effectively clean stainless steel and associated materials. Cleanskin-K can be used in tanks, presses, destemmers, juice channels and more to remove tartrate crystals. Secondarily, it is effective at removing wine color, protein and organic soils. In addition to the potassium carbonate, Cleanskin-K also contains proprietary percarbonates, chelation and sequestering aids, polysurfactants and a rinse aid, to leave your surfaces bright, clean, neutral and spot free.

Recommended Dosage
1-4% w/v *(See chart)*

Usage
Cleaning is most effective when soft or treated/potable warm water is used.

Prepare appropriate volume of 20-60°C(68-140°F) potable water (typically 10% volume of the vessel volume you are cleaning), accurately measuring 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. Cleanskin-K can be used manually, or with automated CIP systems.

Contact time is based on water temperature and quality, amount of Cleanskin-K used and turbulence of contact. Average contact time is 20 minutes.

Storage
Store in a dry, odor free environment between 10–20°C(50–68°F) away from sunlight.

Destainex

Multi-purpose oxidizing cleaner for organic soils and molds
Winery Surfaces, Tanks, Lines, Equipment
#18502 5 kg

TESTIMONIAL

"Last year we started using Destainex-LF at the winery as our full time, general use cleaner. As a MicroCrush winery with more than 150 separate clients (many of them one barrel), we needed to find a way to save time and water. Destainex-LF was the answer and delivers on all its claims and more. Gone are lengthy three-cycle cleanings and the harsh chemicals/long rinses associated with them. A happy cellar crew goes a long way as well."

Eric Lyman
Associate Winemaker
Judd's Hill Winery

Destainex-LF (Low Foaming)

Low Foaming version of Destainex
Bottling systems, winery surfaces, lines, equipment and difficult to rinse systems
#18504 5 kg

Destainex products are proprietary sodium percarbonate based cleaning agents with microbial neutralizing abilities. These highly effective formulations can be used at low levels to remove wine color, protein stains, mold, mildew, and biofilms from wine contact surfaces such as: stainless steel, galvanized metals, concrete, polyethylene (low and high density), polypropylene, plastics, flexible hoses, glass and powder-coated surfaces. Destainex products can be used in both automated (CIP) and manual systems. The sodium percarbonate in Destainex products are complemented with proprietary surfactants and chelation agents, water conditioning materials and rinse aids for a bright, clean and spot free neutral surface.

Destainex and Destainex-LF

Recommended Dosage
0.5-1.5% w/v *(See chart)*

Usage
Cleaning is most effective when soft or treated warm water is used.

Choose Destainex-LF rather than Destainex if used in an application where low foam is desired.
Prepare appropriate volume of potable hot water 40-60°C(104-140°F) and accurately measure the correct weight of your Destainex product. 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. Destainex products can be used manually, or with an automated CIP system.

Contact time is based on water temperature and quality, amount of Destainex product used 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 10–20°C(50–68°F) away from sunlight.

Oak Restorer-Cold Water (CW)

Oak cleaner and refresher	AIRD
#18508 5 kg	

Recommended Dosage
0.5-2% w/v *(See chart)*

Usage
Prepare appropriate volume correct temperature water:
20-30°C(68-86°F)

Storage
Store in a dry, odor free environment between 10–20°C(50–68°F) away from sunlight.

Oak Restorer-Hot Water (HW)

Oak cleaner and refresher	AIRD
#18510 5 kg	

Oak Restorer products are proprietary cleaners formulated for use on oak surfaces. These products were developed on behalf of winery clients in Australia. These buffered carbonate blends also contain bicarbonates and surfactants to effectively remove tartrate build-up, color, tannin and protein residues, thereby extending the working life of barrels, puncheons, redwood tanks and staves. Oak Restorers are single process cleaning agents requiring only a water rinse. No subsequent neutralization is required. Oak Restorers leave your wooden surfaces refreshed, odorless and pH neutral.

Recommended Dosage
0.5-2% w/v *(See chart)*

Usage
Prepare appropriate volume correct temperature water:
40-60°C(104-140°F)

Storage
Store in a dry, odor free environment between 10–20°C(50–68°F) away from sunlight.

Wineglass

Cleaner for cellar and tasting room glassware	AIRD
#18516 5 kg	

Wineglass is a liquid detergent for wine tasting room and cellar glassware with high-quality rinsing properties. Wineglass is safe to use either manually or in a dishwasher.

Storage
Store in a dry, odor free environment between 10–20°C(50–68°F) away from sunlight.

ARTICLE

CONSIDERATIONS FOR SELECTING AND EVALUATING A CLEANING AGENT

The standard bulk chemicals that we use in our industry for cleaning are caustic soda (either sodium or potassium hydroxide based) and citric acid. Although widely used, this combination is limited in effectiveness, and can involve worker-safety issues as well as long-term damage to winery equipment and surfaces.

Caustic soda solutions, if maintained above pH 10, are highly effective at dissolving tartrates and heavy deposits. When used as a multi-purpose cleaner, however, some negative side-effects can result. A caustic solution can be effective at decolorizing and dissolving organic soil, but it also denatures and chars these soils at the same time. This is due to the pH differential between the caustic solution and wine (pH 14 to 3.5 respectively). Denatured and charred organic soils are seen on wine surfaces as a brown/black deposit. The use of caustic can therefore actually create new stains, which provide opportunity for the development of biofilms. In addition to the points above, if a caustic is sodium based, it is potentially environmentally degrading (high sodium effluent can cause sodic soils).

After caustic use, it has become common practice to rinse with a low dose aqueous citric acid solution to neutralize any residual salts (Na or K) and reduce Ca/Mg scale. This process will not, however, remove the charred stains and biofilm left behind by the caustic treatment. This cleaning combination using bulk chemical may be ubiquitous and may seem inexpensive, but it can be potentially ineffective and creates new winery headaches.

An Alternative

Built formulations are a blend of synergistic compounds that allow for optimized cleaning, while respecting your equipment, cellar staff and saving water. In addition to the actual cleaning solution, these complex formulations include surfactants, chelating agents, water conditioners and rinse aids. The chelating agents assist with the removal of minerals that can be associated with the water. The surfactants (surface active agents) reduce the surface tension of the water and help to keep the debris in solution. This allows for the effective removal of dirt and/or soil from the area. AiRD products also have a built in rinse aid that leaves the system clean, spot free and neutral. Instead of bulk caustic, we would recommend using a formulated carbonate based system.

Percarbonates (either potassium or sodium based) are effective at dissolving wine soils at a lower pH than caustic solutions. Due to the built formulations of AiRD products, the soils are removed from the wine contact surface, retained in the water solution and rinsed freely from the system. The formulation itself is fully biodegradable within 30 days.

Once the cleaning solution has been drained, it is important to rinse the cleaning solution from the system. This clean water rinse is the next stage. It is important that this water rinse respects the system and does not re-deposit contaminants from the water, this stage is also important as residual alkali cleaner is incompatible with many of the acid based sanitizers. When using AiRD cleaning products, a citric rinse is not required. Eliminating this step saves time, energy, chemicals and water. The final stage is the actual sanitation phase. Sanitation is only effective if cleaning has effectively removed all residues — organic, inorganic, color, tannins, and microbial materials.

An optimized program follows the W.A.T.C.H. rule (water, action, temperature, concentration and heat), while also considering; soil type (organic, inorganic or combination) and presence (light, moderate or heavy load), soiled material (stainless steel, hoses, concrete), and water condition in addition to the activity of the cleaning agent itself. By understanding these factors you can minimize the amount of cleaning and sanitation agents used, as well as conserving water and energy.

The validation of your program can be determined by traditional and advanced microbiological techniques, which range from plating, DNA analysis and ATP bioluminescence. Essentially, once you are finished the area should look, smell and feel clean!

Documentation and Safety Considerations

It is essential that you maintain records on your regime and incorporate cleaning and sanitation protocols into every stage of your quality assurance program, insuring that the cleaning and sanitation agents selected are appropriate.

All products used in the sanitation program must be approved for use, including the concentration that you intend to use it at. Do not decant into unlabelled containers and do not deviate from the prescribed use. Proper Personal Protective Equipment (PPE) should be respected. For details on PPE, please refer to the specific MSDS which can be found on our website at *www.scottlab.com*.

WATER SAVINGS WITH AIRD PRODUCTS

Classic Method	Water Used*	vs.	AiRD Process	Water Used*
Rinse	100 gallons		Rinse	100 gallons
Caustic	200 gallons		AiRD Product	200 gallons
Long Rinse	200 gallons		Short Rinse	100 gallons
Citric	200 gallons			
Rinse	100 gallons			
TOTAL	**800 gallons**		**TOTAL**	**400 gallons**

Due to its unique formulation, AiRD products can result in up to 50% water savings.*

The chart at left shows a common SOP for a 2,000 gallon tank cleaning.
**Not including potential reuse of AiRD solutions. Actual water savings may be greater.*

FREQUENTLY ASKED QUESTIONS

Why is water quality important?
Water comprises 96-99% of cleaning and sanitation solutions. The chemical and microbiological impurities in water can drastically alter the effectiveness of a cleaner or a sanitizer, and the outcome of your process.

Why is water hardness important?
Hard water (water that has a high mineral content) can leave mineral deposits on the surface of equipment which can cause filming and staining and provide a surface for biofilm development. Hard water also interferes with the ability of a cleaning agent to do its job. The minerals react with bulk caustic and carbonate cleaners to produce the film which leaves less chemical available for cleaning. This is one of the reasons that you should use built formulations.

What if I do not have demineralized water for the final rinse stage?
It is important that the final water rinse does not re-contaminate your sanitized equipment. Use of a 0.2 micron cartridge filter should be used for the final rinse of previously sanitized equipment.

What is a built formulation?
A built formulation is a synergistic blend of compounds that allow the cleaner to clean the surface while solubilizing the soil and removing it from the system.

What are the main type of soil in the winery?
Soil is the presence of a material in the wrong area. It can be visible or invisible. Winery soils can be generally categorized as organic, inorganic or combination. Winery soils can be grape based and include sugars, acids, salts, color pigments, tannins, and proteins, or they can be process based. Process based soils can originate from wine additions, microbial activity, water quality or residual cleaning agent.

How do I determine the type of soil that I have?
Initial rinsing with warm water will tell you if the soil is generally water soluble (examples are sugars and tartrate crystals). If the soil does not rinse freely with warm water, likely candidates are proteins, tannins, polyphenolics or baked on residues that could have been removed with warm water when fresh. In general, these soils are acid-based. This is why an alkaline-based agents is used for cleaning.

How do I prepare the equipment for cleaning?
It depends on the equipment. Generally, a warm water rinse <40°C (104°F) as soon as the equipment has been emptied will stop stains from drying onto the surface, which makes removal much more difficult.

What if I cannot get the water to the recommended temperature?
Follow the W.A.T.C.H. formula and compensate for lack of temperature or time by increasing the other parameters (water, action, time, concentration and heat).

How much water do I need to use?
You would generally use approximately 10% of the equipment volume when cleaning manually. Depending on the stage of the process this water can be re-used (final rinse water can be used as the initial rinse water in a neighboring piece of equipment).

What happens if I add more than the recommended dosage?
More chemical does not always equal more effective cleaning. If more than the recommended is used you can leave chemical residues behind and have to use more water to rinse out the excess. Depending on the cleaning agent, handling may be more difficult due to the physical properties e.g. foaming, heat generation, neutralization, etc.

Do I need to sanitize after cleaning with AiRD products?
After a thorough cleaning the equipment is ready for the sanitation phase. All cleaners have differing anti-microbial abilities but sanitation is not their primary function. After cleaning, all equipment should be process ready, whether a sanitation step is required is process dependent. If unsure always conduct a sanitation step after cleaning.

Why use a specialty cleaner for glassware?
AiRD Wineglass is much safer than using quaternary ammonium. It is free-rinsing, does not leave residue, and is highly effective at removing wine soils and lipstick.

How do AiRD cleaning products impact the environment?
AiRD formulations are biodegradable in 30 days.

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 finished 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. In the last several years, however, significant progress has been made 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 AID

● Highly Recommended
○ Recommended

	Gum Arabic		Manno-protein	Gum Arabic/ Mannoprotein Blends	
	Flashgum R Liquide	Inogum 300	Claristar	UltiMA Soft	UltiMA Fresh
Page	79	79	78	79	79
Reds	●	●	○	●	●
Whites and Rosé	●	●	●	●	●
Promote stability	●	●	●	○	○
Diminish bitterness	●	●		●	●
Diminish harsh tannins and astrigency				○	
Add perception of sweetness and softness	●			●	
Colloidal stability	●	●			
Tartrate (KHT) stability			●		
Aromatic stability			●	○	

Claristar

Natural liquid mannoprotein preparation for tartrate stabilization	
White, Rosé, Red	
#17000 2.5 L #17001 20 L	

Claristar is a specialty liquid mannoprotein product from Oenobrands to aid in the 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 rosé 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 enhanced potassium tartrate stabilization properties, wine can be treated immediately prior to bottling.

Recommended Dosage
Common dosages are 80-100 mL/hL (3-3.8 L/1000 gal) for white and rosé wines and 70-90 mL/hL (2.7-3.46 L/1000 gal) 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. Its effectiveness 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. *Please contact Scott Laboratories, Inc. for more information regarding the bench trial requirement.*

Note: Claristar is not appropriate for calcium tartrate stabilization problems.

Usage
Claristar can be used in white, rosé, and red wines that meet the below criteria:
- Are the final blend
- Have never been pH adjusted with calcium carbonate
- Are confirmed protein stable
- Are under 16% alcohol by volume

Claristar should never be added to a wine prior to cake/DE/Earth/Velo filtration, or cellulose pads. It can be added prior to crossflow and sterile cartridge filtration.

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.

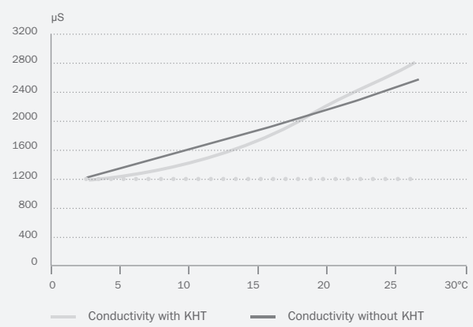
CONFIRMATION OF CLARISTAR DOSAGE

Drops in Temperature Saturation (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 drop drastically, 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. It is also indicative of colloidal stability in red wines.

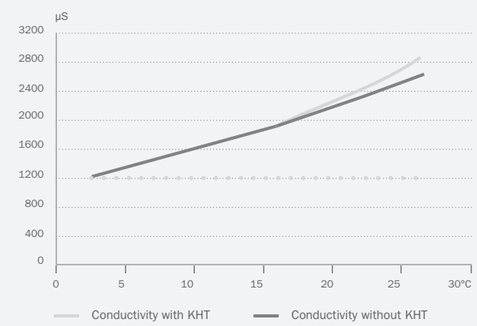
Without Claristar **With Claristar**

Heavy crystallization in non-treated wine.

Analysis of saturation curve on untreated Napa Valley Chardonnay (unstable)



Analysis of saturation curve, with 100 mL/hL Claristar



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).

Inogum 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	

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
150-300 ppm 15-30 g/hL 1.2-2.4 lb/1000 gal*

**Bench trials recommended*

Usage
Add UltiMA Fresh by mixing with 10 times its weight in water. 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 filtration.

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	

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
150-300 ppm 15-30 g/hL 1.2-2.4 lb/1000 gal*

**Bench trials recommended*

Usage
Add UltiMA Soft by mixing with 10 times its weight in water. UlitiMA 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 filtration.

Storage
Dated expiration. Store in a dry, well-ventilated environment at temperatures of less than 25°C(77°F).

ARTICLE

PREPARING WINE FOR BOTTLING

Fining

Fining agents can be used on wine to deal with a variety of issues but it is important that treatments are done at the proper time. Fining can help enhance a wine's clarity as well as improve filterability. *See the fining product chart on page 83 for products and applications.* In general, fining is recommended to take place 6-9 weeks prior to bottling.

Filtration

The cleaner your wine is before filtration, the more cost effective that filtration will be. Limited contact and settling time for fining agents may result in incomplete effect and higher clogging during filtration. More clogging leads to higher filtration and labor costs.

Finishing and Fine Tuning Wines

The best time to make final adjustments to a wine is 6-9 weeks prior to bottling. This can include blending as well as tannin additions for fine tuning of aroma, fruit or mouthfeel.

Heat and Cold Stabilization Pre-Bottling

Once a wine is blended, clarified and/or adjusted, it is often protein stabilized with bentonite and tartrate stabilized by one of several methods. It is recommended to heat (protein) stabilize prior to cold (tartrate) stabilization as bentonite additions may alter tartrate stability. It is important to use a bentonite that has good protein removal capacity. Sodium based bentonites have better protein removal capacity than calcium based bentonites, while calcium based bentonites compact lees better. Sometimes a blend of the two can produce the best results. Bench trials for stability and compaction can save time and money.

Bentonite is an effective adsorption tool that is also indiscriminate between desired and undesired proteins. Strategies can be employed to mitigate large bentonite adds. Small additions (2 g/hL) of FT Blanc help form tannin protein complexes which can reduce instability. Colloidal silica, such as Gelocolle, works on high molecular weight proteins while bentonite works on low molecular weight proteins. Colloidal silica/Gelocolle can be used to reduce total bentonite requirements. Bentonite should be added first, then Gelocolle. Bench trials should be run to determine correct additions.

Performing a rough filtration prior to heat stabilization (whether the wine was fined or not), will help create a clearer product to stabilize. For rough filtration we recommend using a 3–10 micron range depth filter media.

Stabilization by Removal

Traditional tartrate stabilization involves removal of the unstable crystals and their precursors. The common methods used are cellar cold stabilization, electrodialysis and ion exchange. Cold stabilization chills the wine to near freezing to lower the solubility of tartaric. 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. Cold stabilization often results in lower titratable acidity and may alter pH.

Electrodialysis machines pass wine through charged membranes that substitute stable ions for those that could cause instability such as K^+ and HT^+. This process lowers titratable acidity and may alter pH. Ion exchange machines use resin to substitute more stable ions (usually Na^+) for the potassium in the wine. Both of these processes require special equipment and a great deal of water that results in salty effluent.

Tartrate Stabilization by Inhibition

Claristar is a mannoprotein derived from wine yeast. It does not change the charge of your wine. It will not remove KHT. It will inhibit nucleation and crystal growth while increasing the solubility of the KHT in your wine. No final blending, acid adjustments or concentration additions may be added after Claristar has been added. It is important to note that adding a mannoprotein to a protein unstable wine may only further exacerbate the protein instability. *For more information on Claristar and the suitability of your wine, see page 78.*

CMC is a well known synthesized chemical for food products. It is a etherfied cellulose obtained by alkaline carboxymethylation. It works on crystals by defacing them and restricting further growth. Generally the crystals are flattened. CMC should only be used in white wines. It may precipitate color in red and rosé wines. If a wine is protein unstable, CMC may increase this instability and cause a haze. CMC should never be used in wines that have been treated with lysozyme as it will cause a protein precipitation haze. Bench trials should always be done for color loss and filterability.

Tartrate stabilizers such as Claristar or CMC are utilized just prior to bottling on protein stable wines.

Prior to adding Claristar or CMC the following should be adhered to:

- Confirm protein stability using a hot bath and turbidity meter.
- Claristar or CMC should be added 48 hours prior to bottling so it has enough time to "seat itself" in the wine.
- Before adding Claristar or CMC, wine should be filtered through 1–2 micron depth filter media. The finer this filtration, the more crystal nuclei will be removed.

Colloidal Stabilization

Gum arabic products act as colloidal stabilizers by using electrical charge attraction and repulsion. Gum arabic is only effective in conditions of very low to no tartrate instability. They are often more effective at color stabilization by complexing with tannins and polyphenols.

When adding gum arabic the following should be considered:

- These products should be added 24–72 hours prior to bottling.
- Always check filterability after adding these products.

Gum arabic should **not** be added to your wine immediately prior to filtration as it may clog membrane filters. Adding right before a crossflow filtration can also place undue pressure on the elements and cause long term damage.

Bottled Wine

Stabilizing your wine before bottling reduces the chance of haze or precipitation in the bottle. Wines that drop tartrates are subject to colloidal precipitation and vice versa. This can leave bottled wine prone to oxidation and microbial problems if filtration is not performed. For the final filtration, we recommend a .45 micron membrane filter.

FILTRATION

Scott Laboratories' expertise in wine filtration dates back to the 1940s. Though it began with filter sheets, today it extends to virtually every stage in filtration — from juice clarification to membranes for bottling lines.

Members of Scott's staff like Tom Anders, Jeff Heacock, Maria Peterson, Rick Mafit and others bring a wealth of experience. Each has helped scores of customers resolve filtration and clarity issues.

FREQUENTLY ASKED QUESTIONS

What grade filter media should I use?

Filtration is primarily used in winemaking to achieve two goals: to attain an acceptable level of clarity and to improve microbial stability. Consider these goals when selecting your porosity (by micron rating).

The following porosity ranges can be considered a guideline:
> 5μ = rough 1 μ–5 μ = polish < 1 μ = sanitizing

If the final goal is to filter through a sterile membrane before bottling, one must consider preparation through a rough, polishing and sanitizing grade filter prior to sterile filtration. Depending on the initial state of the wine clarity (quantity and type of solids in suspension), filtration steps can be added or removed to enhance efficiency. In general, selecting media grades from each category will achieve your primary goals of clarity and improved microbial stability.

How much wine can I filter through a 0.45 micron membrane cartridge filter before having to replace it?

The membrane will last as long as it continues to let wine through, while also passing regular integrity testing. The point in which membranes will clog is dependent upon the preparation of the wine (pre-filtration or fining), as well as the constituents of the wine (colloids and gums, for example). Regeneration using forward flushes of warm water (120-135°F/49-57°C), as well as chemical regeneration, can help to increase the longevity and throughput of membranes (or any filter media). Filter regeneration is always more effective when performed before filters are entirely clogged.

What are the effects of fining agents, such as activated carbon and bentonite, on filtration?

Fining agents can be very useful. Some products, however, can also lead to the premature clogging of your depth and surface filter media if they have not been properly settled out and racked off the lees prior to filtration. For example, a relatively small amount of fining lees can immediately clog depth media. Also, products like bentonite and carbon can disable hollow fiber crossflow filters by jamming capillaries. Clean rackings after full settling can help prevent these issues and will help optimize efficiency of filtration.

My wine filtered easily through my EK filters, but when I started bottling the next week, the wine immediately clogged my membrane. Why?

Depth filtration (sheets, lenticular, DE, etc.) can manage large colloidal proteins much more effectively and help prepare the wine for membrane (surface) filtration. The assistance of depth filtration is optimally effective if done within a 24 hour window of membrane filtration. If not done within this time frame, the colloidal material in the filtrate begins to regroup and can cause surface clogging on your membrane. If you must wait longer than 24 hours, you can alternatively repeat the filtration through the same grade depth filtration media before filtering through the membrane. You may also consider the use of enzymes to mitigate other clogging factors (i.e. pectins and glucans), as well as submitting samples to your laboratory for analysis to help determine strategies to proceed.

Be sure to check out our new video series, *Drops of Knowledge*. We are pleased to present detailed videos on set-up and usage for sheet filters, lenticular filter and cartridge filters. Visit *www.scottlab.com* and click on the *Forms & Videos* section.

Visit www.scottlab.com for videos on several filtration use protocols.

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 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 settling 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 *(see page 88 for more information)*. 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
Caséinate de potassium	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.

	Casein and/or Bentonite Formulations				Isinglass	Gelatin				PVPP		Silica Gel	Sparkolloid NF*	
	Bentolact S	Caséinate de potassium	Polycacel	Reduless	Cristalline Plus	Colle Perle	Inocolle	Inocolle Extra N1	Freshprotect	Polycacel	Polycel	Gelocolle	Cold Mix	Hot Mix
Page	84	84	87	87	85	85	86	87	85	87	87	86	84	86
Reds				●		●	●	●				●		○
Whites and Rosé	●	●	●	●	●	●	●		●	●	●	●	●	●
Fruit, Cider and Mead	●	●	●	●	●	○	○		●	●	○	●	●	●
Treat moldy juice *(Botrytis)*	●	○	●				●		●	●	○			
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.

Caséinate de potassium

To help prevent oxidation and for the removal of oxidized wine components

White, Rosé, Fruit, Cider

#15807 1 kg
#15808 5 kg

Caséinate de potassium 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, Caséinate de potassium 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 Caséinate de potassium 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 Caséinate de potassium solution before settling or at the start of alcoholic fermentation. For wine, add the Caséinate de potassium solution gradually during pumping over or via fining connection. Mix vigorously after adding the Caséinate de potassium 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, Caséinate de potassium 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

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

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.

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.

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).

Freshprotect NEW NAME

PVPP blend for treatment of oxygen sensitive juice and wine

White, Rosé, Fruit

#15790 1 kg
#15791 5 kg
#15792 20 kg

Freshprotect, (previously called Viniprotect), is a proprietary IOC blend of polyvinylpolypyrrolidone (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 Freshprotect. PVPP is intended as a processing aid. Wines made with it must be racked or filtered afterwards. Freshprotect 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 Freshprotect 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).

Gelocolle

Silica gel for improved settling

Red, White, Rosé, Fruit, Cider

#15782 1 L
#15783 5 L

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*

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

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*

Red Wines

500–1000 ppm 50–100 mL/hL 1.9–3.8 L/1000 gal

**Bench trials recommended*

When used with Gelocolle

250–500 ppm 25–50 mL/hL 0.95–1.9 L/1000 gal

**Bench trials recommended*

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.

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.

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

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*

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.

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.

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 polyvinylpolypyrrolidone (PVPP), micropulverized cellulose and 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 polyvinylpolypyrrolidone (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, Cider

#15116 1 kg
#15115 2.5 kg

Reduless is a proprietary fining product from Lallemand for the reduction of sulfur off aromas such as H_2S and dimethyl sulfide. Its formulation includes bentonite together with other natural elements which are rich in copper. Reduless 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, Sauvignon Blanc, Carignane, Pinot Noir, Chardonnay).

Recommended Dosage

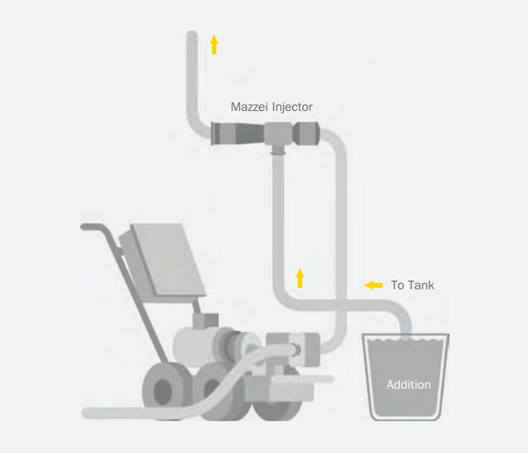
100-150 ppm 10-15 g/hL 0.8-1.2 lb/1000 gal

Usage

Mix Reduless 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.



Mazzei Injector

Please contact Scott Laboratories 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.

Please visit www.scottlab.com for a video of the Mazzei injector in action.

2" stainless steel model 1.5" plastic model

Guth Tank Agitators

Please contact Scott Laboratories for pricing.

Since 1974, Guth tank agitators have been a North American wine industry standard with thousands sold. Fitted with a 2" TC on the nose cone, these mixers have hollow rotors which allow a center shaft to be inserted and retracted from full tanks without product loss. They are lightweight and portable, ideal for tasks as varied as fining additions, cold stabilization and mixing blends. Guths are available in two sizes (the RA 45 and RA 110). When properly inserted, these agitators can mix tanks up to 8,000 and 16,000 gallons respectively. Give us your tank drawing and we will advise the optimal placement of the mixer. Options include gassing flanges, variable frequency drives, and mobile support carriages (recommended).

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-fining and could harm 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_2S, 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 Caséinate de potassium, Polycacel, Polycel or Freshprotect. 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_2.

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_2, 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 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). Clarifying can also help increase the filterability of wines.

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. We have also added a new enzyme this year, which has shown excellent results with hybrid varietals. Some of these are listed on the following charts.

HYBRID AND NON-*VINIFERA* PRODUCTS

Lalvin C

S. cerevisiae • *bayanus*

Yeast for use in cool climate wines high in malic acid, cider, fruit wines, restarting stuck fermentations, and secondary fermentation in sparkling wines

#15689 500 g

A strain selected from the collection of the Pasteur Institute, Paris. Originally isolated from a French wine region, Lalvin C has been used in winemaking since the early 1960's.

Technical Information

Fermentation temperature	15–30°C(59–86°F) ideal [may go down to 12–14°C(54–63°F)]
Lag phase	Very short
Nitrogen needs	Low
SO_2 production	Low
Fermentation speed	Moderate
Vigor	High
Alcohol tolerance	17%
Volatile acidity	Very low
Competitive factor	Sensitive
Sensory contribution	Neutral

New Clear Extreme

Enzyme for hard to settle Hybrid and American grapes

#16257 100g

Hybrid and American grape varieties may be difficult to clarify due to unique grape characteristics and the cool climate conditions for processing. Rapidase Clear Extreme can be used after pressing to help preserve aroma freshness, reduce viscosity, improve juice clarity, help compact lees and speed up clarification even in difficult conditions (low temperature, low pH, hard to settle varieties). Rapidase Clear Extreme will remain active from 6–50°C(43–122°F).

Recommended dosage (dependent on temperature):

6–10°C(43–50°F)	4 g/hL	152 g/1000gal
10–12°C(50–54°F)	2 g/hL	76 g/1000gal
Above 12°C(54°F)	1 g/hL	38 g/1000gal

Settling time less than 6 hours

Above 10˚C(50°F)	3 g/hL	114 g/1000gal

Usage

Dissolve Rapidase Clear Extreme in 10 times its weight in water, stir gently, allow to sit for a few minutes. Then add to the juice right after pressing.

Storage

Dated expiration. Store refrigerated at 4–8°C(40–45°F).

RED WINE YEAST STRAINS

○ Yeast Strain Type
● Highly Recommended
◐ Recommended

	3001	71B	BM 4X4	BRL 97	CLOS	CSM	ICV D254	Exotics SPH	Lalvin C	NT 202	RBS 133	RC212
Page	12	12	13	14	14	14	15	22	90	18	19	19
S. cerevisiae cerevisiae	○	○		○	○	○	○				○	○
S. cerevisiae bayanus									○			
A hybrid yeast strain								○		○		
A blend of yeast strains			○									
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	●				●			●				●
Reduces malic acid content		●						●	●			
MLF Compatibility	Average	Very Good	Below Average	Average	Very Good	Average	Very Good	Very Good	—	Very Good	Good	Good

WHITE WINE YEAST STRAINS

○ Yeast Strain Type
● Highly Recommended
◊ Recommended

	58W3	71B	Alchemy I	CY3079	ICV Opale	Exotics SPH	Lalvin C	QA23	Steinberger	SVG	VIN 13	VIN 2000
Page	12	12	12	15	18	22	90	18	20	20	20	21
S. cerevisiae cerevisiae	○	○		○	○				○	○		
S. cerevisiae bayanus							○	○				
A hybrid yeast strain						○					○	○
A blend of yeast strains			○									
Chardonel			●	●	●			●			●	●
Frontenac Gris	◊	●			●	●	●	●				
La Crescent	●	●	●			●	●	●	◊	●	●	
Muscadine	◊						●	●			●	
Seyval Blanc			●					●		●		
Traminette	●		●			●		◊	●		●	
Vidal Blanc			●		◊							
Vignoles	●		●		◊			●		●	●	
Enhances grapefruit and/or tropical			●			●		●		●	●	
Vigorous; temperature control is advised			●								●	
Barrel fermentation	●			●			●					●
Sur lie aging				●								
Accentuates citrus aromas					●							
Enhances mouthfeel				●	●	●						
Reduces malic content		●			●	●	●			●		
Brings out floral notes	●								●	●	●	
Enhances aromas in high-terpene varieties	●							●	●			
High ester producer	●		●								●	●
Enhances varietal character						●	●					●
MLF Compatibility	Average	Very Good	—	Good	Poor	Very Good	—	Very Good	Average	Good	Good	Good

SPECIALTY WINES
FRUIT WINE & 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 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_2S 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 provides 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, 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 and mead. 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 Cristalline Plus (isinglass) to brighten and clarify both red and white wine. Caséinate de potassium (casein) can treat oxidation and help prevent further browning. Reduless 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_2 Granules and Tablets are easy to use and are already measured into specific doses for your convenience. *See page 69 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 38-41 for more information.*

Please contact us for a copy of our Cider Handbook for a complete offering of products and protocols useful in cidermaking.

CHOOSING THE RIGHT PRODUCT FOR SPECIALTY WINES

● Highly Recommended
○ Recommended

Yeast	Fruit	Mead	Page
71B	●		12
ICV D47	●		15
DV10	●	●	16
EC1118	●	●	16
K1 (V1116)	●	●	16
Lalvin C	●		90
M2	●		17
QA23	●	●	18
R2	●		19
VIN 13	●	●	20
W15	●		21
Nutrients			
Fermaid A	●	●	35
Fermaid K	●	●	35
Fermaid O	●	●	36
Anchorferm	●	●	35
Go-Ferm	●	●	34
Go-Ferm Protect Evolution	●	●	34
Malolactic Bacteria			
Alpha	●		61
IB (Inobacter)	●		64
MBR 31	●		61
PN4	●		62
Enzymes			
Beta	●		53
BG	●		55
HC	●		56
KS	●		56
Pec5L	●		57

Tannins	Fruit	Mead	Page
FT Blanc	●		45
FT Blanc Soft	●	●	45
FT Rouge	●		46
FT Rouge Soft	●		46
Fining Agents/Stability			
Bentolact S	●		84
Caséinate de potassium	●		84
Colle Perle	●		85
Cristalline Plus	●		85
Freshprotect	●	○	85
Flashgum R Liquide	●	●	79
Gelocolle	●		86
Hot Mix Sparkolloid NF	●	●	86
Inocolle	●		86
Inogum 300	●	●	79
Polycacel	●		87
Reduless	●	●	87
Sulfur Dioxide			
Inodose Granules	●	●	69
Inodose Tablets	●	●	69
Yeast Derivative Nutrients			
Booster Blanc	●	●	39
Booster Rouge	●		39
ICV Noblesse	●	●	39
OptiMUM White	●	●	40
Opti-Red	●		40
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 as a research facility to address the specific issues that impacted the North American industry. Julius Fessler, the company founder, was awarded the ASE (now ASEV) Merit Award in 1958 for such contributions. The tradition of both service and innovation has continued to be central to our laboratory's mission ever since. Much of our daily work centers upon the enological hurdles and challenges that our industry faces 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 product portfolio.

VELCORIN CHALLENGE

Velcorin Challenge

Volume needed: two 375 ml samples needed per challenge

Includes microbial analysis of both a Velcorin-treated and untreated sample

A Velcorin Challenge provides information on the suitability of Velcorin, a microbial control agent, as a treatment to stabilize a particular wine. This test requires submission of two 375 mL bottles of each wine to be challenged: one bottle is used as a control and the second bottle is treated with 200 ppm of Velcorin (DMDC). Wine samples should be collected with care, using sterile sampling containers and devices. Sterilize all sample ports prior to pulling samples. Twenty-four hours after Velcorin treatment, both treated and untreated samples are filtered through a 0.45 micron membrane which is then placed on WLN agar. After five days of incubation, colonies are counted and results are reported.

Methanol testing for Velcorin addition quantification

Volume needed: 50 ml needed per sample

Velcorin, a microbial control agent, breaks down into roughly equal parts of CO_2 and methanol in the presence of water. The increase of methanol due to Velcorin (DMDC) addition can be used to quantify the amount of Velcorin dosed into a particular wine. All wines contain naturally occurring methanol, and background levels may vary. If dosage quantification is desired, methanol testing needs to be performed on wine samples collected before and after Velcorin (DMDC) dosing.

$$\frac{\text{Post Velcorin Methanol} - \text{Pre-Velcorin Methanol}}{0.48} = \text{approximate ppm of Velcorin dosed}$$

WINE ENHANCEMENT

Wine Enhancement Trials

Volume needed: minimum of two 750 ml samples

Enhancement and/or fining trials to determine which product(s) and the optimal dose rate needed to achieve the desired effect.

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 what tartrate stabilization product is compatible with a given wine and at what dosage rate.

In-Depth Tartrate Stability

Volume needed: four 750 ml samples

This analysis will help determine what tartrate stabilization product is compatible with a given wine, and at what dosage rate. In addition, the in-depth analysis will assist in avoiding any unforseen filtration issues.

Claristar Screen

Volume needed: two 750 ml samples

This analysis will help determine if your wine meets the Claristar Use Guidelines and thus a good candidate for Claristar use.

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.

PACKAGING EQUIPMENT

The combined experience and technical knowledge of Scott Laboratories and our international suppliers provides 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.

For a complete list and more information about our Crush Pad and Packaging Equipment, please visit our website at www.scottlab.com.

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1 Armruster Elevator Conveyor
2 Armbruster SB3000 Sorting Belt
3 Armbruster Rotovib with Rollersorter
4 Willmes Sigma 12
5 MBF Superbloc®

PACKAGING

CORKS, WIREHOODS & SCREWCAPS

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_2
- First moisture controlled cork warehouse
- 35-year presence in Portugal
- SPME testing in both the USA and Portugal
- ISO certified lab in Portugal
- Sustainably harvested cork

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.

For a complete list and more information about our corks and wirehoods, please visit our website at www.scottlab.com.

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1 Sterisun Corks
2 Natural Corks
3 One + One Corks
4 Colmated Corks
5 Champagne Corks
6 Bar Top
7 Wirehoods
8 Screwcaps

GENERAL TOOLS
CALCULATIONS AND CONVERSIONS

Volume Conversions

mL = milliliter
fl oz = fluid ounce
gal = gallon
L = liter
hL = hectoliter

1 mL	=	0.035 fl oz
1 fl oz	=	30 mL
1 L	=	1000 mL
1 L	=	0.2642 gal
1 gal	=	3785 mL
1 gal	=	3.785 L
1 hL	=	100 L
1 hL	=	26.4 gal

Mass Conversions

mg = milligram
g = gram
kg = kilogram
lb = pound

1 kg	=	1000 g
1 kg	=	2.205 lb
1 g	=	1000 mg
1 lb	=	453.6 g
1 lb	=	0.4536 kg
1 metric ton	=	1000 kg
1 metric ton	=	2205 lb
1 US ton	=	2000 lb
1 US ton	=	907 kg

Internet Conversion Tools

www.onlineconversion.com

www.wineadds.com

www.winebusiness.com/tools

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 lb/1000 gal	=	454 g/1000 gal	=	0.454 kg/1000 gal	=	120 mg/L	=	27.2 g/barrel*	=	0.120 g/l
1 kg/hL	=	1000 g/hL	=	10,000 mg/L	=	2.271 kg/barrel*	=	10 g/L		
1 ppm	=	1 mg/L				*barrel	=	60 gal	=	227.1 L
1°Brix	=	1% sugar (wt/vol)								
1 g/100 mL	=	1%								
1 g/L	=	0.1%								

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.)

$$\text{mLs of stock solution to add per sample bottle} = \frac{(\text{sample size in mLs}) \times (\text{desired concentration in mLs/1000 gal}) \times (0.000026)}{\text{\% concentration (v/v) of stock solution}}$$

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	Recommended Storage (once opened)	Optimal Storage Temperature
Active Dried Yeast	Use immediately	20°C(68°F)
Bentolact S	Dry: Tightly sealed; dry Rehydrated: should not be stored more than 24 hours.	25°C(77°F)
Biodiva	Use immediately	4°C(40°F)
Caséinate de potassium	Dry: Tightly sealed; dry Rehydrated: should not be stored more than 48 hours.	25°C(77°F)
Claristar	Use immediately	10°C(50°F)
Cleaning Products (AiRD)	Dry, odor-free environment away from sunlight.	10–20°C(50–68°F)
Colle Perle	Tightly sealed	25°C(77°F)
Cristalline Plus	Tightly sealed; dry	25°C(77°F)
Exotics SPH	Use immediately	5–15°C(41–59°F)
Freshprotect	Tightly sealed; dry	25°C(77°F)
Gum Arabics	Tightly sealed	25°C(77°F)
Gelocolle	Use immediately	10–20°C(50–68°F)
Inocolle	Tightly sealed	25°C(77°F)
Inocolle Extra N1	Tightly sealed; dry	25°C(77°F)
Inodose Granules & Tablets	Use immediately	25°C(77°F)
Lallzymes	Dry: General Storage Rehydrated: Use within a few hours	25°C(77°F)
Lyso-Easy	Use immediately	18°C(65°F)
Lysovin	Dry: General Storage Rehydrated: Refrigerate	Dry: 5–10 years @ 18°C(65°F) Rehydrated: 22% stock solution—refrigerated—retains 90% activity after 12 months
Malolactic Bacteria	Use immediately	Short term: @ 4°C(40°F) Long term: @ -18°C(0°F)
Mannoproteins	Tightly sealed	25°C(77°F)
Polycacel	Tightly sealed; dry	25°C(77°F)
Polycel	Tightly sealed; dry	25°C(77°F)
ProDessert	Use immediately	4°C(40°F)
ProElif	Use immediately	4°C(40°F)
ProRestart	Use immediately	4°C(40°F)
Rapidase Enzymes	Tightly sealed; refrigerate.	4–8°C(40–45°F)
Scottzymes	Liquid: Tightly sealed; refrigerate Dry: Tightly sealed; dry environment	1-2 years: Store liquid forms: @ 4°C(40°F) Store dry forms: @ 18–24°C(60–77°F)
Sparkolloid NF (Hot & Cold Mix)	Tightly sealed; dry	4 years @ 18°C(65°F)
Tannins	Tightly sealed; dry	18°C(65°F)
Velcorin	Not recommended	20–30°C(68–86°F)
Yeast Nutrients Yeast Derivative Nutrients ML Nutrients	Tightly sealed; dry	18°C(65°F)

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 2015

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**.

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
Editable PDF now available on our website 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
E-Mail to info@scottlabsltd.com

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
Cleaning Agents						
73	18500	Cleanskin-K	5 kg			
73	18502	Destainex	5 kg			
73	18504	Destainex-LF	5 kg			
74	18508	Oak Restorer-CW	5 kg			
74	18510	Oak Restorer-HW	5 kg			
74	18516	Wineglass	5 kg			
Encapsulated Yeast						
23	15150	ProDessert	1 kg			
24	15571	ProElif	1 kg			
24	15154	ProRestart	1 kg			
24	15158	ProMesh Barrel Bag	—			
24	15159	ProMesh Tank Bag	—			
Specialty Yeast Strains						
22	15213	Exotics SPH	250 g			
22	15685	Biodiva	125 g			
Premium Yeast						
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			
12	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			
13	15176	BM 4x4	500 g			
13	15200	BM 4x4	10 kg			
13	15669	BRG	500 g			
13	15670	BRG	10 kg			
13	15102	BRL97	500 g			
13	15205	BRL97	10 kg			
14	17106	Cepage Merlot	500 g			
14	15201	Clos	500 g			
14	15204	Clos	10 kg			
14	15640	Cross Evolution	500 g			
14	15641	Cross Evolution	10 kg			
14	15638	CSM	500 g			
14	15639	CSM	10 kg			

Page	Product #	Product	Size	Quantity	Price ($)	Ship Date
14	15208	CVRP	10 kg			
14	15210	CVW5	10 kg			
14	15061	CY3079	500 g			
14	15082	CY3079	10 kg			
14	15143	D21 (ICV)	500 g			
14	15163	D21 (ICV)	10 kg			
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			
15	15062	DV10	500 g			
15	15106	DV10	10 kg			
15	15053	EC1118 (Prise de Mousse)	500 g			
15	15076	EC1118 (Prise de Mousse)	10 kg			
15	15214	Elixir	500 g			
16	17143	Fermichamp	500 g			
16	17144	Fermichamp	5 kg			
16	15101	GRE (ICV)	500 g			
16	15142	GRE (ICV)	10 kg			
16	15063	K1 (V1116)	500 g			
16	15077	K1 (V1116)	10 kg			
90	15689	Lalvin C	500 g			
16	15644	L2226	500 g			
16	15645	L2226	10 kg			
16	15648	M2	500 g			
16	15649	M2	10 kg			
16	15650	MT	500 g			
16	15651	MT	10 kg			
16	15184	NT 50	1000 g			
17	15190	NT 112	1000 g			
17	15185	NT 116	1000 g			
17	15226	NT 116	10 kg			
17	15191	NT 202	1000 g			
17	15227	NT 202	10 kg			
17	15221	OKAY (ICV)	500 g			
17	15222	OKAY (ICV)	10 kg			
17	15068	Opale (ICV)	500 g			
17	15652	QA23	500 g			
17	15653	QA23	10 kg			
17	15071	R2	500 g			
17	15056	RA17	500 g			
18	15687	RBS 133	500 g			
18	15057	RC212	500 g			
18	15097	RC212	10 kg			
18	15072	Rhône 2056	500 g			
18	15180	Rhône 2056	10 kg			
18	15171	Rhône 4600	500 g			
18	15130	R-HST	500 g			

Page	Product #	Product	Size	Quantity	Price ($)	Ship Date
18	15665	RP15	500 g			
18	15666	RP15	10 kg			
18	15084	Steinberger (DGI 228)	500 g			
18	15086	Steinberger (DGI 228)	10 kg			
19	15144	SVG	500 g			
19	15657	Syrah	500 g			
19	15658	Syrah	10 kg			
19	15091	T73	500 g			
19	15183	VIN 13	1000 g			
19	15228	VIN 13	10 kg			
19	15195	VIN 2000	1000 g			
19	15173	VRB	500 g			
19	15118	W15	500 g			
19	15119	W15	10 kg			

Vi-A-Dry Yeast

20	15081	CEG (Epernay II)	500 g			
20	15093	CEG (Epernay II)	10 kg			
20	15060	Montrachet (Davis 522)	500 g			
20	15074	Montrachet (Davis 522)	10 kg			
20	15085	PM (Prise de Mousse)	500 g			
20	15083	PM (Prise de Mousse)	10 kg			

Yeast nutrients; natural yeast derivative nutrients

33	15147	Anchorferm	10 kg			
37	15179	Booster Blanc	2.5 kg			
37	15169	Booster Rouge	2.5 kg			
33	15805	DAP	5 kg			
33	15070A	Fermaid A	10 kg			
33	15073	Fermaid K	2.5 kg			
33	15070	Fermaid K	10 kg			
34	15070K	Fermaid K (Kosher)	10 kg			
34	15067	Fermaid O	2.5 kg			
34	15107	Fermaid O	10 kg			
32	15149	Go-Ferm	1 kg			
32	15135	Go-Ferm	2.5 kg			
32	15161	Go-Ferm	10 kg			
32	15103	Go-Ferm Protect Evolution	2.5 kg			
34	15804	Inocel	1 kg			
37	15105	Noblesse (ICV)	2.5 kg			
34	15679	Nutrient Vit End	2.5 kg			
38	15198	OptiMUM White	1 kg			
38	15202	OptiMUM White	2.5 kg			
38	15148	Opti-Red	1 kg			
38	15138	Opti-Red	2.5 kg			
38	15211	Opti-Red	10 kg			
38	15165	Opti-White	1 kg			
38	15136	Opti-White	2.5 kg			
38	15216	Opti-White	10 kg			
35	15887	Phosphate Titres	1 kg			
35	15888	Phosphate Titres	5 kg			

Page	Product #	Product	Size	Quantity	Price ($)	Ship Date
38	15662	Redstyle	2.5 kg			
35	15100	SIY 33 (Fermaid 2133)	12.5 kg			
35	15069	SIY Cell Hulls (Yeast Hulls)	1 lb			
35	15069	SIY Cell Hulls (Yeast Hulls)	44 lb bag			

Scott'Tan Tannins

49	15970	Bold	500 g			
48	15956	Complex	1 kg			
48	15958	Estate	1 kg			
49	15971	Finesse	500 g			
45	15954	FT Blanc	1 kg			
45	15975	FT Blanc Citrus	5 kg			
45	15955	FT Blanc Soft	1 kg			
45	15968	FT ColorMax	1 kg			
46	15950	FT Rouge	1 kg			
46	15951	FT Rouge	5 kg			
46	15972	FT Rouge Berry	1 kg			
46	15973	FT Rouge Berry	5 kg			
46	15952	FT Rouge Soft	1 kg			
46	15953	FT Rouge Soft	5 kg			
48	15960	Refresh	500 g			
49	15962	Riche	500 g			
49	15963	Riche Extra	500 g			
47	15964	Uva'Tan	500 g			
47	15965	Uva'Tan Soft	500 g			

Enzymes

53	16200	Lallzyme Beta	100 g			
53	16203	Lallzyme Cuvée Blanc	100 g			
53	16204	Lallzyme EX	100 g			
53	16205	Lallzyme EX	250 g			
53	16206	Lallzyme EX-V	100 g			
53	16208	Lallzyme EX-V	500 g			
54	16207	Lallzyme MMX	100 g			
57	16257	Rapidase Clear Extreme	100 g			
57	16254	Rapidase Extra Press	20 kg			
55	16176	Scottzyme BG	1 kg			
55	16175	Scottzyme Cinn-Free	1 kg			
53	16165	Scottzyme Cinn-Free	25 kg			
56	16172	Scottzyme Color Pro	1 kg			
56	16162	Scottzyme Color Pro	25 kg			
55	16173	Scottzyme Color X	1 kg			
55	16163	Scottzyme Color X	25 kg			
56	16171	Scottzyme HC	1 kg			
56	16161	Scottzyme HC	25 kg			
56	16174	Scottzyme KS	1 kg			
56	16164	Scottzyme KS	25 kg			
57	16170	Scottzyme Pec5L	1 kg			
57	16160	Scottzyme Pec5L	25 kg			

One liquid kilo of Scottzyme enzymes is approximately 890 mL.

Page	Product #	Product	Size		Quantity	Price ($)	Ship Date
Malolactic Bacteria							
63	15609	1-Step Alpha	25 hL				
63	15610	1-Step Alpha	100 hL				
63	15611	1-Step Alpha	500 hL				
63	15612	1-Step Alpha	1000 hL				
63	15029	1-Step VP41	100 hL				
63	15058	1-Step VP41	500 hL				
63	15054	1-Step VP41	1000 hL				
61	15601	Alpha	2.5 hL				
61	15602	Alpha	25 hL				
61	15603	Alpha	250 hL				
61	15604	Beta	2.5 hL				
61	15605	Beta	25 hL				
61	15606	Beta	250 hL				
63	15617	Beta Co-Inoc	25 hL				
61	15108	Elios 1 (ICV)	25 hL				
61	15109	Elios 1 (ICV)	250 hL				
64	15024	IB (Inobacter)	25 hL				
61	15022	MBR 31	2.5 hL				
61	15032	MBR 31	25 hL				
61	15127	MBR 31	250 hL				
64	15027	MT01	25 hL				
62	15615	O-MEGA	25 hL				
62	15616	O-MEGA	250 hL				
62	15607	PN4	25 hL				
62	15608	PN4	250 hL				
62	15048	VP41	2.5 hL				
62	15042	VP41	25 hL				
62	15044	VP41	250 hL				
ML Nutrients							
65	15681	Acti-ML	1 kg				
65	15218	ML Red Boost	1 kg				
65	15141	Opti'Malo Plus	1 kg				
65	15217	Opti'ML Blanc	1 kg				
Microbial Controls							
68	16405	Lyso-Easy	250 mL				
68	16406	Lyso-Easy	1 L				
68	16407	Lyso-Easy	5 L				
68	16402	Lysovin	500 g				
68	16400	Lysovin	1 kg				
68	16401	Lysovin	5 kg				
70	16410	No Brett Inside	100 g				
69	15777	2 g SO_2 Inodose Granules	(40/box)	1-4			
69	15777	2 g SO_2 Inodose Granules	(40/box)	5-19			
69	15777	2 g SO_2 Inodose Granules	(40/box)	20+			
69	15778	5 g SO_2 Inodose Granules	(25/box)	1-4			
69	15778	5 g SO_2 Inodose Granules	(25/box)	5-19			
69	15778	5 g SO_2 Inodose Granules	(25/box)	20+			

Page	Product #	Product	Size		Quantity	Price ($)	Ship Date
69	15780	100 g SO_2 Inodose Granules		1-19			
69	15780	100 g SO_2 Inodose Granules		20-59			
69	15780	100 g SO_2 Inodose Granules		60+			
69	15781	400 g SO_2 Inodose Granules		1-14			
69	15781	400 g SO_2 Inodose Granules		15+			
69	15775	2 g SO_2 Inodose Tablets	(42/box)	1-4			
69	15775	2 g SO_2 Inodose Tablets	(42/box)	5-19			
69	15775	2 g SO_2 Inodose Tablets	(42/box)	20+			
69	15776	5 g SO_2 Inodose Tablets	(48/box)	1-4			
69	15776	5 g SO_2 Inodose Tablets	(48/box)	5-19			
69	15776	5 g SO_2 Inodose Tablets	(48/box)	20+			
Fining, Clarifying and Stability Products							
84	15787	Bentolact S	1 kg				
84	15788	Bentolact S	5 kg				
84	15789	Bentolact S	25 kg				
84	15807	Caséinate de potassium	1 kg				
84	15808	Caséinate de potassium	5 kg				
78	17000	Claristar	2.5 L				
78	17001	Claristar	20 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				
79	15772	Flashgum R Liquide	1 L				
79	15773	Flashgum R Liquide	5 L				
85	15790	Freshprotect	1 kg				
85	15791	Freshprotect	5 kg				
85	15792	Freshprotect	20 kg				
86	15782	Gelocolle	1 L				
86	15783	Gelocolle	5 L				
86	15795	Inocolle	1 L				
86	15796	Inocolle	5 L				
86	15797	Inocolle	20 L				
87	15801	Inocolle Extra N1	1 kg				
79	15793	Inogum 300	1 L				
79	15794	Inogum 300	5 L				
87	15785	Polycacel	1 kg				
87	15786	Polycacel	5 kg				
87	15784	Polycel	1 kg				
87	15116	Reduless	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				
79	17010	Ultima Fresh	1 kg				
79	17012	Ultima Soft	1 kg				

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