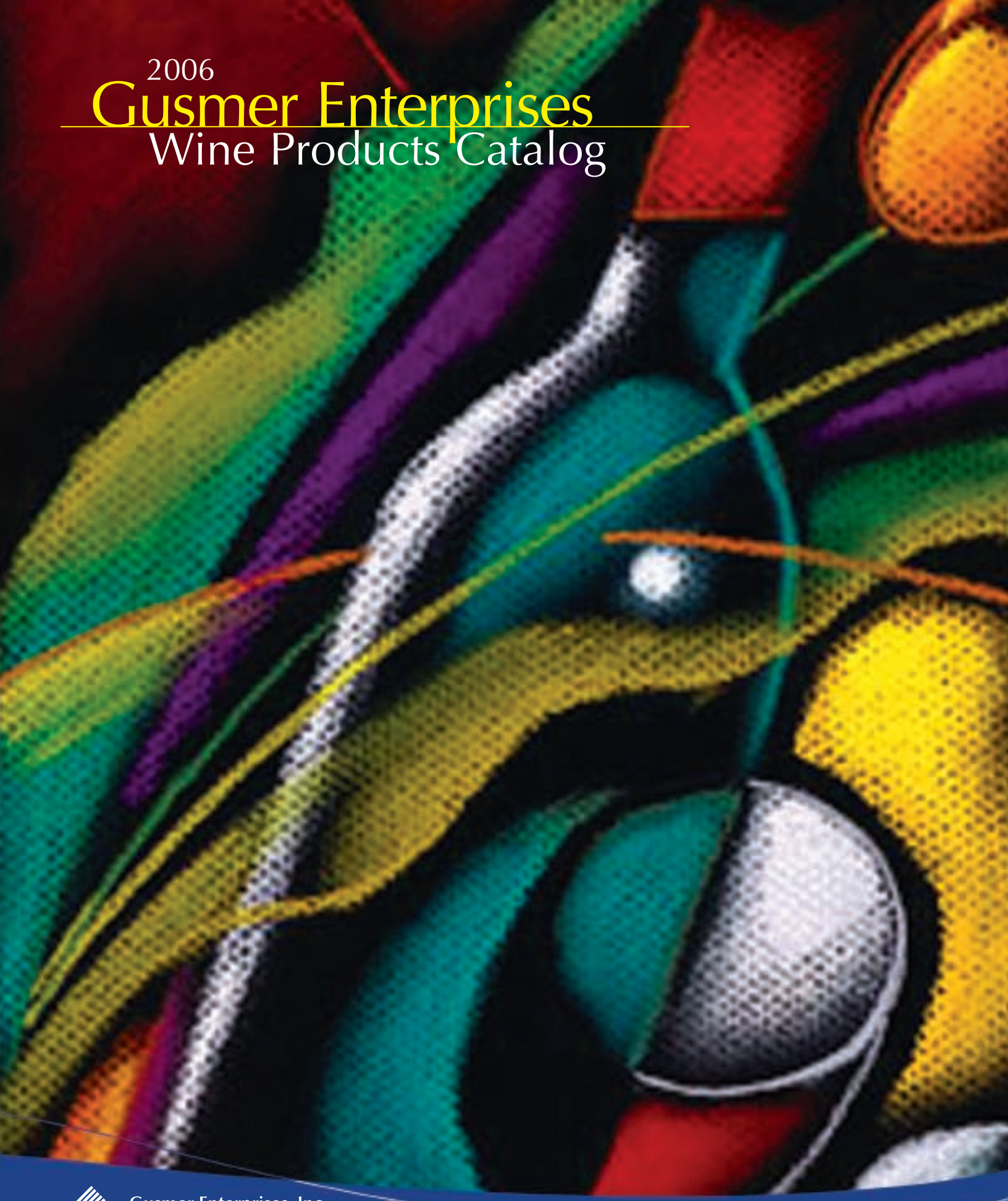
2006

Gusmer Enterprises

Wine Products Catalog



Gusmer Enterprises, Inc.

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New Featured Products inside back cover

Prices and product offerings subject to change without notice

Contact and Order Information 2006

Locations:

West Coast

Napa
640 Airpark Road
Suite D
Napa, CA 94558

Phone: 707.224.7903
Toll free: 800.224.WINE
Fax: 707.255.2019

8:30-5:00, M-F PST

Fresno
81 M Street
Fresno, CA 93721

Phone: 559.485.2692
Fax: 559.485.4254

8:00-5:00, M-F PST

East Coast

Mountainside
1165 Globe Avenue
Mountainside, NJ 07092

Phone: 908.301.1811
Fax: 908.301.1812

8:00-5:00, M-F EST

Midwest

Waupaca
1401 Ware Street
Waupaca, WI 54981

Phone: 715.258.5525
Fax: 715.258.8488

8:00-5:00 M-F CST

Directions:

Napa
From Hwy 29: Turn west on Airport Road toward the Napa airport. Turn left on Airpark Rd. Second driveway on left, first building on right.

Fresno
From Hwy 99: Take Ventura exit east. Turn right onto "M" Street.

Mountainside
Please call for directions.

Credit Cards:

We accept Visa, MasterCard, and American Express.

Terms of Sale:

Our terms are Net 30 days for established accounts ($25 minimum order). If your account is past due, charging privileges may be suspended until the account is current.

Return Policy:

We offer credits if products are returned within 15 days of shipment. Please call for an RA# (return authorization number).

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, please read the following:

- Sealed units must be unopened and undamaged upon return.
- Damage claims must be reported within 5 working days of receipt of your order.
- Original packing must be retained for UPS inspection of shipping damage claims.
- Sorry—no returns on ML bacteria.
- 20% restocking fee.
- Customer to pay return freight costs.

Placing Orders:

Most orders are shipped within 24 hours of receipt of order. You may place your order by telephone, fax, or online at www.gusmerwine.com. Your order will ship from the closest location holding the requested inventory.

Supplemental technical information is available online.
Go to www.gusmerenterprises.com and/or www.gusmerwine.com

www.gusmerwine.com
www.gusmerenterprises.com

Gusmer Enterprises, Inc., puts forth this catalog in good faith but makes no guarantee, expressed or implied, concerning the use or misuse of the products or data listed within.

Welcome to Gusmer Enterprises, Inc.

Enology and Technical Services

Lars Petersen, Technical Director for Biological Products

Lars received his M.Sc. from DTU (Copenhagen, Denmark), in Bio Tech Engineering, and he acquired his winemaking experience in Barolo, Italy. Before joining Gusmer Enterprises he was the Application Manager at Chr. Hansen (Viniflora products). Since January 2003, he has been in charge of technical activities for Gusmer's Biological Products and Services division.
Email: lpetersen@gusmerenterprises.com

Larry Silberman, Director of Applications Support

Larry is in charge of filter-media R&D at our production facility in Fresno, California. He has a B.S. Degree in Chemistry from California State University, Fresno, and has accrued more than 15 years of experience in beverage filtration. His strong background in filtration theory is augmented by extensive work with our media in the field.
Email: lsilberman@gusmerenterprises.com

Rodger Pachelbel, VP of Sales–Wine & Juice Industries

Rodger is a graduate of the Enology program at California State University, Fresno, and has been with Gusmer Enterprises for more than 17 years. He is an experienced winemaker who has worked in both the laboratory and production. Rodger oversees the technical sales and marketing of all of our products to the wine industry.
Email: rpachelbel@gusmerenterprises.com

R&D and Application Support Labs

Gusmer Enterprises, Inc., is committed to providing innovative solutions to our customers. With three laboratories equipped with analytical instrumentation and filtration test equipment, our technical staff can support customer sample requests and new application developments. Our R&D personnel have experience in filtration development and design, analytical testing, microbiology and material science. With our capabilities, Gusmer Enterprises can support your testing needs, make filtration application recommendations, and qualify new materials for your wine requirements.

Inside Sales

East Coast
Marge Shackell
908.301.1811 x223 (Mountainside, NJ)
mshackell@gusmerenterprises.com

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707.838.3457 (Windsor, CA)
dgusmer@gusmerenterprises.com

Northwest (OR, WA, ID, MT, WY, British Columbia)
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503.647.0937 (Hillsboro, OR)
kstewart@gusmerenterprises.com

Shipping and Hazmat Information

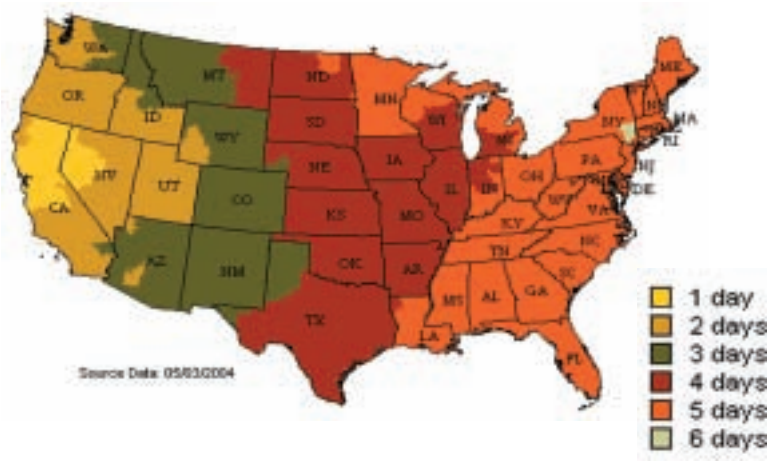
Hazardous materials are shipped the most economical way possible in accordance with carrier and Department of Transportation (DOT) regulations. Prices normally include packaging, although special packing charges may occasionally be added for hazardous materials. Because of federal and international HAZMAT shipping regulations, special DOT–approved shipping boxes and additional paperwork are involved in shipping all chemicals marked "HM."

For this extra handling, UPS charges a $25.00 surcharge for each HAZMAT ground parcel.

Not all HAZMAT items may seem hazardous to those using them, but the DOT thinks they are! NOTE: All carbon must be shipped by truck. UPS will not handle it.

VERY IMPORTANT: Only ONE HAZMAT class may be included in each parcel. If an order contains items in more than one HAZMAT class, each class must go in a separate package, EACH with a separate HAZMAT surcharge!

Some of our delicate glassware requires extra packing for shipment. We charge a special handling fee for these orders.



Shipping from California via UPS

Most orders are sent via UPS Groundtrac. Ask us for the approximate delivery time to your zip code. Other options are UPS 3rd-day select, 2nd-day air economy, 2nd-day air AM (delivery by 10:30 AM), and next-day-air saver (delivery by 3 PM). Next-day-air AM is guaranteed by 10 AM to most cities. Shipments totaling 100 lbs. or more automatically go by UPS Hundredweight, at a much lower cost per pound than regular ground service; so it pays to consolidate your orders!

We do not ship perishable items (Viniflora Oenos, for example) over weekends, so please place these orders early enough so that we can ship Monday through Wednesday. On Thursday, perishable items must be sent overnight (expensive!) unless you are in a one-day delivery range from the shipping point. UPS OFFERS SATURDAY DELIVERY TO LARGER CITIES ONLY (and imposes an extra fee). For more detailed information about UPS services and restrictions, go to www.ups.com.

Larger shipments are shipped by common carrier.

If your order contains products stocked at more than one location, we will ship from the location (or locations) that will result in the best possible freight savings.

Summary of Yeast Strain Suggestions

This table presents general suggestions for yeast strain selection, based on the strains we carry. These suggestions are NOT meant to be restrictive or inflexible, but may provide useful guidelines.

No matter what the must, if fermentation to dryness is of paramount importance, use a vigorous yeast such as RUBY.ferm or Fermichamp.

For information on suggested amounts of yeast, bacteria and nutrients, go to **www.gusmerwine.com**.

Very detailed product descriptions, technical support pages, and MSDS sheets are available.

White Wines

Grape/Style	Yeast
Chardonnay	
not usually sluggish	Symphony, RUBY.ferm, Fermiblanc
dry, history of sluggish fermentation	Fermichamp (add Superfood & Vitamix)
full bodied	Fermicru LVCB
barrel fermented	Symphony, Fermicru 4F9
not quite dry	Fermiblanc
Sauvignon Blanc	
barrel & tank fermented	Fermicru 4F9
Gewürztraminer, Muscat, Riesling, Chenin Blanc	
to stop before dryness	Fermiblanc
aromatic, dry	Symphony, Fermicru 4F9
Viognier	
barrel fermented	Fermicru 4F9
tank fermented	Fermicru LVCB
Pinot Grigio	
fruity (pear, melon)	Harmony, Fermicru 4F9, Fermicru LVCB
crisp, grassy, mineral style	RUBY.ferm, Symphony, Harmony
Non-Vinifera whites, fruity and/or slightly sweet	Fermiblanc
Non-Vinifera whites, dry	Fermicru 4F9

Red Wines

Grape/Style	Yeast
Cabernet Franc	NOBLE.ferm, Fermirouge, Melody
Cabernet Sauvignon	Melody, Symphony, Rhythm, Harmony, NOBLE.ferm, MERIT.ferm, Cepage Cab
Carignan	Melody, MERIT.ferm
Merlot	RUBY.ferm, NOBLE.ferm, MERIT.ferm, Harmony, Rhythm, Cepage Merlot
Pinot Noir	RUBY.ferm, Symphony, Harmony, Fermirouge
Pinotage	Symphony, Fermicru 4F9, RUBY.ferm
Shiraz	RUBY.ferm, MERIT.ferm, Symphony, Melody, Rhythm
Syrah	MERIT.ferm, Cepage Merlot, Melody
Tempranillo	MERIT.ferm, Melody
Zinfandel	MERIT.ferm, Melody, Fermirouge, Harmony, Rhythm
Reds blended with Cabernet	NOBLE.ferm, Fermirouge, Cepage Cabernet
Other reds, high alcohol	MERIT.ferm, Melody, Rhythm, Fermichamp
Other reds, medium style	Melody, Fermirouge
Reds with vineyard stressors	RUBY.ferm, Fermichamp
Non-Vinifera reds	RUBY.ferm, Fermirouge

Special Grape Styles and Other Fruit Wines

Grape/Style	Yeast
Blanc de Noirs, rosés, blushes	Fermirouge
Sparkling (cuvee fermentation)	Fermiblanc
Sparkling (tirage fermentation)	Fermichamp
Distilling	MERIT.ferm, Fermichamp
Re-inoculate stuck fermentation	MERIT.ferm, Fermichamp
Cider, mead	Fermiblanc (add lots of nutrients!)
Apples, Berries, Cherries	Fermichamp, Fermirouge
Other fruits, ferment to dryness	MERIT.ferm
Other fruits, to stop before dryness	Fermichamp, Fermiblanc

Chr. Hansen Yeast Strains

Harmony.nsac, Symphony.nsac, Melody.nsac, Rhythm.nsac

The finest hour of *non-Saccharomyces* yeast in winemaking

Most alcohol fermentations today are performed using commercial yeast products consisting of a single yeast species, *Saccharomyces cerevisiae*. However, many winemakers know that natural (wild) fermentations can result in a wine that is more complex and that enjoys improved flavor benefits.

In natural (wild) alcoholic fermentation, there may be many active species of *non-Saccharomyces* yeasts, which dominate the yeast population. Some of these impart positive attributes to the wine, while others can cause detrimental effects. At the start of fermentation, *S. cerevisiae* is barely detectable (Figure 1), but as the fermentation progresses, *S. cerevisiae* eventually becomes dominant, out-competing the *non-Saccharomyces* species because of better adaptability to such environmental elements as O_2 and increasing ethanol concentration. While the *Saccharomyces* yeasts are in low numbers at the beginning of fermentation, the *non-Saccharomyces* strains have the chance to do their work. One might say that the *non-Saccharomyces* species have their finest hour at the beginning of a spontaneous alcoholic fermentation.

When the temperature is initially low and kept low during fermentation—or because of a delay in the growth and consequent heat generation by *S. cerevisiae* (as seen in Figure 1), the *non-Saccharomyces* populations are present for an extended period. This may explain why winemakers experience enhanced flavor development when fermenting at lower temperatures, simply giving the *non-Saccharomyces* species more time to grow and enhance the flavor development. In an uncontrolled fermentation, however, various species of indigenous *non-Saccharomyces* yeast may be present, giving an undesirable flavor impact. The flavor development depends on the yeast species present and the chemical and physiological conditions prevailing.

When adding controlled populations of *S. cerevisiae, Torulaspora delbrueckii,* and *Kluyveromyces thermotolerans* (preselected for their enhanced flavor impact) in high cell numbers to a grape juice (Figure 2), these three species will be the dominant strains, compared to the spontaneous fermentation shown in Figure 1. As in the spontaneous fermentation charted in Figure 1, *T. delbrueckii* and *K. thermotolerans* are best at the beginning of fermentation, before they are out-competed by *S. cerevisiae*, which then completes the fermentation.

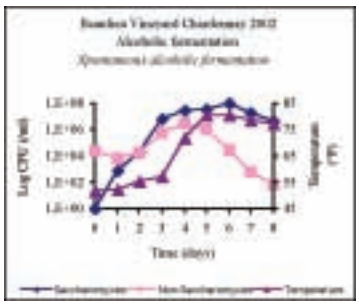


Fig 1. Spontaneous alcoholic fermentation

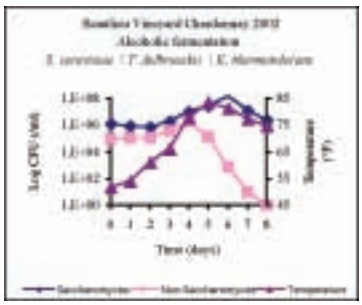


Fig 2. Grape juice inoculated with HARMONY.nsac

A combined product with pure strains of selected *non-Saccharomyces* and *Saccharomyces* yeasts will out-compete the indigenous *non-Saccharomyces* species, ensuring a desired control of the fermentation process and, at the same time, contributing the flavor benefits of selected strains of *T. delbrueckii* and *K. thermotolerans*.

The results are coming in on the performance of Hansen's mixed cultures!

Introduced in 2004, the Viniflora.nsac yeasts are gathering a dedicated following in the industry. The first two yeasts, SYMPHONY.nsac and HARMONY.nsac have been well received worldwide. These yeasts are blends using RUBY.ferm as the *S. cerevisiae* strain.

"Overall, I would say that by using the **SYMPHONY.nsac**, we have lifted the quality of the wine by at least one grade."

—An Australian winemaker, 2004

The most recent releases of RHYTHM.nsac and MELODY.nsac (blends using MERIT.ferm as the *Saccharomyces cerevisiae* strain) allow for higher alcohol tolerance unique to MERIT.ferm (up to 17%).

"Chr. Hansen's **RHYTHM.nsac** yeast showed very well in our Syrah yeast trials. For the second consecutive year, this yeast added fruit, complexity, and structure over the other yeast strains, and the differences became even more pronounced as the wines aged."

—A California winemaker, 2006

SYMPHONY.nsac
Chr. Hansen, Denmark

A unique blend of *Saccharomyces cerevisiae* (RUBY.ferm) and *Kluyveromyces thermotolerans* strains that carries out a safe and reliable alcoholic fermentation, enhancing the aroma and flavor of the wine. The blend provides more fruity and complex wines in the tested varieties of Chardonnay, Pinot Noir, Riesling, Shiraz, and Cabernet Sauvignon.

HARMONY.nsac
Chr. Hansen, Denmark

An optimal blend of *Saccharomyces cerevisiae* (RUBY.ferm), *Kluyveromyces thermotolerans*, and *Torulaspora delbrueckii* strains that enhances the aroma and flavor of your wine. This blend results in more fruity and complex wines in varieties such as Riesling (with apple, pineapple, and mango tones and with less bitterness), Pinot Blanc, and Chardonnay. In red wines (Merlot, Shiraz, Zinfandel, and Cabernet Sauvignon) it produces a more distinct effect, particularly in berry-fruit expression, softer tannins, and prolonged mouth feel.

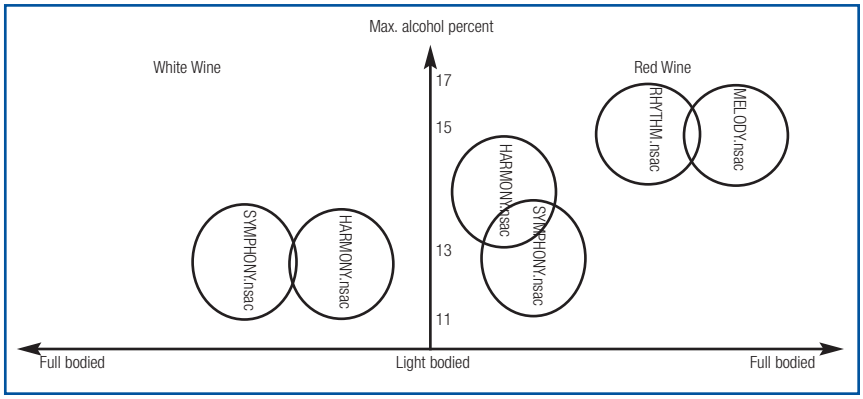
RHYTHM.nsac
Chr. Hansen, Denmark

A blend of MERIT.ferm and *Kluyveromyces thermotolerans* strains carries out reliable higher alcohol fermentations, while preserving the complex flavor and rounded tannins of fruity red grapes. These strains are compatible with malolactic cultures, in particular Viniflora CH-16. Low level production of both SO_2 and volatile acidity.

MELODY.nsac
Chr. Hansen, Denmark

MELODY.nsac is a combination of MERIT.ferm, *Kluyveromyces thermotolerans*, and *Torulaspora delbrueckii strains*. While tolerating the higher alcohol levels unique to Merit, it enhances the aroma, complexity and extended mouth feel in red wines. It is also compatible with malolactic fermentation, specifically with Viniflora CH-16. MELODY.nsac produces low levels of SO_2 and volatile acidity.

Guidelines for use of Viniflora®.nsac



ML-friendly Premium Yeast

Winemaking is an integrated process, and the yeast that is used for primary fermentations can have a profound effect on the success of malolactic fermentations. Our goal is to offer a range of premium yeast strains that have a perfect synergy with bacteria, good fermentation kinetics and produce a complex range of flavors and aromas suitable for the best wines. We find these qualities in Chr. Hansen's premium yeast strains.

Chr. Hansen technical support may be reached through either our Napa or Fresno locations.

RUBY.ferm

Chr. Hansen, Denmark

For Pinot Noir, Chardonnay

A wine yeast selected for its unique fermentation capacity in both red and white wines, RUBY.ferm is particularly friendly toward Viniflora® bacteria, encouraging a successful malolactic fermentation. Suggested grape varieties include Chardonnay, Pinot Blanc, Pinot Gris, Merlot, Pinot Noir, Shiraz, and Pinotage.

NOBLE.ferm

Chr. Hansen, Denmark

For Cabernet-family reds

A red-wine yeast especially suitable for European Bordeaux-style wines, capable of a steady and reliable alcohol fermentation. It is friendly toward Viniflora® bacteria, ensuring a successful malolactic fermentation. Suggested grape varieties include Cabernet Sauvignon, Merlot, and Cabernet Franc.

MERIT.ferm

Chr. Hansen, Denmark

For high-alcohol reds

A new strain selected especially for fermentation of red wines with a potential of high alcohol (up to 17%). This strain's proven superiority for high-alcohol red wines makes it a perfect partner for the new malolactic culture for high-alcohol wines, Viniflora® CH-16. This is a very strong combination for fast and effective malolactic fermentations under difficult conditions. Suggested grape varieties include Cabernet Sauvignon, Merlot, Shiraz, Carignane, Grenache, Tempranillo, Zinfandel, and Petite Syrah.

Discounts available for larger volumes.

Hansen Yeast Strains	Pack Size	Price
NOBLE.ferm	500 g 20 x 500 g	$27.00 $469.80
RUBY.ferm	500 g 20 x 500 g	$27.00 $469.80
MERIT.ferm	500 g 20 x 500 g	$27.00 $469.80
SYMPHONY.nsac	500 g 20 x 500 g	$28.84 $536.60
HARMONY.nsac	500 g 20 x 500 g	$28.84 $535.60
MELODY.nsac	500 g 20 x 500 g	$28.84 $535.60
RHYTHM.nsac	500 g 20 x 500 g	$28.84 $535.60

DSM Yeast Strains

FERMIBLANC® (AROM) & FERMIROUGE®

Cognac (Fermiblanc) and Narbonne (Fermirouge)

For: white or red (respectively)

These strains' specialty is expression of fruity/varietal aromas. Beta-glucanase activity releases fruity or floral grape aromas during fermentation. Well liked and very versatile, these are two of our most popular strains.

Fermiblanc – for aromatic whites, to bring out a floral varietal complexity, or to help out a less aromatic variety. Less tolerant to alcohol than most strains, it can be chilled to leave some residual sugar. Low H_2S production.

Fermirouge – for reds, particularly Pinot Noir, Cabernet Franc, and Merlot, where balance is important and fruity/berry aromas are desired. A slower and more even fermenter, it tolerates cooler temperatures than do most red wine yeasts. High alcohol tolerance.

FERMICRU RANGE

France (4F9), Chile (LVCB)

These strains have been selected for their unique treatments of white and rosé wines.

Fermicru 4F9 – for aromatic whites & rosés, recommended for aging on lees. It tends to ferment to dryness and enhances fruity character.

Fermicru LVCB – for aromatic whites, fruity notes of citrus, pear, tropical fruit. It is suited to low-temperature ferments (54°F) and is also used to produce sparkling wine base.

FERMICHAMP®

Narbonne, France

For: re-inoculating stuck wines, and for tirage

Fermichamp is our most popular strain for finishing fermentations and restarting stuck wines. It is also used for high-alcohol wines and as a tirage yeast, like other bayanus strains. Listed as fructophilic by the manufacturer, Fermichamp is much more resistant to alcohol than most strains, and tolerates higher VA. Not tolerant to low temperatures.

FERMIVIN®

Narbonne, France

This yeast produces low SO_2, low VA, low H_2S, with alcohol and temperature tolerance of 14% (up to 16% with nutrient supplementation) and 59°-95°F. The sugar/alcohol yield is 16.5 g sugar for 1% alcohol.

CEPAGE STRAINS

Cabernet, Merlot

These ultrapremium, specialty French strains were developed by ITV in Bordeaux for use on single-variety fermentations. Some great wines are made with the assistance of these special strains!

Cabernet (Strain 2881) – Enhances varietal characteristics of Cabernet Sauvignon, especially aromas of blackberry, chocolate, and tobacco. It improves tannin extraction and polymerization, increasing mouth feel and producing well-rounded wines.

Best at 25°-30° C (77°-86° F).

Merlot (Strain 4882) – Increases color extraction and varietal aroma concentration (berries, cherries, spices). Winemakers who have tried this yeast have reported excellent results. It is a popular red wine yeast.

DSM Yeast Strains	Pack Size	Price
Fermiblanc, Fermirouge, Fermichamp, Fermivin	500 g 20 x 500 g	$16.50 each $275.00 case of 20 x 500 g
NEW ECONOMY SIZE **FERMIROUGE & FERMIVIN**	15 kg	$225.00 per case (1-4 cases) Inquire for larger quantities
Fermicru 4F9, Fermicru LVCB	500 g 20 x 500 g	$26.50 each $465.00 case of 20 x 500 g
Cepage Strains (Cabernet/Merlot)	500 g 20 x 500 g	$26.50 each $465.00 case of 20 x 500 g

Quality Parameters of Commercial ML Bacteria

Know What You Are Buying

Critical parameters for malolactic fermentation and the quality of commercial bacteria products

Not all strains of *Oenococcus oeni* are the same. For example, some strains are more tolerant than others to low pH and alcohol. That tolerance depends partly on the natural capabilities of the strain and also, more importantly, the production process that it has undergone—i.e., whether it has been produced in a manner by which the cell wall has been adapted to enter the harsh environment of a typical wine. It takes a lot of expertise to successfully produce freeze-dried bacteria. The finished product may contain a lot of cells; but if the correct production parameters are not applied, the cells could be damaged or dead.

It is, therefore, important to make the right choice when selecting a commercial bacterial product. There are many commercial products available. How do you determine the quality of each of these products? The quality of most bacterial products available is currently determined by counting the number of cells originally in the pouch. But when you are ready to use the product, are these live cells, or are they damaged or even dead cells?

Chr. Hansen's Viniflora® products are tested not only for cell numbers, but also for the activity of the cells—i.e., their capability to convert malic acid to lactic acid. Their scientists have worked for several years to develop a new method which can measure the conversion of malic acid to lactic acid, a method which can be used as part of a quality-control procedure for each batch of product produced. We call this method "MACC" (Malic Acid Conversion Capacity), a groundbreaking new method to measure this very difficult parameter. All Viniflora products are tested for the correct number of cells and for assurance that these cells have the desired level of malolactic activity in wine.

Only Chr. Hansen does this!

Chr. Hansen Freeze-Dried ML Cultures

With Chr. Hansen direct inoculation cultures of *Oenococcus oeni* (formerly *Leuconostoc oenos*), NO starter preparation is needed. Just add the packet in dry form to must or wine.

Unopened packets last at least **two years** in your freezer.

Viniflora® Oenos – has been selected for its overall exceptional performance and ability to perform fast and clean malolactic fermentation in most wines. This strain can be used in both red wine and white wine and has a clean and classic flavor profile. It has an excellent all-round tolerance towards pH, alcohol, temperature, and SO_2.

Viniflora® CH-35 – has been selected for its superior performance and capability to perform malolactic fermentation in difficult white wines. This strain is the perfect match for rosé and white wines, but can also be used with success in red wines. It has a good tolerance to low pH and high levels of SO_2.

Viniflora® CH-16 – A new strain, specifically selected for its consistency in conducting fast malolactic fermentation in high-alcohol red wines (up to 16% volume) with a pH value above 3.4. It has a very high fermentation speed and a low production of volatile acidity.

We strongly recommend using Leucofood™ when inoculating with ANY ML bacteria culture.

ML Nutrients

LEUCOFOOD™

This rich mixture of **primary-grown yeast extract T154, casein digests, vitamins, and minerals** helps ML bacteria grow and survive. It can be essential when fermenting with yeast strains that hoard nutrients or have high nitrogen requirements, depleting grape nutrients more thoroughly. Unlike yeasts, ML bacteria cannot store nutrients, and they cannot synthesize all the amino acids they need, so they must find them in the wine. Nutrient depletion is frequently the cause when MLF begins but does not finish.

Blended specifically for ML bacteria, Leucofood is NOT the same as Superfood, it has no DAP because ML bacteria cannot use inorganic nitrogen.

LEUCOVIT™

A blend of the vitamins **pantothenic acid, riboflavin, and biotin,** Leucovit replenishes vitamins used up by yeasts. It too is formulated specifically for ML bacteria (use Vitamix or Supervit for yeasts). Note: It is not recommended to add Leucovit to wines that are already infected with Brettanomyces.

Pack Size	Qty (Packs)	Viniflora® Oenos	CH-35 & CH-16
Small	1/2 box (5 pks)	$60.65 / 5 pk	$71.70 / 5 pk
For up to 66 G / 250 L	1-4 boxes (10 pks)	$110.30 / box	$132.30 / box
	5+ boxes	Inquire	Inquire
Medium	1-4 packs	$60.69 / pk	$71.72 / pk
For up to 660 G / 2,500 L	5-9 packs	$55.17 / pk	$66.20 / pk
	10-19 packs	$54.06 / pk	$63.44 / pk
	20-49 packs	$51.86 / pk	$61.79 / pk
	50+ packs	Inquire	Inquire
Large	1-9 packs	$472.75 / pk	$545.48 / pk
For up to 6,600 G / 25,000 L	10-19 packs	$448.88 / pk	$515.94 / pk
	20+ packs	Inquire	Inquire

ML Nutrients	Suggested Dose	Pack Size	Price per Unit
Leucofood™	0.04-0.05 g / L	100 g	$9.95
Nutrient for	0.15-0.2 g / G	1 kg	$35.00
ML bacteria	for wine / must	5 kg	$149.80
		25 kg	$26.00 per kg ($650.00 / box)
Leucovit™	0.001 g / L	10 g	$12.00
Vitamins for	4 g / 1,000 G	100 g	$42.50
ML bacteria		1 kg	$400.00

About Superfood®
And other Nutrients

VFERM NUTRIENTS
PRODUCED BY VINOTEC NAPA

Adding nitrogen to N-deficient juices is of critical importance. Insufficient nitrogen has many negative effects on yeast growth and metabolism. Cell numbers, growth, fermentation rate, protein synthesis (including the proteins that bring sugars into the cell), and alcohol resistance all depend on nitrogen. H_2S may be formed from interruption of amino-acid synthesis when nitrogen has been depleted. Also, wine sensory qualities are best with an appropriate balance of nitrogen from a variety of sources.

Fermentation researchers have long known that supplementation with a complex blend of ingredients is more effective in most cases than just adding inorganic nitrogen (DAP) and promotes more even fermentations.

Superfood®

For musts at risk for fermentation problems.
Dose: 35-70 g / hl (3-6 lbs / 1,000 G)

Superfood contains: yeast hulls, inorganic nitrogen (DAP), yeast extracts, complex minerals, and vitamins.

SUPERFOOD IS SIMPLY THE MOST EFFECTIVE AND COMPLETE YEAST SUPPLEMENT FOR WINEMAKING.

It is the ORIGINAL proprietary complex yeast nutrient, and also the most popular.

Superfood works better than other blends because of its painstaking selection of highest-quality ingredients (including ONLY primary-grown yeast products); and it provides the complex supplementation that yeasts need for growth and survival during the stress of fermentation.

Hundreds of winemakers in several countries rely on Superfood. They often tell us that Superfood has solved their fermentation problems more quickly than have other products, because Superfood is different.

Superfood can help any fermentation go smoothly to completion, but it is especially recommended for high-risk fermentations that may become sluggish or stuck.

Superfood, containing a variety of nitrogen sources—is MUCH better for yeasts than just DAP alone under the stressful anaerobic conditions of fermentation. Its unique formula includes 33% DAP (providing 37 ppm available nitrogen at 4 lbs/1,000 G).

Most nutrients have a much higher DAP content than Superfood. When Lisa Van de Water formulated Superfood in 1986, her philosophy was to provide a higher percentage of the complex ingredients yeasts needed to balance inorganic nitrogen additions. Wineries can add extra DAP as needed to supplement nitrogen-deficient musts.

Test YAN (assimilable nitrogen) and bring nitrogen to recommended level (average 250 ppm, more for high-Brix grapes) with DAP, or stuck fermentations may occur even if supplements have been added.

THE BEST SUPPLEMENTATION FOR MANY MUSTS IS SUPERFOOD AND SUPERVIT, PLUS EXTRA DAP.

In winery and lab trials, Superfood consistently finishes fermentation more quickly and completely than competing brands.

Superfood makes healthier fermentations by:

- Providing the most powerful defense against stuck or sluggish fermentations.
- Increasing fermentation predictability.
- Balancing the over-stimulation from adding too much inorganic nitrogen at the start of fermentation.
- Improving aromas and flavors by allowing more balanced amino-acid uptake.
- Enhancing yeast growth, viability, and long-term survival by increasing health of cell membranes and tolerance to sugar and alcohol.
- Reducing yeast stress, which can lead to acetic acid, H_2S, complex sulfides, and other unwanted metabolites.
- Removing toxic yeast byproducts (short-chain fatty acids)

Superfood's UNIQUE formula:

- Contains soluble yeast extract, not just autolysed yeast, so nutrients are not locked up in cells.
- Has less DAP than competing blends, allowing a higher level of naturally complex ingredients and giving the wine maker more precise control over nitrogen additions.
- Minerals are balanced specifically for alcoholic fermentation.
- Ingredients are carefully processed for neutral flavor, and homogenized for uniformity.
- Promotes more complete utilization of nutrients and sugars than other blends, creating a "nutrient desert."

Nutrient Ingredients

Yeast Hulls, Nutrex 370

These yeast hulls (also called cell membranes, yeast cell walls, yeast ghosts, envelopes cellulaires) are the insoluble membrane fraction remaining after separating out T154 yeast extract. They are beneficial to fermentations, adsorbing pesticide residues, toxic short-chain fatty acids produced by yeasts (C8-10), and other inhibitory compounds. They also provide sterols and long-chain fatty acids to build healthy cell membranes to protect the cell from alcohol toxicity and osmotic shock. Nutrex 370 has very neutral sensory qualities, without the cheesy odors and aggressive flavors common in many other brands.

Yeast Extract T154

T154 is rich in amino acids in proportions used by yeasts and also supplies natural vitamins, micronutrients, and other yeast components in an easily soluble form, not locked up in cells as they are in autolysed yeast. T154 is agglomerated to reduce its high hygroscopic nature, but if exposed to air it will harden and should not be used.

Only autolyzed yeast is legal to add to organic wine. Contact us.

See our website for information on

PRIMARY GROWN YEAST PRODUCTS

What makes our complex nutrients so special? They have the most nutritious and complete ingredients available. Do you think that all yeast products are the same? THINK AGAIN!

YEAST REHYDRATION: To kick-start fermentation, add 100 g of T154 and 100 g Nutrex 370 to the warm water used to rehydrate 500 g of dry yeast. Important note: Make sure that juice nitrogen deficiency is corrected if you are adding ANY nutrient to the yeast rehydration water.

VITAMIX V™ & SUPERVIT®

Vitamix V: Pure yeast vitamins (add along with complex blends like Superfood).

Dose: 0.1-0.2 g / hl (4-8 g / 1,000 G)

Supervit: Vitamins and minerals together in a nutritive base (add with Superfood for best nutrition).

Dose: 2.5 g / hl (100 g / 1,000 G)

Vitamins make yeasts healthier, promote survival, and are beneficial in preventing sulfides. Musts deficient in nitrogen can produce sulfides even if there is sufficient pantothenate; but if there is enough nitrogen, yet too little pantothenate, even MORE—and worse-smelling—sulfides may occur. Vitamin supplements provide great "insurance" against possible deficiencies.

Vitamix and Supervit contain the following vitamins.

- Thiamine is needed for healthy yeast growth and is quickly depleted by grape molds and by vineyard yeast species such as *Kloeckera*. Larger SO_2 additions bind up thiamine.
- Pantothenate helps prevent sulfide formation from interruption of methionine synthesis, and plays a role in co-enzyme synthesis.
- Pyridoxine should be added along with thiamine.
- Myo-inositol is required for cell division and stimulates yeast growth rate.
- Biotin is critical for cell survival and metabolism and acts synergistically with nitrogen; but yeasts cannot synthesize it.

Item	Rec.Dose	Pack Size	Price
COMPLEX BLENDS			
Superfood®	35-37 g / hL	1 kg pack	$17.50 each
(Super-premium yeast	(3-6 lbs / 1,000 G)	5 kg pack	$79.00 each
nutrient blend)	1-2 boxes	25 kg (55 lbs)	$308.00 / box
	3-4 boxes	25 kg	$288.85 / box
	5+ boxes	25 kg	Inquire
NUTRIENT INGREDIENTS			
Yeast Hulls	23-35 g / hL	1 kg pack	$5.99 each
Nutrex 370	(2-3 lbs / 1,000 G)	5 kg pack	$26.98 each
(yeast cell membranes)		22.7 kg (50 lbs)	$105.15 / bag
Yeast Extract	6-12 g / hL	1 kg pack	$27.29 each
T 154 aggl.	(0.5-1 lb / 1,000 G)	5 kg pack	$136.99 each
(primary grown extract)		18 kg (40 lbs)	$321.36 / bag

Superfood® is a registered trademark of Lisa Van de Water (Van de Water Fermentations).

Item	Pack Size / Dose	Price
VFerm Vitamix V™ (4-8 g / 1,000 G)		
(pure yeast-vitamin blend)		
	10 g	$15.00 / pk
	100 g	$70.00 / pk
	1 kg	$400.00 / pk
VFerm Supervit® (100 g / 1,000 G)		
(yeast vitamins & minerals—a good complement for Superfood or any other nutrient blend)		
	100 g	$10.65 / pk
	1 kg	$38.50 / pk
	10 kg	$360.00 / pk

Adding Nitrogen

YAN Guidelines (juice YAN plus added YAN):	
21 Brix or less	200-250 ppm YAN
23 Brix	250-300 ppm YAN
25 Brix	300-350 ppm YAN

Add nutrients early. Yeasts need nitrogen during their growth phase and throughout fermentation.

Supplements that do not contain DAP can be added to the water used to rehydrate dry yeast. See page 13.

Add some supplements during the yeast growth phase (when you add yeast). Dividing yeasts need many nutrients, including nitrogen, minerals, vitamins, micronutrients, and survival factors. If nitrogen is limited during growth, fewer cells (lower biomass) will be produced.

Add the rest of the supplements during the first half of the fermentation. Make the last addition at or just before midfermentation, to give the yeasts some extra nitrogen after they have finished growing. Late in fermentation, yeasts lose the ability to take in nitrogen because of the effects of alcohol.

It is **VERY IMPORTANT** to break supplements into portions instead of adding them all at once. A large influx of nitrogen as DAP throws the yeast cells' metabolism off balance, leading to flavor problems, nitrogen wasting, and too fast a fermentation—which may sometimes even generate enough heat to kill off the yeasts.

The **more nitrogen** added, the **more important** it is to divide the supplements into portions. If a fermentation is too fast, delay or reduce planned nutrient additions.

Adding nitrogen to already sluggish/stuck musts usually does not help and may actually hurt. Unused nitrogenous nutrients, added too late in the fermentation to be used by yeasts, can cause problems, including the stimulation of spoilage microbes.

Yeast hulls may be added directly to stuck fermentations, and nitrogenous nutrients are useful when preparing a re-inoculation starter.

The best way to calculate how much nitrogen should be added to a juice is to test ammonia nitrogen and alpha-amino nitrogen (NOPA) with a UV spectrophotometer. The sum of these measurements is called "Yeast-Available Nitrogen" (YAN). We do these tests daily during harvest and offer complete kits for wineries to test NOPA in their own labs. See pages 51 & 53.

More information on nutrients, including our Nutrient Addition Chart and an explanation of common risk factors are also posted online at www.gusmerwine.com. See complete details on nutrient ingredients on the Technical Information page.

Calculating Nutrient Additions:

Risk Factors for Nitrogen Deficiency:

- Low-N varietals (Merlot, Riesling, Zinfandel, Chardonnay, etc.)
- Rootstocks with lower berry N
- Poor or infertile soil
- Water stress or hot, dry summers
- Low-vigor, struggling vines
- Signs of nutrient or mineral deficiency in vines
- Vine diseases (phylloxera, Petri disease, etc.)
- Vineyard history of H_2S or stuck/sluggish fermentations

Reasons for Higher Nitrogen Needs:

- Grape diseases (mold, rot, etc.)
- Grapes starting to dehydrate
- HIGH-SUGAR grapes (25+ Brix, even when rehydrated)
- Clarified juices (fined/filtered)
- Hot ferments (31C/86F or >)
- Uninoculated fermentations
- Yeast strain with high N needs
- ML inoculation before dryness
- ANY OTHER REASON that a fermentation might not finish

Negative Effects of Adding Too Much Nitrogen:

- Fermenting too fast and/or too hot (yeasts may even die from excessive heat)
- Less fruity aromas
- Residual unused nitrogen sources, especially arginine, which can feed spoilage microbes such as *Brettanomyces*

STAGE 1: At yeast inoculation, or when *Saccharomyces* start growing in an uninoculated fermentation (instead of *non-Saccharomyces* vineyard yeasts).

STAGE 2: Fermentation is fully active and Brix has dropped at least 2 degrees. At this point the yeasts have taken up most of the nitrogen present in the juice, especially ammonia N.

STAGE 3: At or just before midfermentation, before 12 Brix. When yeast growth has stopped, but the alcohol level is low enough that yeasts can still take up nitrogen.

Nutrient Addition Charts

These charts are intended as general guidelines ONLY! Note that lower-Brix grapes and cooler ferments need less nitrogen, while higher-Brix grapes and warmer ferments need more. Some yeasts also have higher N requirements.

Test juice nitrogen (YAN) and use risk factors on page 14 to evaluate nitrogen deficiency.

Recommendation: Add 25 ppm Supervit to all ferments at yeast inoculation.

We can develop specific nutrient recommendations for your winery situation.

250 ppm = 25 g / hL ≅ 2 lbs / 1,000 G
500 ppm = 50 g / hL ≅ 4 lbs / 1,000 G

Chart A. YAN<100 ppm (<150 ppm at 25+ Brix) or VERY HIGH RISK grapes (3+ risk factors, or 2 if very severe)

STAGES	SUPERFOOD (total 500-600 ppm) Added YAN = 38-46 ppm	DAP (total 500-600 ppm) Added YAN = 105-126+ ppm
Stage 1: At yeast inoculation (also add vitamins)	250 ppm	150 ppm
Stage 2: First half of fermentation, add part each day to slower ferments	150 ppm	150-250+ ppm (less if ferment is too fast, more if it is too slow)
Stage 3: Midfermentation (12+ Brix)	100-200 ppm	200 ppm

Chart B. YAN 100-150 ppm (150-200 ppm at 25+ Brix) or HIGH RISK grapes (2 risk factors, or 1 if very severe)

STAGES	SUPERFOOD (total 400-500 ppm) Added YAN = 31-38 ppm	DAP (total 500+ ppm) Added YAN = 105+ ppm
Stage 1: At yeast inoculation (also add vitamins)	250 ppm	100 ppm
Stage 2: First half of fermentation, add part each day to slower ferments	125 ppm	200+ ppm (less if ferment is too fast, more if it is too slow)
Stage 3: Midfermentation (12+ Brix)	125 ppm	200 ppm

Chart C. YAN 150-200 ppm (200-250 ppm at 25+ Brix) or MODERATE RISK grapes (2 mild risk factors, or 1 if severe)

STAGES	SUPERFOOD (total 300-400 ppm) Added YAN = 23-31 ppm	DAP (total 200-300 ppm) Added YAN = 42-63 ppm
Stage 1: At yeast inoculation (also add vitamins)	250 ppm	0 ppm
Stage 2: First half of fermentation, add part each day to slower ferments	0 ppm	100 ppm
Stage 3: Midfermentation (12+ Brix)	50-150 ppm	100-200 ppm (less if ferment is too fast)

Chart D. YAN 200-250 ppm (300-350 ppm at 25+ Brix) or LOW RISK grapes (1 risk factor, not severe)

STAGES	SUPERFOOD (total 150-250 ppm) Added YAN = 11-15 ppm	DAP (total 0-100 ppm) Added YAN = 0-22 ppm
Stage 1: At yeast inoculation (also add vitamins)	100 ppm	0 ppm
Stage 2: First half of fermentation	0 ppm	0 ppm (unless H_2S forms)
Stage 3: Midfermentation (12+ Brix)	50-100 ppm	0-100 ppm (do not add if ferment is too fast)

Chart E. YAN 250+ ppm (300+ ppm at 25+ Brix) or grapes with NO apparent risk factors

STAGES	SUPERFOOD (total 100 ppm) Added YAN = 8 ppm	DAP (total 0-50 ppm) Added YAN = 0-11 ppm
Stage 1: At yeast inoculation (also add vitamins)	100 ppm	0 ppm
Stage 2: First half of fermentation	0 ppm	0 ppm (unless H_2S forms)
Stage 3: Midfermentation (12+ Brix)	0 ppm (add 125 ppm Nutrex 370)	0-50 ppm (do not add if ferment is too fast)

Novozymes Enzymes

Enzymes for use with White Grapes

White Grape **Macerating** Enzyme
Vinozym® FCE:

Designed to selectively release varietal intensity and aromas in white wines through the liberation of flavor and aromatic skin compounds. Ideal for Chardonnay, Sauvignon Blanc, and White Zinfandel wines. Purified to control cinnamyl esterase activity, which preserves the delicate aromas of white wines (no formation of volatile phenols). Allows for more efficient pressing at lower pressures, resulting in higher free-run and first-press fractions. Also aids in settling, clarification and filtration.

	Dose	Pack	Price per Pack	
Vinozym FCE:	18-27 g / ton	250 g	1-10	$53.45
Vinozym FCE is typically			11-19	$52.50
dosed at the crusher.			20 +	Inquire

Clarification Pectinase for White Grapes
Novoclair® Speed:

A pectinase enzyme that is optimized for settling solids quickly prior to fermentation in white grape juice … lower solids leads to cleaner fermentations. Use Novoclair Speed to protect delicate aromas and produce the highest-quality white wines. Novoclair Speed is purified to control cinnamyl esterase side activity.

	Dose	Pack	Price per Pack	
Novoclair Speed	9-18 g / ton	250 g	1-10	$63.75
			11-19	$62.63
Novoclair Speed is typically			20+	Inquire
dosed at the crusher or clarification tank.				

Enzymes for use with Red Grapes

Red Grape **Macerating** Enzyme
Vinozym® G:

Designed to selectively release high quality anthocyanins and tannins from grape skins. Increases the red hues (520 nm) from 10% to 30% in red wines and produces a long-term, stable color. Produces a more desirable phenolic structure, and increases intensity and mouth feel. Also aids in settling, clarification, and filtration.

	Dose	Pack	Price per Pack	
Vinozym G	27-36 g / ton	250 g	1-10	$47.05
Vinozym G is typically			11-19	$45.34
dosed at the crusher.			20+	Inquire
		10 kg	1-10	$1,390.00
			11+	Inquire

Premium Red Grape **Macerating** Enzyme
Vinozym Vintage® FCE:

A macerating enzyme formulated for the production of premium red wines. Possesses all the desirable attributes of the original Vinozym G, but is further purified to control cinnamyl esterase activity. This ensures that the preparation is completely neutral in regard to ethyl-phenols.

	Dose	Pack	Price per Pack	
Vinozym Vintage FCE	27-36 g / ton	250 g	1-10	$60.90
Vinozym Vintage FCE is typically			11-19	$58.70
dosed at the crusher.			20+	Inquire

Enzyme used with both Red & White Grapes

Pectinase Enzyme

Ultrazym® 100G:

	Dose	Pack	Price per Pack	
Ultrazym 100G	9-18 g / ton	100 g	1-10	$19.58
Ultrazym 100G is typically dosed			11-19	$19.17
at the crusher or clarification tank.			20+	Inquire

A concentrated pectinase preparation that is exceptionally effective for the degradation of soluble and insoluble pectins. Depectinization of both red and white juices and wines leads to better settling, greater clarification, cleaner fermentations, and improved filterability. Also great for all fruit wines. A standard in the wine industry for many years.

Enzyme used for Maturation

Enhances **Maturation** of both red & white wines

Vinoflow® FCE:

	Dose	Pack	Price per Pack	
Vinoflow FCE		100 g	1-10	$31.56
	115 g / 1,000 G for whites & roses		11-21	$30.51
	190 g / 1,000 G for reds		20+	Inquire
Vinoflow FCE is added after alcoholic fermentation.				

Vinoflow FCE is used to accelerate aging on lees, allowing for shorter maturation periods in a tank or barrel. Add Vinoflow FCE just after alcoholic fermentation to aid in the degradation of yeast cell walls, resulting in the liberation of glyco-mannoproteins and the enrichment of colloidal substances. Vinoflow FCE produces silkier textures and fuller wines. A blend of beta glucanase and pectinase, this enzyme also helps with the natural clarification and compaction of lees. Vinoflow FCE is purified to control cinnamyl esterase activity, thus protecting the aroma of fine wines. Use of Vinoflow FCE requires a one-time petition to the TTB. Contact Gusmer Enterprises for details.

Enzyme used for Clarification & Filtration

Enhances **Filtration**

Vinoflow® G:

	Dose	Pack	Price per Pack	
Vinoflow G		100 g	1-10	$31.56
	115 g / 1,000 G for whites & roses		11-21	$30.51
	190 g / 1,000 G for reds		20+	Inquire
Vinoflow G is added at least 10 days prior to filtration.				

Vinoflow G is blend of pectinase from *Aspergillus niger* and beta (1-3,1-6) glucanase from *Trichoderma harzianum* that is designed to enhance filtration by breaking down larger polysaccharides that can cause filterability issues in wines. Glucans, from yeast cell walls and *Botrytis cinerea*, and pectin from grapes are classic sources of polysaccharides that can lead to filterability issues. Vinoflow G breaks down glucans and pectin into smaller, more soluble components allowing for better filterability of wines. The enzyme is best added to wines at least 10 days prior to the early stages of filtration. Use of Vinoflow G requires a one-time petition to the TTB. Contact Gusmer Enterprises for details.

Enzyme used for Enhancement of Aromas in White Wines

Pectinase with **Betaglucosidase** Activity

Novarom™ Blanc:

	Dose	Pack	Price per Pack	
Novarom Blanc	185 g / 1,000 G	100 g	1-10	$40.47
			11-19	$37.10
(for sweeter wines, use 370 g / 1,000 G)			20+	Inquire

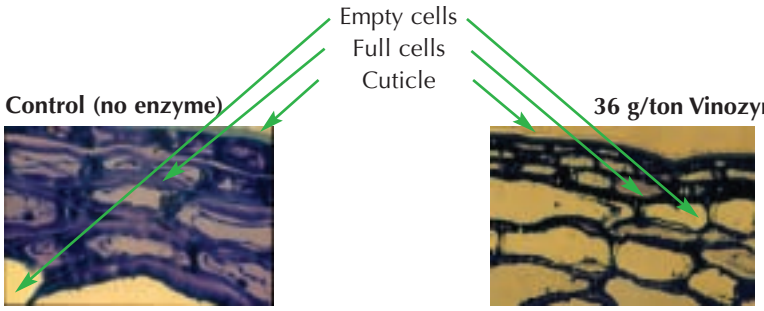
A pectinase that contains glycosidase side activity. Frees bound terpenes from terpenyl-glycosides and enhances varietal aroma compounds. Added to newly fermented wines or older vintages as a 10% solution during racking for a contact time of at least one month. A sensory evaluation should be conducted weekly, and when aroma is optimized the enzyme is simply inactivated with bentonite (2 lbs / 1,000 G). An excellent choice for Riesling, Gewürztraminer, Muscat varieties, Chardonnay, and other white-wine varieties.

About Novozymes

Enzymes

Premium Red Grape **Macerating** Enzyme — Vinozym Vintage® FCE

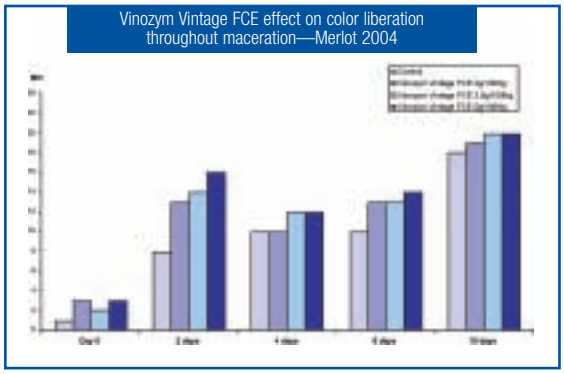
Vinozym Vintage® FCE is the result of many years of enological research by Novozymes in their quest to offer the very best macerating enzyme for premium red wine production. The key to enzymatic red grape maceration is "selectivity" … the ability to extract desirable color, aroma, and flavor compounds, but not undesirable bitter and harsh tannic compounds. Vinozym Vintage FCE has the right blend of pectinases to slightly perforate the cell-wall structure, allowing for the gentle diffusion of anthocyanins and agglutinated tannins, but not destroying the cell-wall structure, leading to over extraction. Vinozym Vintage FCE is purified of cinnamyl esterase and beta glycosidase activity, and has no effect on grape seeds.



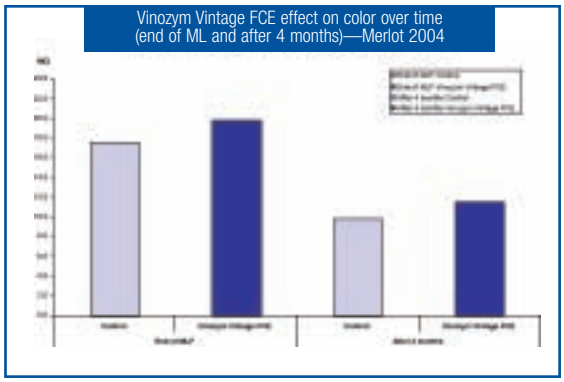
Cross section of red grape skin after 15 days maceration.
The maceration is complete, but the cell structure is intact. More color is extracted.

The use of Vinozym Vintage FCE leads to an increase in color, across many grape varietals, that is stable over time.

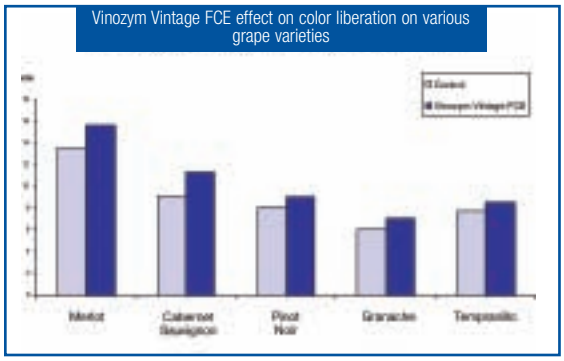
Vinozym Vintage FCE effect on color liberation throughout maceration—Merlot 2004



Vinozym Vintage FCE effect on color over time (end of ML and after 4 months)—Merlot 2004



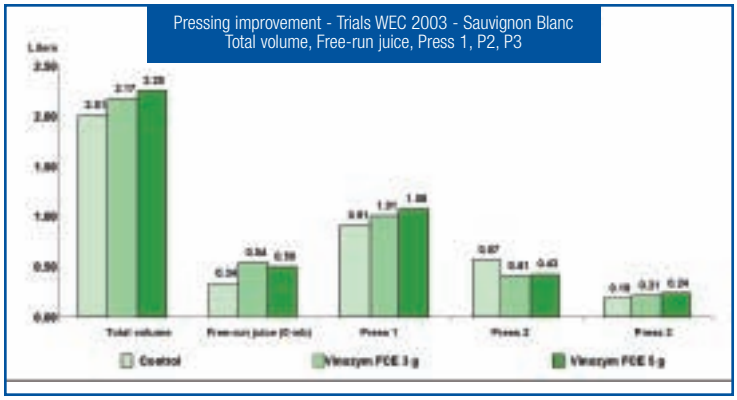
Vinozym Vintage FCE effect on color liberation on various grape varieties

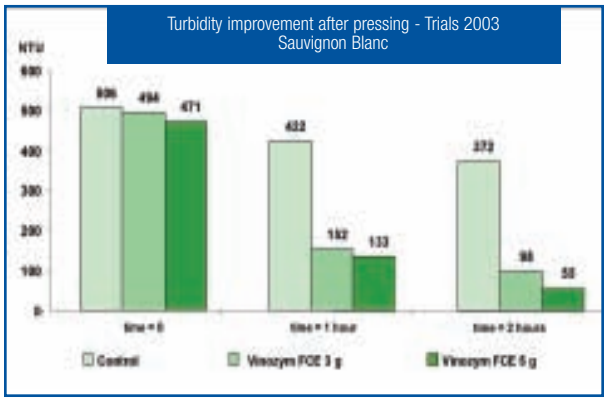


Lush red wines with better structure, mouth feel, and color—purified of undesirable enzymatic activities … Vinozym Vintage is the best for premium red wine production.

Premium White Grape **Macerating** Enzyme — Vinozym® FCE

There are many aromas and aroma precursors, in addition to tannins and polysaccharides, in the skin cells of white grapes. These compounds lead to the varietal expression that is signature to the wine. Whether you're making a distinct Sauvignon Blanc or a rich Viognier, Vinozym® FCE is the white grape maceration enzyme that will allow for the gentle extraction of aroma and flavor compounds. Add Vinozym FCE at the crusher for higher yields of quality free-run juice and get better clarification before alcoholic fermentation.

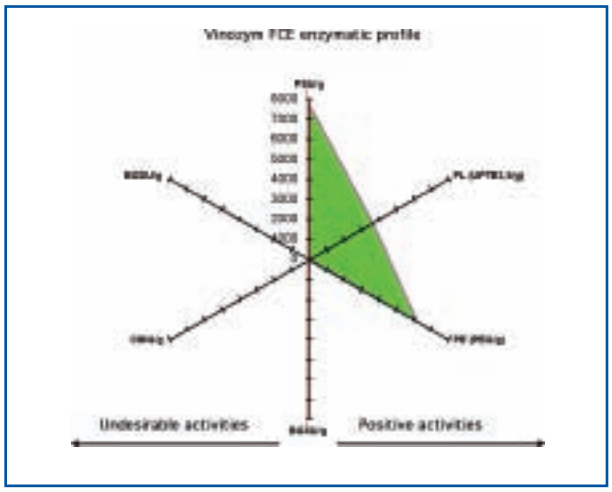


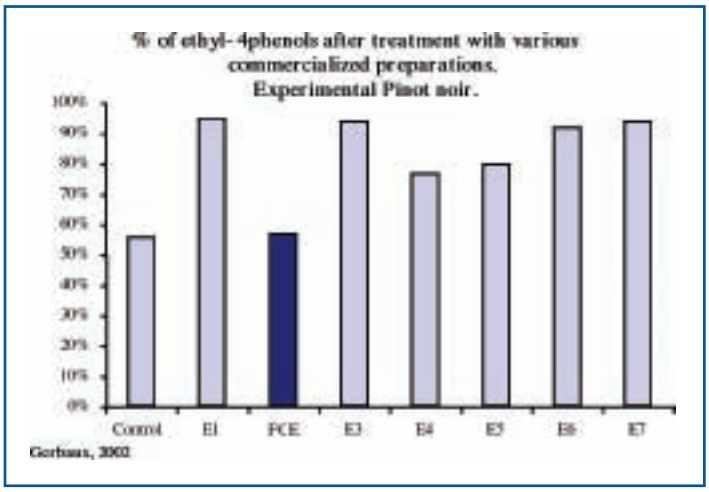


Novozymes Purifies Their Enzymes Like No Others …

It is well documented that some enzymatic side activities, such as cinnamyl esterase, can lead to the formation of unpleasant aromas in premium wines. Novozymes goes to great extents to purify their FCE type enzymes (Vinozym Vintage FCE, Vinozym FCE, Novoclair Speed, and Vinoflow FCE) to control the level of cinnamyl esterase side activity. You'll get only the enzymatic activities your wines deserve.

Enzymatic Profile





PSU/g = Pectinase Activity
PL = Pectinlyase
PE = Pectinmetylesterase
BGXU = Betaglucanase (glucanex)
CINU = Cinnamyl Esterase Unit
BGDU = Betaglucosidase Unit

Chr. Hansen

Lactizyme

Using Lactizyme to Combat Wine Spoilage

Lactizyme (lysozyme) is used by winemakers to control the growth of gram-positive spoilage bacteria, which can create sluggish fermentations and increases in volatile acidity, to control certain aspects of malolactic fermentations (MLF), and to stabilize wines after alcoholic fermentation or when MLF is completed.

Lactizyme plays an important role in establishing a healthy environment for alcoholic fermentation. The growth of *Pediococcus*, *Lactobacilli*, and other spoilage organisms can be hard to control, especially in high-pH wines where SO_2 is less effective. The addition of high levels of SO_2 needed to control these bacteria may also inhibit the yeast involved in alcoholic fermentation. Lactizyme, unlike SO_2, does not inhibit yeast.

Lactizyme may be used in a flexible manner, allowing winemakers to achieve different objectives, depending on the dosage and the stage of addition to the must or to the wine.

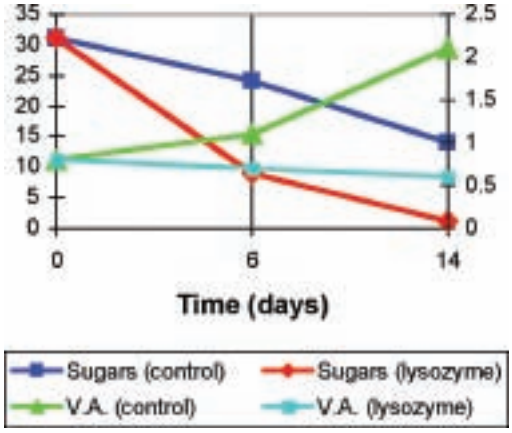
The addition of Lactizyme to the grape must in low levels of between 100 and 150 ppm (10-15 g/hl) as early as possible allows inhibition of some of the organisms that cause stuck and/or sluggish fermentations, and increased production of volatile acidity.

The addition of Lactizyme in low levels to the must will control the development of indigenous bacteria. This control will also prevent the occurrence of premature malolactic fermentation, which can lead to an increase in V.A. and off flavors. The alcoholic fermentation will progress more smoothly, without competition for nutrients between the yeast and the lactic acid bacteria.

At the first sign of a sluggish fermentation, Lactizyme should be added to the must at a level of 250 to 350 ppm (25 to 35 g/hl).

If a wine begins to develop volatile acidity as a result of lactic acid bacteria activity, an immediate Lactizyme dosage of up to approximately 250 ppm (25 g/hl) will assist in reducing the bacterial count and bring the volatile acidity under control. It is imperative that the Lactizyme be added promptly, before the bacteria count is too high. **Lactizyme will not inhibit acetic acid bacteria.**

Influence of lysozyme on Sugars and V.A. Changes During Stuck Fermentations

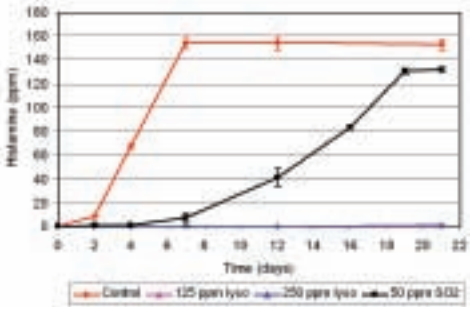


(Source: V. Gerbaux & al., ITV, France, 1999)

Lactizyme and Biogenic Amine Production

In general, biogenic amines do not impose any risk for consumers. However, histamine production by bacteria in fermented foods can lead to food spoilage. Histamine is reported to be one of the causative agents for physiological distress and may lead to digestive disturbances. Substances such as ethanol in alcoholic beverages can inhibit the metabolism of histamine and further increase the histamine level in the body.

Efficacy of Lactizyme and SO_2 in controlling the production of histamine by L.Hilgardii.



Histamine then triggers harmful effects referred to as false food allergies characterized by headaches, itching, nausea, abdominal cramps, vomiting, or even more severe reactions. During recent years, large wine retailers in some countries have imposed a maximum of 10 ppm histamine in the wine they will purchase and sell.

Early studies have shown that the formation of histamine and other biogenic amines was mainly due to *Pediococcus damnosus* strains. More recently, however, there have been new evidences that strains from the genera of *Lactobacillus* and *Oenococcus* can also produce histamine. Recent research has shown that Lactizyme is effective in controlling the growth of bacteria which are responsible for biogenic amine production. See the graph on previous page.

Frequently Asked Questions

1) **When is the best time to add Lactizyme (lysozyme) to my wine?**
The best time to add Lactizyme is right at the crusher. If you suspect your grapes have a high bacterial count, a slightly higher level of Lactizyme may be used. However, for most fermentations, a dosage level of between 100-150 ppm should be sufficient to clear the must for a good alcoholic fermentation. The earlier Lactizyme is added, the better. If the Lactic Acid Bacteria (LAB) have already caused organoleptic problems, Lactizyme cannot change this, it can only prevent further degradation of the wine. If you are also adding SO_2, add it first and allow it to fully disperse, and then add Lactizyme.

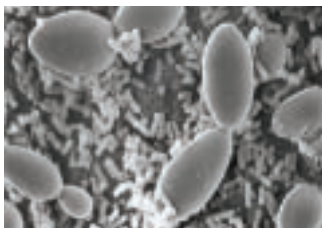
2) **Can I use Lactizyme and still have my wine go through MLF?**
Lactizyme will not prevent wine from going through MLF. Previous research studies done in conjunction with a large culture manufacturer have indicated that Lactizyme's effect on MLF cultures is a function of the pH of the wine, the strain of the culture, and the dosage level of the lysozyme. If you are inoculating with a starter culture, check with your culture distributor as to which MLF cultures work best with Lactizyme.

3) **What do I do if my fermentation starts to slow and my volatile acidity is increasing?**
While the addition of SO_2 may kill yeast, adding Lactizyme will not inhibit yeast. (Refer to the electron microscope photographs.) By the time your wine starts to exhibit sluggishness or high V.A., the bacterial count will dictate that higher levels of Lactizyme are required. After bench trials to determine efficacy, an addition of between 250 and 350 ppm is recommended (bench trials are suggested as some strains of LAB may be more resistant to Lactizyme). As well, the efficacy of Lactizyme will be affected by the bacterial cell count: if cell counts are above 10^6 CFU/ml, higher dosage levels of Lactizyme are required.

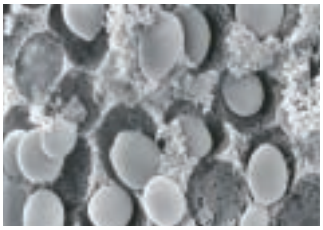
4) **Can I add Lactizyme prior to bottling?**
For situations in which a microbial problem is identified before bottling, Lactizyme may be added. However, we strongly recommend that you wait at least two to three weeks after the addition of Lactizyme before bottling. Otherwise, settled cellular debris and sediment may appear in the bottle.

5) **What will Lactizyme do to the color of my red wine?**
Several studies have shown that Lactizyme added early in the winemaking process will have minimal effect on most red wines. We recommend you conduct a sample trial—color changes, if any, should occur within 48 hours.

Suggested Dose		
100-500 ppm = 0.1-0.5 g / L = 0.4-2 g / G		
Pack size	**Qty**	**Price per pack**
100 g		$25.00
500 g	1-19	$77.24 each
5 kg	1	$772.40
5 kg	2+	Inquire



Yeast and Lactobacilli *prior to lactizyme*



Yeast and Lactobacilli *after lactizyme*

Cellar Chemicals

Package Sizes – Choose 1kg, 5kg, or Sack Size

"Disc." means that the chemical pack size has been discontinued, and will be available only while supplies last.

Note: Multiple-sack discounted prices available. Please inquire.

55 LBS = 25 KG 50 LBS = 22.7 KG

Chemical / Use	1 kg	5 kgs	Sack	Sack Price
Ascorbic acid (for treating H_2S)	$25.00 each	$112.50 each	25 kg	$350.00
Bentonite (multiple uses)				
Vitiben (hydrates in cool water)		Full Sack Only	22.7 kg	$20.00
KWK Traditional (hydrates in hot water)		Full Sack Only	22.7 kg	$20.00
Carbon (removes color/odor problems)				
S51 (deodorizing)		Full Sack Only	18 kg	$86.00
KBWJ Norit (for decolorizing/oxidation)		Full Sack Only	18 kg	$90.30
ALL CARBON SHIPS FROM FRESNO BY TRUCK ONLY				
Citric acid	Disc. $10.00 each	$29.26 each	22.7 kg	$65.00
Diammonium phosphate (Nitrogen addition)	$10.00 each	$26.00 each	22.7 kg	$50.00
Egg albumin - Ovogel (sold in 500 g packs)	$20.00 each	N/A	N/A	N/A
Gelatin (fining agent)				
Silverleaf (ultra-pure leaves) 1-lb units	$24.00 each	$22.00 each		
Granular 100 Bloom		Full Sack Only	25 lbs	$169.25
			25 kg	$289.50
Gelsol (liquid gelatin) 55-lb pail ~5 Gal		Full Pail Only	55-lb pail	$260.85
Isinglass (sold in 1-lb bags)	1 bag	5 or more bags		
Flocced	$39.52 / bag	$28.60 / bag	Inquire for	
Drifine (20-min prep time)	$74.88 / bag	$57.20 / bag	larger qty	
Klear-Mor		Full Sack Only	11.35 kg	$148.53
Kolorfine® (caseinate fining agent)		$89.35 each	22.7 kg	$356.43
Kolorfine® Plus (caseinate/PVPP compound)		$118.80 each	20 kg	$436.83
Malic acid (acid addition)		$31.50 each	22.7 kg	$102.50
Potassium bitartrate (cream of tartar)		$47.25 each	25 kg	$201.15
Potassium carbonate (acid reduction)		$24.75 each	22.7 kg	$55.00
Potassium metabisulfite (SO_2 addition, cleaning)	$5.00 each	N/A	25 kg	$81.21
Potassium sorbate (bottling stability)	$14.00 each	$63.00 each	22.7 kg	$235.00
PVPP (Polyclar VT)	$38.00 each	$152.00 each	25 kg	$600.00
Soda Ash (sodium carbonate) for cleaning	Disc. $2.00 each	Disc. $6.00 each	22.7 kg	$16.93
Tartaric acid (acid additions)	$10.00 each	$40.00 each	25 kg	$165.00
TSP chlorinated (for cleaning)		Full sack only	22.7 kg	$63.81
Non chlorinated TSP (for cleaning) Drum size only		Full drum size only	50 kg	$99.00
Nalco 1072 colloidal silica (to settle gelatin fining, and clarify)		$18.00 per 1,000 ml btl	5 Gal	$211.40

Cellar Additions

Chemical	Comment	Suggested Trial Levels g / L and lb / 1,000 G unless noted
Acid additions	Small acid addition (tartaric, malic, citric) Larger acid addition (tartaric, malic, citric)	0.5-1 g / L (4-8 lbs / 1,000 G) 1-2 g / L (8-16 lbs / 1,000 G)
Ascorbic acid	Add before copper to treat disulfides	10-50 ppm
Bentonite For protein stability:	For clarification only whites, rosés (non-Vinifera) whites, rosés (Vinifera) warm climate or high pH	0.06-0.24 g / L (0.5-2 lbs / 1,000 G) 0.06-0.48 g / L (0.5-4 lbs / 1,000 G) 0.12-0.60 g / L (1-5 lbs / 1,000 G) 0.24-1.2+ g / L (2-10+ lbs / 1,000 G)
Carbon KBWJ (Norit)	Decolorize slight brown/pink or oxidation Decolorize darker brown/pink or oxidation	0.15-0.24 g (1/8-2 lbs / 1,000 G) 0.06-0.48 g / L (1/2-4 lbs / 1,000 G)
Carbon (S51)	Deodorize slight off odor Deodorize worse off odor	0.015-0.24 g (1/8-2 lbs / 1,000 G) 0.12-0.96 g / L (1-8 lbs / 1,000 G)
Copper Also see Sulfide Reducing Matrix page 28	Treat mild sulfides alone Treat stronger sulfides alone Treat disulfides after ascorbic acid treatment	0.1-0.2 ppm as Cu 0.3-0.5 ppm as Cu 0.2-0.6 ppm as Cu
Egg albumin (Ovogel)	Softens tannins, reduce bitterness	0.03-0.24 g (1/4-2 lbs / 1,000 G)
Gelatin	Clarify whites or reds Reduce bitter tannins in whites Reduce bitter tannins in reds	0.015-0.06 g / L (1/8-1/2 lb / 1,000 G) 0.015-0.06 g / L (1/8-1/2 lb / 1,000 G) 0.06-0.12 g / L (1/2-1 lb / 1,000 G)
Isinglass – Flocced – Drifine	Clarification, reduce bitterness Clarification, reduce bitterness	0.007-0.06 g / L (1/16-1/2 lb / 1,000 G) 0.007-0.06 g / L (1/16-1/2 lb / 1,000 G)
Klear-Mor	Clarification	0.75-0.36 g / L (3/4-3 lbs / 1,000 G)
Kolorfine® – Caseinate compound	Treat oxidation, remove color precursors	0.24-0.96 g / L (2-8 lbs / 1,000 G)
Kolorfine® Plus – Caseinate/PVPP compound	Treat oxidation, remove color precursors	0.24-0.96 g / L (2-8 lbs / 1,000 G)
Nalco 1072	With gelatin, settle/clarify wines and juices	0.06-0.24 ml / L (1/2, 1, 2 ml / G) depends on gelatin amount added
Potassium bitartrate	Cold stabilization	0.06-0.48 g / L (1/2-4 lbs / 1,000 G)
Potassium carbonate	Reduce acid – potassium (chill to drop crystals)	To remove 0.1 g / 100 ml of TA do trials of: 0.45-0.75 g / L (3.7-6.2 lbs / 1,000 G)
Potassium sorbate	Inhibits yeast growth in the bottle	150-200 ppm
PVPP	Remove brown/pink color precursors Remove unwanted odor, flavor	0.06-0.24 g / L (1/2-2 lbs / 1,000 G) 0.06-0.48 g / L (1/2-4 lbs / 1,000 G)

Contact your Gusmer sales rep for information,
or go to www.gusmerwine.com for product-support literature.

See our Fining Agent reference guide (available online). This is a brief description of the purpose, lab preparation, and cellar instructions for common fining agents.

Cellar Supplies

Some items have been discontinued, and will be available only while supplies last.

Item / Description		Price for Each	Price per Pack
Carboy Cap: plastic, fits over top, holds fermentation lock		$2.25	$19.00 / 10 pk
Carboy Funnel: plastic 12" diameter (it's big!) with strainer		$10.00	N/A
Fermentation Locks: plastic cylindrical 3-piece (no stoppers)		$2.00	$45.00 / 50 pk
Gum Stoppers:			
drilled (most bungholes) 10.5 (54 mm/46 mm) *Some solids available—inquire.*		$1.50	$67.50 / 50 pk
drilled 11 (56 mm/48 mm)		$2.00	$90.00 / 50 pk
Must Paddle: 19", plastic	Disc.	$4.00	N/A
Sample Bottles & Caps: 750 ml & 375 ml, 12 / case		$15.00 / case	N/A
SO_2 Masks: half-face mask—acid gas/organic vapor respirator (Note: NOT intended for use as dust masks; dust will plug masks). These low-maintenance SO_2 respirators are a convenient, cost-effective way to handle short-term jobs. Use with replaceable cartridges or use the disposable unit. We hear from customers that the disposable mask will last approximately 1 year if stored in a plastic bag between uses.			
Disposable (normal life approx. 6 months)		$30.00	N/A
Mask plus 2 replaceable cartridges		$45.00	N/A
Extra cartridges for above mask (2 / pack)		$22.00	N/A
Sulfur Sticks: described as dripless, (less drippy than others)		N/A (approx. 25 sticks)	$19.00 / 500 g
Thermometer: red spirit, no mercury			
Floating, TrueBrew, C/F scales, 8.25"	Disc.	$5.50	N/A
Lab style, red spirit, dual-range C/F scales, 12"		$7.50	N/A
Wine Thiefs:			
Plastic, 19" (Needs to be specified as 3 part)		$6.00	$49.00 / 10 pk
Economy, glass, no handle, 12"	Disc.	$6.00	$59.00 / 10 pk
Pyrex glass, bent, 16", D-ring, 1.25" O.D		$38.00	N/A
Pyrex glass, bent, 18", plastic grip, 1.25" O.D		$42.00	N/A

Carboy cap

Half mask plus cartridges (SO_2)

Disposable SO_2 mask

Fermentation lock

Wine Thief 16-inch D-ring

Wine Thief 18-inch plastic grip

Ferco Tannins

Located in the heart of one of France's major grape-growing regions, Ferco is a leader in the development of enological tannins produced from 100% white-wine grape skins and seeds. Fully developed grapes are carefully selected and put through a revolutionary process developed by Ferco. Pure grape tannins are extracted with gentle processing techniques (low temperature, no organic solvents) that respect and preserve the true nature of grape tannins. These tannins solubilize instantly and completely in wine and give winemakers full control to balance tannins for optimal structure, mouth feel, color stabilization, flavor, and aromas.

Grap'tan®V: Grape tannin for use ***during vinification.***

Grap'tan V is added directly to the must just after crushing. Used in wines for color stabilization (red wines), improved tannin structure, increased midpalate character, reduced vegetative flavors/aromas, and aid in protein stabilization (white wines).

Suggested dose rate: 30-100 g / ton, or 170-570 g / 1,000 G

"We were pleased with the results on our reds using Grap'tan V in combination with other tannin during fermentation. The mouth feel was balanced adding the desired structural component and achieving the color stabilization we sought. Grap'tan V's performance was superior to other comparable tannins we have used in the past. We will continue to use Grap'tan V."

—California Winemaker, 2006

Item / Description	Price for Each	
Grap'tan®V	$176.90 / kg	Inquire for qty discount.
Grap'tan®E	$223.00 / kg	"
Grap'tan®S *(Note: package size 500 grams)*	$145.00 / 500 grams	"
Grap'tan®PC *(Note: package size 500 grams)*	$129.50 / 500 grams	"

Grap'tan®E: Grape tannins for use ***during aging.***

Grap'tan E is used to help protect wines against oxidation during the aging process. It also helps to stabilize color and improve tannin structure. It is added to the wine after malolactic fermentation.

Suggested dose rate:
180-1,150 g / 1,000 G (REDS)
75-275 g / 1,000 G (WHITES)

Grap'tan®S and Grap'tan®PC: Grape tannins for addition to ***finished red and white wines.***

These tannins solubilize instantly in wine and can be added at any point up to three weeks prior to bottling. They are used to achieve optimal phenolic balance, increase midpalate character, reduce vegetative flavors and aromas, reduce "hot" alcohol character, among other benefits.

Since Grap'tan S is extracted from skins and Grap'tan PC is extracted from seeds, their composition and organoleptic properties are different. In general, S adds more roundness and PC adds more tannic structure. The choice between S and PC is a function of the wine type, balance, and age.

Suggested dose rate:
180-1,150 g / 1,000 G (REDS)
75-350 g / 1,000 G (WHITES)

Oak Alternatives

Gusmer Enterprises, Inc., is pleased to introduce our complete line of Oak Alternatives!

For over 30 years, Gusmer Enterprises, Inc., has been manufacturing high-quality oak alternatives for the wine industry. We developed Oak-Mor® in the mid-1970s and it is now sold in all major wine producing countries around the world. Oak-Mor was created as a method to supplement oak character in barrels, or to reduce or eliminate oak barrel aging. We source only the finest American white oak, and we use only the premium heart wood. Our unique toasting process creates desirable flavors and aromas, while reducing harsh and bitter tannin components. The proper use of Oak-Mor can enhance the quality of your wine at a fraction of the cost of using new oak barrels.

We recently released our new line of oak alternatives called Oak Avantage®. In addition to a granular form, the Oak Avantage is also available as an oak chip. Our Oak Avantage is manufactured to the same high standards as our Oak-Mor line, but the Avantage series undergoes a unique aging and toasting process which offers distinct complexity to the aroma and flavor profile. The Avantage is manufactured from select American white oak (*Quercus alba*) and premium French oak (*Quercus sessiliflora*) that offer both complexity and finesse to wine flavors and aromas.

Our oak alternatives can be added during fermentation and aging, or they can be used to balance finished wines. Thorough extractions occur in approximately 7-14 days, and granular oak will settle by the end of the extraction period. Stirring or circulation may be applied to improve the speed of extraction. If used during fermentation, granular oak is easy on presses and pumps.

Two forms of Oak

Granular Oak

Oak Chips

Premium Oak-Mor®

Made from select American white oak, we use a flash drying process that provides a smooth, rich, creamy, flavor. Since it is in a granular form, the extraction of the desirable sensory components is very rapid. Premium Oak-Mor is an excellent tool to assist in balancing fruit and tannin flavors, or to soften young wines.

American Oak Avantage®

Our American Oak Avantage offers the classic aromas and flavors of American oak, but in a more refined and elegant style. This oak is produced from the high-quality seasoned staves and is passed through a special air drying process that creates a more delicate and sweeter oak character. The American Oak Avantage can be used during fermentation or aging and is available in a granular form, or as an oak chip.

Toasted Oak-Mor®

This granular oak offers classic American oak flavors. We pass American white oak through a unique toasting process that produces high levels of whiskey lactones, creating distinct flavors of vanilla, smokiness, and butterscotch. It is often used to add complexity and finesse to wine flavors and aromas. Toasted Oak-Mor is a favorite of many winemakers.

French Oak Avantage®

Made from select air dried French oak, this highly extractable oak is ideal for enhancing the overall structure of the wine. The French Oak Avantage is made from select French oak that has undergone an 18-month seasoning process. The French Oak Avantage produces a clean and sophisticated oak impression that is typical of French oak. It is an excellent product to add to aging wines, or it can be used to touch up a finished wine. As with the American Oak Avantage, the French Oak Avantage is available as a granular oak or as an oak chip.

Item / Description	Sack	Price
Oak-Mor American Granular Oak		
Premium Oak-Mor	18.1 kg	$104.05 per bag
Toasted Oak-Mor	18.1 kg	$126.66 per bag
French Oak Avantage		
Chips	25 kg	$153.21 per bag
Granular	20 kg	$151.65 per bag
American Oak Avantage		
Chips	12 kg	$41.96
Granular	20 kg	$139.10

Quantity discounts available. Please inquire.

Sulfide & Metal Reduction

Sulfide Reducing Matrix

(sulfide and mercaptan reduction in wine)

Gusmer's Sulfide Reducing Matrix (SRM) has been proven effective in the reduction of single-sulfur compounds present in wine, such as hydrogen sulfide, methyl mercaptan, and ethyl mercaptan. These single-sulfur compounds are reduced without the risk of residual metal and without the risk of binding delicate flavors and aromas.

Example from the 2001 Vintage:
6,000 gallons of Pinot Noir with H_2S, passed through a plate filter with 50 sheets of SRM, resulted in the reduction of H_2S to below threshold level. The winemaker felt that the wine was greatly improved and was able to use it in the intended premium program.

Compound	Formula	Sensory Description	Sensory Threshold	Reactive with SRM or Copper Sulfate
hydrogen sulfide	H_2S	rotten egg	0.9-1.5 ppb	Yes
ethanethiol (ethyl mercaptan)	CH_3CH_2SH	burnt match, earthy	1.1-1.8 ppb	Yes
methanethiol (methyl mercaptan)	CH_3SH	rotten cabbage, burnt rubber, pungent	1.5 ppb	Yes
diethyl sulfide	$CH_3CH_2SCH_2CH_3$	rubbery	0.9-1.3 ppb	No
dimethyl sulfide	CH_3SCH_3	canned corn, truffles, "sulfidey" or vegetal at high levels	17-25 ppb	No
diethyl disulfide	$CH_3CH_2SSCH_2CH_2$	garlic, burnt	3.6-4.3 ppb	Only if converted back to single sulfide form
dimethyl disulfide	CH_3SSCH_3	cooked cabbage, onion-like at high levels	9.8-10.2 ppb	Only if converted back to single sulfide form

The SRM and MRM are most commonly available in 40-cm and 60-cm sheets for installation in a plate filter. They may also be sized to fit any type of plate filter or are available in a lenticular cartridge form.

Metal Reducing Matrix

(copper/iron reduction in wine)

Gusmer's Metal Reducing Matrix (MRM) has been proven effective in the reduction of copper and iron in wine. These metals are permanently and selectively removed.

Example from the 2001 Vintage:
6,500 gallons of Chardonnay with a copper level of 1.20 ppm passed through a 40-cm plate filter with 80 sheets of the MRM, resulting in a reduction of copper to 0.37 ppm. The copper level was reduced to below the legal limit and the winemaker felt that the wine opened up and exposed a pronounced fruit character.

For detailed information on these products go to www.gusmerenterprises.com

Sulfide or metal problems? Send us a sample and we will assist you in selecting the best sulfide treatment using SRM or MRM media. Treated samples will be returned to you for your evaluation.

Cellu-Flo®

Fiber Filter Aids
For use on pressure leaf filters

Cellu-Flo filter aids are insoluble alpha-cellulose fibers that combine to form a fibrous matrix on the filter septum. This cellulose matrix provides the proper site for fast and efficient diatomaceous earth (DE) precoating. It is primarily the DE that removes fine particles from the filtration stream, while the fibers provide support, strength, and stability to the precoat.

Filter aids are also used as part of the body feed to lengthen the filtration cycle while improving the quality of filtration.

Cellu-Flo CLR and CLS fiber filter aids are pure, highly refined cotton fibers especially developed for use as a primary precoat and as a part of a body feed. The CLS fiber has a positive zeta potential (net positive charge) that effectively removes negatively charged particles (yeast, bacteria, etc.) that may be smaller than the average pore size of the filter cake. CLS fiber is an essential part of the precoat and body feed regime when high quality filtration is expected from the pressure leaf filters. Pressure leaf filter applications, such as preparing wines for membrane filtration, benefit greatly by the zeta potential of CLS fiber, producing wines with better membrane filterability.

Cellu-Flo RW and SL fiber filter aids are derived from select soft and hard woods. The bright white color and neutral flavor and aromas are evidence of the high purity of all Cellu-Flo fibers. RW and SL fibers are good precoat and body feed fibers for rough and polished pressure leaf filtration applications.

In both applications, DE is added (after the primary precoat of cellulose fibers) at rates of 15-25 pounds/100 square feet of filter surface area.

Cellu-Flo filter aids come in 25-pound bags. Contact your Gusmer sales rep for pricing or for more information on getting the best from your pressure leaf filters with fiber filter aids.

Typical application rates:	Pounds/100 Square Ft of Filtration Surface Area
RW and SL Fibers	7-10
CLR and CLS Fibers	5-7

Gusmer Matrix™ Filter Sheet Series

Gusmer Enterprises, Inc., has been a vital part of the beverage industry for generations, contributing much of the depth filtration technology that enables the efficient clarification and sterile filtration of wine, beer, distilled spirits and allied beverages. Gusmer is proud to offer the Matrix™ filter sheet series, which has been created specifically to meet the challenges and economics of beverage processing.

Gusmer's Matrix™ gradient density filter sheets are a composite of the finest charge-modified cellulose pulps and filter aids. Produced with a controlled porosity and positive charge (zeta potential/electrokinetic absorption), the Matrix™ filter sheets have a high wet strength, superior throughput capacity, and excellent retention capabilities. The Matrix™ series can be relied upon to remove micron and sub-micron particulate, such as gross solids, haze constituents, yeast, bacteria, and colloids, on a consistent basis, yet preserves color, aromas, and flavors in wine, beer, and other beverages.

Figure 1

Application Guide

Filtration Type	Matrix Filter Grades	Nominal Micron Retention	Possible Applications	Recommended Flow Rates Wine (gal/hr/sq. ft²)	Maximum Flow Rates (gal/hr/sq. ft²)	Maximum Differential Pressure (psi)
Coarse Filtration	MTX-35	4.0 µm	Arrest fermentation, Gross clarification Fining Agent Removal, Bioreduction	24-32	30-40	45
	MTX-45	1.0 µm	Gross clarification, Fining Agent Removal, Bioreduction	24-32	30-40	45
Polish Filtration	MTX-55	0.6 µm	Polished Degree of Clarity, Fining Agent Removal, Bioreduction	16-24	20-30	45
Sterile or Premembrane Filtration	MTX-65	0.5 µm	Polished Degree of Clarity, Bioreduction, Membrane Filtration Preparation	8-12	10-15	21
	MTX-70	0.4 µm	Polished Degree of Clarity, Bioreduction, Membrane Filtration Preparation	8-12	10-15	21

The Matrix™ filter sheet series is a complete series, offering a range of grades appropriate for coarse, polish, and sterile (or pre-membrane) filtration applications. Gusmer's experienced technical support staff understands beverage processing and is available to help you select the appropriate grade for your application. Filter sheet media is available to fit virtually any plate to plate filter press. The standard 40-cm and 60-cm sheets are regularly stocked and ready for immediate shipment from our various locations.

Life and Efficiency Analysis

Gusmer's Life and Efficiency Analysis is an automated system that simultaneously compares the performance of filter sheet media under controlled conditions. The Matrix™ filter media showed greater throughput and retention compared to the competition.

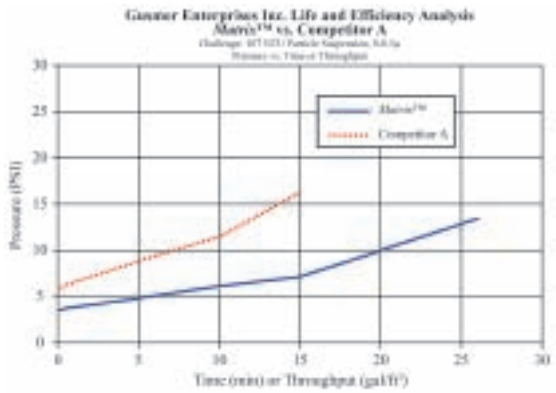


Figure 2

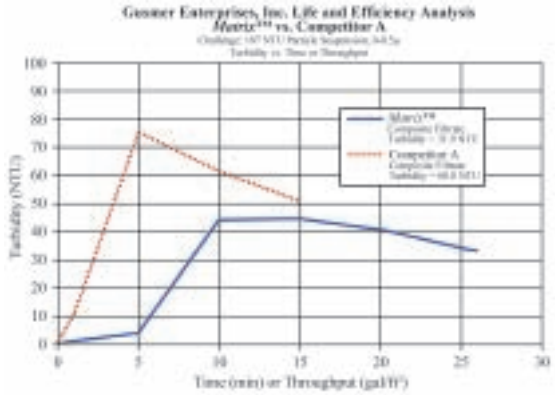


Figure 3

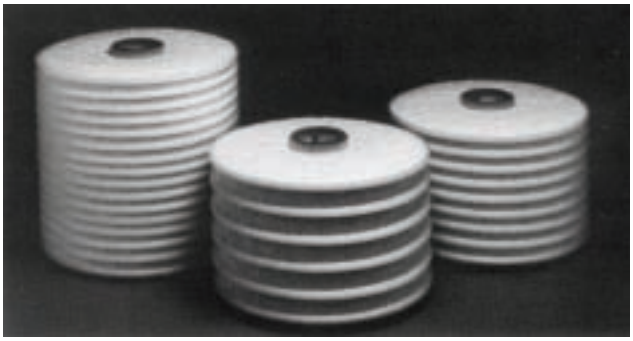
Life and Efficiency Analysis compares the total throughput (gal/ft^2) and turbidity (NTU) during a filtration cycle of 10 psi over the initial starting pressure. The Matrix™ filtered 26 gal/ft^2 prior to an increase of 10 psi (diff. pressure) over the initial starting pressure, where as the competition filtered 15 gal/ft^2 (Figure 2). The corresponding turbidity curves (Figure 3) shows the Matrix™ to be much more retentive.

Customer Support

Gusmer Enterprises, Inc., is one of the world's largest depth filter manufacturers and distributors of beverage processing aids and equipment. With two ISO 9001 certified manufacturing facilities (both supported by fully equipped R&D laboratories), an analytical laboratory and four distribution centers throughout the United States, Gusmer offers customers full technical support and customer service that is surpassed by none. In the business since 1924, Gusmer is dedicated to the long-term success of our customers.

Cellu-Stack® Cartridges

Gusmer offers a full range of lenticular filter cartridges and housings. The 1900SD Cellu-Stack cartridges offer winemakers the advantages of depth filter sheet media in a convenient and sanitary cartridge form. Housings are available for demonstrations at your winery.



For more information on the installation or use of the Matrix™ filter media, please contact your Gusmer Enterprises representative.

Millipore Products for Microbial Management

– because a lot depends on what's not in your wine.

MILLIPORE

For 50 years, Millipore has supplied wineries around the world with microbial management programs that monitor and remove microorganisms and other contaminants from wine. Trusted as the "gold standard" by generations of winemakers, Millipore products for clarification and presterile and sterile filtration will ensure microbial stability while maintaining quality, clarity, flavor, and aroma. Gusmer is proud to offer a full range of Millipore products, including a full range of Millipore products for microbial monitoring and detection in the product stream and throughout the winery. Contact a Gusmer application specialist today for process assistance focusing on reliability and total filtration optimization. Some recommended filtration cartridges are presented below. See page 41 for Millipore's microbial detection products.

New… Vitipore®II and Vitipore®II Plus Cartridges for Sterile Filtration Applications

Constructed with Durapore® polyvinylidene fluoride (PVDF) membrane, the Vitipore II and Vitipore II Plus cartridges have been engineered to meet the demanding and varied conditions of wine filtration.

- Innovative design for higher flow rates and extended throughput and service life
- Easy to clean with broad chemical compatibility
- Robust patented end-cap supports demanding process conditions
- Quality built right in—certificate of quality included with each box

Millipore offers a range of filtration solutions. For details on additional options, contact Gusmer today!

Bevigard™ M and Polygard® CR Prefiltration & Clarification Filters

- Versatile depth and surface filters for clarification and presterile filtration requirements
- Enhanced protection of more expensive final filters to improve overall process economics
- High dirt-loading capacity and wide chemical compatibility
- Quality built right in—certificate of quality included with each box

New…Vitipore® II and Vitipore® II Plus Cartridges for Sterile Filtration Applications

MILLIPORE

	Vitipore II Filters	Vitipore II Plus Filters
Application	Single-layer membrane construction is ideal for processing cleaner wines.	Dual-layer membrane plus a prefilter layer provide superior performance in difficult-to-filter wines with heavier particulate or colloid content.
Pore Sizes	CVBW: 0.22 µm; CVBB: 0.45 µm CVBY: 0.65 µm; CVBA: 1.0 µm	CVPB: 0.45 µm + 0.5 µm prefilter CVPY: 0.65 µm + 0.5 µm prefilter
Microorganism reduction efficiency	Reduction Titer	Reduction Titer

Microorganism	CVBW	CVBB	CVBY	CVBA	CVPB	CVPY
Pseudomonas aeruginosa	10^7					
E. Coli	10^7	10^7			10^7	
Saccharomyces cerevisiae		10^7	10^7	10^7	10^7	10^7
Lactobacillus hilgardii		10^7			10^7	
Oenococcus oeni		10^7			10^7	

Materials of Construction		
Membrane:	Hydrophilic PVDF	Hydrophilic PVDF + Mixed cellulose esters
Film Edge, Supports, and Structural Components:	Polypropylene	Polypropylene
O-rings:	Silicone	Silicone
Filtration Area	8.4 ft^2 (0.78 m^2) per 10 inch cartridge	8.4 ft^2 (0.78 m^2) per 10 inch cartridge
Bubble Point at 25°C	CVBW: 45 psig (3000 mbar) CVBB: 28 psig (1930 mbar) CVBY: 14 psig (970 mbar) CVBA: 9 psig (620 mbar)	CVPB: 28 psig (1930 mbar) CVPY: 14 psig (970 mbar)
Air Diffusion at 25°C	CVBW: 15.2 ml / min at 40 psig (2760 mbar) CVBB: 17.1 ml / min at 22 psig (1520 mbar) CVBY: 9.1 ml / min at 9 psig (620 mbar) CVBA: 6.3 ml / min at 7 psig (480 mbar)	CVPB: 17.1 ml / min at 22 psig (1520 mbar) CVPY: 9.1 ml / min at 9 psig (620 mbar)
Sanitization/Sterilization	May be in-line steam sterilized 100 times for 30 minutes, up to 109°C, or hot-water sanitized 50 times for 30 minutes, up to 80°C—except for CVBW, which may be hot-water sanitized 30 times for 30 minutes, up to 80°C.	

The Vitipore® II and Vitipore® II Plus cartridges are available in 10-, 20-, 30-, and 40-inch lengths and Code 7, Code 0, and Code 5 configurations.

For specific ordering information or filter sizing and selection recommendations, please contact Gusmer.

Bevigard™ M and Polygard® CR Prefiltration & Clarification Filters

	Polygard CR Filters	Bevigard M Filters
Application	Gradient-density media in a wide range of pore sizes are ideal for clarification applications in a range of liquids.	Pleated surface filter used for prefiltration to protect final sterile filters.
Pore Sizes	CRK1: 0.1 µm CRK3: 0.3 µm CRA5: 0.5 µm CR01: 1.0 µm CR03: 3.0 µm CR05: 5.0 µm CR10: 10 µm CR25: 25 µm CR50: 50 µm CR75: 75 µm CR99: 100 µm	CWSS: 0.5 µm + 0.2 µm, dual-layer CWSC: 1.2 µm + 0.5 µm, dual-layer
Materials of Construction		
Filter Media:	100% wrapped polypropylene	Mixed cellulose ester
Film Edge, Supports, and Structural Components:	Polypropylene	Polypropylene
O-rings:	Silicone	Silicone
Filtration Area	N/A	Double-layer: 7.5 ft. (0.70 m^2) per 10 inch cartridge Single-layer: 8.6 ft. (0.80 m^2) per 10 inch cartridge
Sanitization	Hot-water sanitized at 176°F (80°C) for 30 minutes	Hot-water sanitized at 176°F (80°C) for 30 minutes

Bevigard™ M and Polygard® CR cartridges are available in 10-, 20-, 30-, and 40-inch lengths and Code 7, Code 0, and Code 5 configurations. The Polygard CR are available in the above configurations as well as industrial code F.

Large, engineered Millipore filtration systems are available.

Check with your Gusmer Enterprises sales representative.

NEW!

Bevliner™

MILLIPORE

Single and Multi-Round Housing

Bevliner™ T-line housings deliver safe, reliable performance and process separation consistency, from scale-up through manufacturing expansion. Bevliner™ housings' modular design makes it easy to meet food and beverage processing needs by being available in the appropriate size for any application. Bevliner™ housings are both CE and ASME compliant, meeting all design and manufacturing standards.

Materials of Construction (Wetted Parts):

All metal surfaces in contact with product are 316 stainless steel.

All seals are silicone.

Inlet/Outlet connection seal to housing is PTFE, Teflon polymer.

Surface Finish:

Mechanical polish (MP)—All housings stainless steel wetted parts are mechanically polished: Ra^2<0.8 µm

Some Bevliner™ housings are kept in stock...ready for immediate shipment.

- Easy to configure
- Fast delivery
- Economical
- CE and ASME compliant design

Automatic Filter Integrity Testing–Integritest® Mini IIP Instrument

The Integritest Mini IIP is a portable instrument designed to perform a pressure-hold integrity test on membrane filter cartridges. This compact unit operates via rechargeable batteries and holds up to 19 test programs and 200 test results in its memory, for easy recall and printing.

- Compact and easy to use
- Rechargeable battery powered for portability and in-plant usage
- Winfilter™ software offers Windows® based data storage and documentation.

Windows is a registered trademark of Microsoft Corporation.

Vaslin Bucher Cross-Flow Filters

Evaluate a Vaslin Bucher Cross-Flow System at your winery

FM 40i

Evaluate a Vaslin Bucher FM filter at your facility with our FM 40i demonstration filter. This fully automated 40-square-meter filter is trailer mounted and can be brought to most facilities for a production trial. Contact your Gusmer representative for details.

Vaslin Bucher has engineered fully automated cross-flow filtration systems that truly cross over into the next realm of filtration… the FM and FX cross-flow filtration systems. These cross-flow systems cut out multiple depth filtration steps and eliminate the handling and losses associated with them.

Vaslin Bucher's FM and FX filters fully respect the quality of your wines!

- Provide one-step filtration
- Utilize a low filtration pressure (17 psi), kept at a constant level via a positive displacement feed pump
- Operate with essentially no increase in wine temperature
- Back-pulse technology optimizes flow rates
- Require no disposal of spent filter media
- Are easy to use and capable of operating around the clock without direct operator supervision

A wide range of models, with flow rates ranging from 200 to 15,000 gallons per hour, means that there's a system to meet the needs of virtually every winery.

Arrest fermentations with the Vaslin Bucher cross-flow filter

An active fermentation (glass in the center) can be arrested with one pass through the filter (glass on the right) and fermentation lees retained (glass on the left).

FX 1, FX 2, and FX 3 - The New Generation of Cross-Flow Filters

Designed to filter wine at almost any stage of processing: juice, during primary fermentation, after malolactic fermentation, after stabilization treatment, prior to bottling...young wines, mature wines...

The new FX 1, FX 2, and FX 3 range is the best answer to the small and medium size wineries' requirements for cross-flow filtration.

FX 3

Unique Process

FX 1, FX 2, and FX 3 are equipped with a variable speed pump. Vaslin Bucher has used this technique for more than 15 years. With this technique, the inlet flow rate equates to the outlet flow rate (no by-pass on the circulation loop), which means reduced wine agitation and minimal temperature increases (temp. increases <2 C°).

A new patented retentate concentration process manages the retentate concentration in the loop during the filtration cycle to avoid membrane fouling, allowing for the reduction of intermediate water rinsing and expediting cleaning cycles.

New Filtration Module

FX 1, FX 2, and FX 3 are equipped with "Single Housing" modules and clamp mountings with a "high throughput" cross-flow filtration membrane specifically designed for wine filtration.

The membrane is made of a hydrophilic polymer with an average porosity below 0.2 µm, so as to guarantee a low microbe permeate.

REVERSE OSMOSIS from VASLIN BUCHER

Osmo TOP OM XM

Grape Juice Concentration
Wine Concentration
Partial Wine De-alcoholization
Redux

- Efficient for both red and white grape must/wine
- Strong improvement of the wine organoleptic quality: structure, aromas, and colors
- Light clarification needs for the must (400 NTU turbidity is sufficient) due to exclusive membranes
- Very easy to use and clean with easy maintenance
- Compact—fits easily into your cellar without special installation

For more detailed information contact your Gusmer representative or go to www.gusmerwine.com for more extensive descriptions.

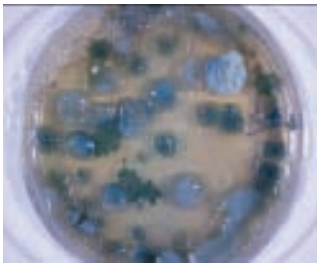
Common-Use Lab Chemicals

Some items have been discontinued, and will be available only while supplies last.

Chemical	Comments	Shelf Life		Size	/ Price	Size	/ Price
Alcohol, Reagent	For burning in alcohol burners	indefinite		500 ml	$15.00		
Brix 20° Solution	To adjust refractometers & calibrate hydrometers	1-2 mos in fridge		2 ml vial	$5.00	500 ml	$18.00
Clinitest Kit	Complete kit for sugar tablet tests	indefinite		Full kit	$34.00		
Replacement Components:							
Color chart	Laminated color chart (1)	N/A		each	$3.00		
Test tube	Flat bottom test tube (3)	N/A		each	$0.50	3 / pk	$1.20
0.5 ml pipet	For measuring wine sample (3)	N/A		each	$0.50	10 / pk	$3.00
[HM] Clinitest tablets	Individually wrapped, 100 / box (1)	indefinite		each	$29.00		
NEW Contrex Glass Cleaner	Alkaline Liquid Detergent, free rinsing phosphate free, no special handling/disposal	indefinite		1,000 ml	$12.50		
Copper sulfate & other sulfide chemicals	For treating sulfide odors. See Kit.						
1% solution	(0.15 / G = 0.1 ppm as Cu)	1-2 yrs	Disc.	500 ml	$9.00	1 L	$15.00
10% solution and	(15 ml / 1,000 G = 0.1 ppm as Cu)	1-2 yrs		500 ml	$15.00	1 L	$19.00
Crystals		indefinite				500 g	$45.00
Sulfide Detection Kit	For detecting, distinguishing, and treating odors of H_2S, mercaptans, and disulfides					Full kit	$25.00
Chemicals	Ascorbic acid 1%	until yellow		30 ml (d)	$5.00		
	Cadmium sulfate 0.05%	indefinite		30 ml (d)	$5.00		
	Copper sulfate 0.05%	indefinite		30 ml (d)	$5.00		
	Copper sulfate 1%	1-2 yrs		60 ml (d)	$5.00		
Hydrochloric Acid							
0.01 N	For standardizing sodium hydroxide	1 yr		125 ml	$7.00	500 ml	$13.00
0.10 N	solutions. (Specify strength when ordering.)						
Hydrogen peroxide 30%							
	For A/O SO_2 test	1 yr in fridge		125 ml	$27.00	500 ml	$47.00
[HM]	For the $25 cost of the HAZMAT freight, it is more economical to purchase larger sizes.						
ML Chromatography							
ML Chromatography Kit [HM]	Self-contained unit for paper chromatography. Complete kit.	N/A				Full kit	$40.00
Replacement Components:							
Paper #1	8.5" x 10.5" (larger—fits 1 G jar)	see note		10 / pk	$9.00	50 / pk	$34.00
	Leave in solvent 6-8 hours.			25 / pk	$17.00		
Paper #20	8.5" x 10.5" (larger—fits 1 G jar)	see note		10 / pk	$17.00	50 / pk	$60.00
	Leave in solvent 12+ hours.			25 / pk	$35.00		
Paper #20	7.5" x 9" (fits acrylic jar)	see note		10 / pk	$11.00	25 / pk	$25.00
	Note: All chromatography paper is sensitive. Store away from fumes (CO_2, SO_2, acid, and alkaline fumes).						
ML Chrom. Solvent	Composed of butanol, formic acid,	at least 1 yr		125 ml	$17.75	500 ml	$59.00
[HM]	bromocresol green.	unopened		250 ml	$33.00		
ML Acid Standards	Tartaric, malic, citric, lactic (specify)	until moldy		each	$3.00	set of 4	$10.00
Capillary tubes	Special made 25 uL thin-bore tubes	N/A		100 / pk	$4.00	500 / pk	$8.00
	(500 pk is 40 g)			1,200 / pk	$24.00		
Chromatography jar	Glass, 1 G	N/A		each	$4.00		

Lab Chemicals

Chemical	Comments	Shelf Life	Size /	Price	Size /	Price
NOPA						
	Instructions & calculation diskette provided on request, with purchase of chemicals. Requires UV spectrophotometer (335 nm). Number of samples that can be tested with kits depends on how many times standards are also run.					
NOPA Test Kit	Contains all components needed & instructions Ships 2-day delivery with ice pack		For 80 samples	$95.00		
NOPA chemicals:						
Isoleucine std, 140 mg / L	Prepared vials (use 1 per test run)	freeze	10 vials	$15.00		
O-phthaldialdehyde	0.67%	1 mo in fridge	120 ml	$16.00		
No-OPA	Reagent alcohol	stable	120 ml	$7.00		
N-acetyl-L-cysteine	Buffer part 1	2 mos in fridge	500 ml	$16.00		
Boric acid/NaOH	Buffer part 2	2 mos in fridge	500 ml	$16.00		
pH Buffers						
pH 4.01 or 7.00	Color coded, prepared to NBS standards.	6-12 mos	250 ml	$8.00	500 ml	$10.00
	Specify which pH.		1 L	$15.00		
pH Electrode Soak	KCl-buffer solution to store electrodes	until moldy	250 ml	$8.00	500 ml	$10.00
Phenolphthalein 1%	Indicator for TA test and V.A. test	indefinite	125 ml	$6.00	250 ml	$8.50
Phosphoric acid **[HM]**	25% For A/O SO_2 test	indefinite	500 ml	$18.00	1 L	$25.00
Ripper SO_2 Test						
Iodine 0.02 N	VERY light sensitive. Protect from light.	standardize often	500 ml	$13.00	1 L	$18.00
Sod. hydroxide 1 N **[HM]**	VERY caustic. Caution!	1-2 yrs			1 L	$15.00
Sod. thiosulfate 0.1 N	For standardizing iodine	1 yr	125 ml	$7.50		
Starch 1%	Indicator for Ripper SO_2 test	until moldy	500 ml	$12.75		
Sulfuric acid 25% **[HM]**	VERY corrosive. Caution!	indefinite	500 ml	$20.00	1 L	$30.00
Sodium hydroxide (NaOH)	For titration, specify strength. 0.01 N for A/O SO_2 test 0.067 N for VA & TA tests 0.10 N for TA tests	6 mos-1 yr	500 ml	$12.00	1 L	$15.00
Titration Adjustment Solutions						
To adjust the pH of water prior to testing TA or the color of peroxide/indicator before testing SO_2. Specify dilute acid OR base, for testing acid OR SO_2		until moldy	30 ml (d)	$5.00		
Vacuum Aspiration (A/O) SO_2 Indicator	Proprietary 4 dye formula; sharper color changes from purple to green.	3-6 mos test often	15 ml (d)	$7.00	30 ml	$10.00
Vacuum Aspiration Chemicals:						
	Hydrogen peroxide 30% Indicator NaOH 0.01 N HCl 0.01 N Phosphoric acid Dilute Acid and Dilute Base for SO_2 test					



Microbiology supplies are still available.

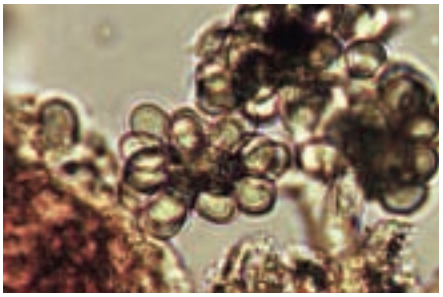
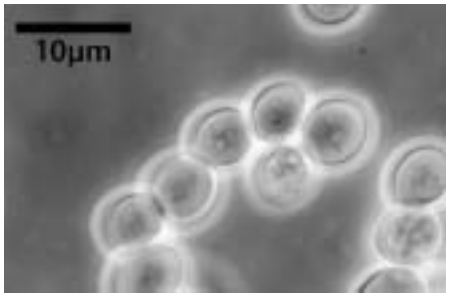
Call for availability of prepared agar (WL, WLC, and MR agar) and Methylene Blue.

Illustrated Guide to Microbes and Sediments in Wine, Beer and Juice

by Dr. Charles G. Edwards

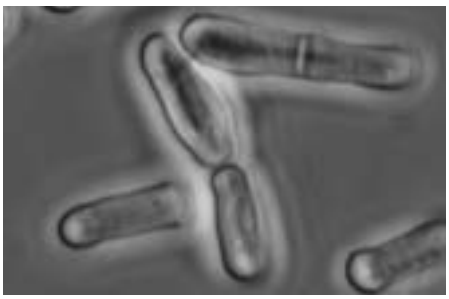
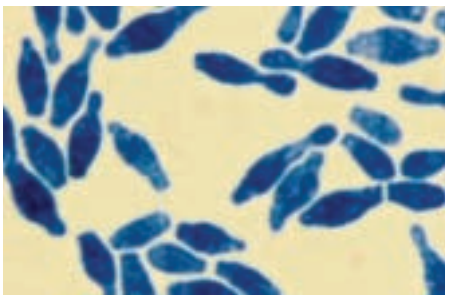
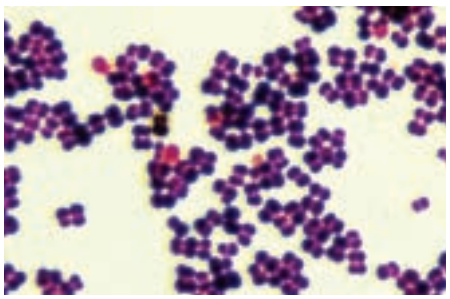
At last, one of the most useful books for wine microbiology is now available … a "must-have" for microscopic examination and tentative identification of microorganisms and sediments in wines, beers, and juices!

Illustrated Guide to Microbes and Sediments in Wine, Beer and Juice is a microscope companion book that includes over 30 different species of yeast, bacteria, and mold commonly found associated with wines, as well as frequently encountered sediments. This book is an extensive compilation of photographs and reference information printed on durable, spill-resistant paper and has been spiral bound so the pictures lie flat when in use with a microscope.

The microorganisms were obtained from culture collections located around the world. Each organism is featured in three photographs: (1) a typical colony grown on commercially available culture media; (2) a color stain; and (3) a phase contrast view of the microorganisms grown in wine, beer, and juice.

This volume is available in English, French, German, Italian, Spanish, and Chinese versions and is therefore an essential resource for winemakers worldwide. It's a comprehensive reference book that will quickly become a standard for any technical wine library.

Price: $125.00 (quantity discounts available)

Published by **WineBugs LLC, 2006**

Process Monitoring Tools from Millipore

MILLIPORE

Ensuring product safety and flavor is essential to your wine process. Millipore's Microfil® Filtration System provides all the tools to sample your product or raw materials and culture your sample.

Sample Collection

1. EZ-Pak® sterile-membrane dispenser dispenses membrane that can be used with the Microfil funnel to fit your Microfil vacuum manifold or standard vacuum flask.
2. Microfil® or Microfil V disposable filtration funnels with their push-fill design make capturing your sample fast and easy.
   - Microfil V funnels have the membrane built right in.
   - Microfil funnels require a separate EZ-Pak or S-Pak membrane.
3. Microfil Vacuum Manifold is easy to use. The three-place manifold allows for multiple sample testing at one time, while its novel fit with level allows for faster sample filtration and easy membrane removal.
4. Standard Vacuum Flask with No. 8 stopper is ideal for imaging a single sample.

EZ-Pak®

Microfil® V

Microfil®

Microfil® Vacuum Manifold

Standard Vacuum Flask

Microorganism Culture

5. Membranes are placed onto the Petri Plates with Sterile Pads and incubated with sterile ampoule media for organism culture.
6. Choosing the correct Media is essential to growth. See the order table on page 42 for an extensive list.
7. Incubate, grow and count.

Ordering Information — call for prices

EZ-Pak® 4-µm Membrane: 600 / pack (4 bands of 150 filters)

Pore Size, µm	Filter Color	Catalog No.
0.45	white	EZHAWG474
0.45	black	MSP000814
0.45	green	EZHAGG474
0.8	white	EZAAWG474
0.8	black	EZAABG474

Sterilized Microfil® Funnels and EZ-Pak® Membrane Cartridges: 150 / pack

Pore Size, µm	Funnel Volume, ml	Filter Color	Catalog No.
0.45	100 ml	white	MZHAWG101
0.45	100 ml	black	MZHABG101
0.8	100 ml	black	MZAABG101
0.45	250 ml	white	MZHAWG251
0.45	250 ml	black	MZHABG251

Single pack (S-Pak) filters are available when only a few tests will be conducted. Contact Gusmer for details.

Microfil® Filtration Systems

	Catalog No.
3-Place Manifold and Support	MIAC03P01
Funnel Dispenser, 100 ml	MIACFD101
Funnel Dispenser, 250 ml	MIACFD201
Support with 1/4-in. Value	MIAC01401
Stand-alone Support	MIAC01P01
Microfil V Tulip	MIACN8S01

Microfil V Filtration Devices

Pore Size, µm	Funnel Volume, ml	Qty / Pack	Catalog No.
0.45	100 ml	24	MVHAWG124
0.45	100 ml	24	MVHABG124
0.8	100 ml	24	MVAABG124

Culture Media: Media in 2L plastic ampoules

Target Microorganism	Name	Qty / Pack	Catalog No.
Brettanomyces	Brettanomyces Selective Broth	50	SC1M339H3
Yeast & Mold	m-Green Broth	50	M00000P2M
Heterotrophic Bacteria	m-HPC Broth	50	M00000P2S
Bacteria, Yeast & Mold	Orange Serum Broth	50	M00000P20
Total Heterotrophic Organisms	Tryptone Glucose Extract Broth (TGE)	50	M00000P2T
Total Count Acid	Tomato Juice Broth	20	MX00TJ220
Preservative Resistant Yeast	PRY Broth	50	SC1P417H2
Total Heterotrophic Microorganisms	Tryptone Glucose Extract Broth with TTC	50	M0000P2TT
Bacteria	Wallerstein Differential Broth	50	M00000P2D
Bacteria, Yeast & Mold	Wallerstein Nutrient Broth	50	M00000P2N
Yeast & Mold Selective Broth	(Inhibits bacterial growth)	50	M0000P2SM

Filter Flasks

	Qty / Pack	Catalog No.
1 L Vacuum Filtering Flask	1	XX1004705
4 L Vacuum Filtering Flask	1	XX1004744
Accessories		
Silicone tubing 3/16 in. ID 140 cm	1	XX7100004
Neoprene No. 8 perforated stopper	5	XX1004708

Swabs and Samplers

	Color	Qty / Pack	Catalog No.
Yeast and Mold Sampler	yellow	25	MY0010025
Total Count Sampler	white	25	MT0010025
Swab in vial with phosphate buffer	clear	25	MMSB10025

Petri Dishes and Pads

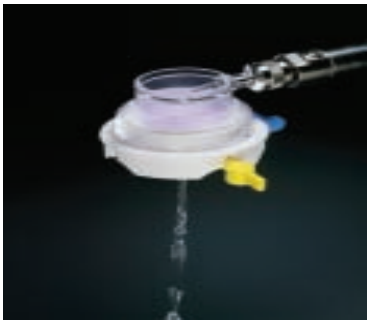
	Qty / Pack	Catalog No.
Petri dish 47 mm	100	PD1004700
Petri dish 47 mm	500	PD1004705
Petri dish 47 mm with Pad	100	PD10047S0
Petri dish 47 mm with Pad	500	PD10047S5
Absorbent Pads	100	AP10047S0
Pad Dispenser	3	XX6200024

Looking for a one-step wine sampling process? Look no further than MicropreSure® Online Filtration Monitors

Testing on your production line saves steps and speeds sampling. These unique devices use the pressure in tanks or pressurized lines to process and collect samples through a microporous membrane within an enclosed chamber. And because the single-use monitors are securely locked together, sampling pressurized lines will not create leaks.

MicropreSure monitors are dosed throughout the entire test, so there's no risk of adventitious contamination while sampling in a production environment. Organisms are captured on the membrane right at the collection site, ensuring a representative sample and reliable test results. These lightweight monitors are shipped presterilized so operators don't need to sterilize bulky sample containers and transport them back to the lab. After processing, microbes are contained and protected within the device.

Sampling valves are available to ensure a sterile transfer. If the sampling-port outlet is a male luer port (such as an ESP valve), use the MicropreSure online filtration monitor without a sampling-port adapter. If the sampling-port outlet has a Tri-Clover® connection, install a MicropreSure sanitary sampling valve.



ESP MicropreSure Sampling Valve

Ordering Information

MicropreSure® On-line Filtration Monitor

	Qty per Pack	Catalog No.
MicropreSure device with pad for liquid media, EO sterilized, bulk packed, 0.45 µm white gridded	48	MSHA WGM 48
MicropreSure device with pad for liquid media, EO sterilized, bulk packed, 0.45 µm black gridded	48	MSHA BGM 48
Accessories		
MSOpener™ vacuum manifold	1	MSOP ENR 01
MSOpener tulip	1	MSOP NMS 01
Sterile sampling tube 5 in.	1	M000 000 01

For the appropriate adapter, please refer to the product User Guide.

Sampling Valves

	Catalog No.
Sanitary sampling valve 316 L stainless steel 1/4 in. weld end fitted with Viton O-ring and plug seal, polypropylene valve cap	YY20 040 W0
Sanitary sampling valve ECTFE body stainless steel stem 1/4 in. NPT fitted with Viton O-ring and plug seal, polypropylene valve cap	YY20 040 H0
Sanitary sampling valve 316 L stainless steel 1/4 in. NPT fitted with Viton O-ring and plug seal, polypropylene valve cap	YY20 040 S0
Sanitary sampling valve 316 L stainless steel 1/8 in. NPT fitted with Viton O-ring and plug seal, polypropylene valve cap	YY20 040 E0
MicropreSure sanitary sampling valve 316 L stainless steel 1/4 in. NPT fitted with silicone O-ring and plug seal, ABS valve cap	MXPE SP1 4N
MicropreSure sanitary sampling valve 316 L stainless steel 1/8 in. NPT fitted with silicone O-ring and plug seal, ABS valve cap	MXPE SP1 8N
MicropreSure sanitary sampling valve 316 L stainless steel 1 1/2 in. TC fitted with silicone O-ring and plug seal, ABS valve cap	MXPE SPT CL

Millipore also offers products for air monitoring. Contact Gusmer today for details on M Air T Testing systems.

Labware

Some items have been discontinued, and will be available only while supplies last.

Item	Comments	Size	/ Price	Size	/ Price
Balance					
Triple beam from Ohaus	Standard balance for measuring up to 610 grams, readable to 0.1 g.			each	$140.00
Electronic balances from Ohaus					
NEW Scout® Pro SP202	Capacity 200 g, Readable to 0.01 g, gram or ounce weight, 4.7 inch weigh pan.			each	$295.00
Scout® Pro SP6000	Capacity 6,000 g, Readable to 1.0 g, gram, ounce, pound weight, 6.5 inch weigh pan.			each	$240.00
FD15 Series Portioning Scale	Stainless steel cellar scale. Capacity 15 kg. Readable to 2 g, gram, kilogram, pound weight, 8.2" x 8.2" removable, dishwasher safe stainless steel weight pan. (We recommend this durable, washable scale for cellar use.)			each	$475.00
Beakers					
Griffin glass	Discount available for pack purchase of same size.	50 ml	$3.00	600 ml	$5.75
	Pack qty is 6 or 12, depending on size.	250 ml	$3.50	1,000 ml	$9.00
Handled Beaker, PP	Very popular item. Graduated, with large handle.	500 ml	$7.00	2,000 ml	$9.00
		1,000 ml	$8.00	3,000 ml	$10.00
Buret	Glass with Teflon stopcock	10 ml	$85.00	25 ml	$59.00
Cash Still	Self-evacuating—complete unit (still, heater, condenser).			each	$545.00
(see page 51 for VA Kit)	Buy stand & clamps separately (talon, extension, and 2 clamp holders)				
	Replacement heating coil			each	$35.00
	Replacement condenser			each	$99.00

Scout Pro SP202

Scout Pro SP6000

FD15 Portioning

Cash Still - buy stand and clamps separately.

See Page 51 for Volatile Acidity Kit

Griffin glass beaker

Plastic handled beakers

Buret with Teflon stopcock

Lab Equipment

Some items have been discontinued, and will be available only while supplies last.

Item	Comments		Size	Price	Size	Price
Clamps						
Buret clamp	Single or double, secure, easy release		single	$15.00	double	$24.00
Extension clamp	LaPine 3 finger, requires variable holder		each	$24.50		
Talon clamp	Holds cylindrical glassware (64-89 mm dia.)		each	$40.00		
Variable clamp holder	Secures extension & talon clamps		each	$10.00		
Cylinders						
Graduated glass	Class A, glass base.	Disc.	10 ml	$5.55	100 ml	$15.00
		Disc.	25 ml	$7.90	250 ml	$20.00
			50 ml	$12.00	500 ml	$28.00
Graduated PMP plastic	Clear and very durable.		50 ml	$6.50	500 ml	$13.50
			100 ml	$8.00	1,000 ml	$18.00
			250 ml	$10.00		
Hydrometer cylinder	Nalge PMP, 14.5" x 2", holds 500 ml				each	$18.00
Ebulliometer	Dujardin-Salleron. TTB approved French measuring device for measuring alcohol (allow 4-12 week order time for import). For replacement thermometers for the ebulliometer, see Thermometers, on page 48.				each	$675.00

Single buret clamp

Double buret clamp

Extension clamp

Talon clamp

Variable clamp holder

Class A cylinder

PMP cylinders

Ebulliometer

Thermometer with stopper (French)

Use reagent alcohol in the burner (see page 38)

Replacement burner wicks are available at $10.00 for a box of 12.

Item	Comments	Size / Price	Size / Price
Flasks			
Boiling flask	Kool-Grip® (cork) coated neck allows safe handling while full of hot water.	1,000 ml $45.00	
Erlenmeyer flask	Glass, wide mouth.	125 ml $4.50	500 ml $6.50
		250 ml $5.50	
Volumetric flask	Glass, snap-cap. Very fragile.	100 ml $15.00	500 ml $25.00
		250 ml $20.00	
Hydrometers			
Brix hydrometer	No thermometer. Higher ranges special order.	-5 to +5 $20.00	9 to 21 $20.00
		-1 to 11 $20.00	19 to 31 $20.00
		0 - 32 F $20.00	
	Set of 3 (-1/11, 9/21,19/31)	set of 3 $55.00	
Thermohydrometer	Brix, with thermometer, BLUE SPIRIT	-5 to +5 F $35.00	9 to 21 F $35.00
		-1 to 11 F $35.00	19 to 31 F $35.00
		0 - 32 F $29.00	
	Set of 3 (-1/11, 9/21, 19/31)	set of 3 $95.00	
Kimwipes	4.5" x 8.5", box of 280, for delicate tasks.	each $5.00	
ML Chromatography	See Lab Chemicals section.		
Parafilm	Excellent for quick seal of containers.		2" x 250' $19.50
			4" x 250' $34.00
pH Meters, Electrodes			
Mettler Toledo S20 meter	Bench top meter, portable (batteries), auto temperature compensation and buffer recognition, auto endpoint display. Includes stand and temperature compensating electrode InLab413.		each $599.00
Mettler Toledo S80 meter	Dual channel, multi-use meter. See below for details.		each $1,799.00
Electrodes	Mettler Toledo InLab 413 Epoxy body, 3 in 1 gel filled combination electrode with ATC sensor and multi pin head. Durable, designed for accuracy with wine and beer.		each $230.00
	Mettler Toledo InLab 410 glass body, 3 in 1 combination electrode with ATC sensor and multi pin head. Has silver ion trap which allows for fast and accurate results and prevents contamination.		each $300.00

NEW

Thermohydrometer BLUE SPIRIT

Erlenmeyer flask

Volumetric flask

Mettler Toledo S20 pH Meter

Go to gusmerwine.com for more detailed information on these and all products.

Seven Multi S80 pH/ISE Meter

Mettler Toledo's most versatile meter.

Modular expansion unit instrument based on electrochemical measuring techniques, this user-friendly meter allows for flexibility with plug-in expansion units to upgrade or change the meter at any time without purchasing a new meter.

Meter specs:

Range: -2.000...19.999
Accuracy: +/- 0.0002
Temp: -30 to 130°F

- GLP compliant
- Upgradeable at any time
- Secure data management
- Ability to customize calibration settings
- Stand-alone electrode arm
- R3232C interface to connect to PC/Printer
- Powerful memory
- Shows graphs and slopes
- User-friendly instructions and excellent Mettler technical support

Full range (22 ions) of Electrodes sold separately

NEW

Lab Equipment

Item	Comments		Size / Price			Size / Price	
Pipets							
Disposable	Glass, sterile, individually wrapped.		0.5 ml	$0.75		pk / 125	$75.00
		Disc.	5 ml	$1.00	Disc.	pk / 100	$50.00
			10 ml	$1.00		pk / 100	$50.00
Volumetric	Glass, Class A, VERY fragile.		1 ml	$3.25		20 ml	$6.25
			5 ml	$4.25		25 ml	$6.75
			10 ml	$5.25		50 ml	$9.25
	NEW! Wide tip volumetric for must samples		10 ml	$5.50			
Wide-Tip	Glass, wide tip for juice/must samples.				Disc.	10 ml	$12.00
Wide-Tip milk	Not graduated - 10 ml volume only					10 ml	$9.00
Pipet Bulbs	Rubber, safety, "turkey baster type."					each	$9.50
Pipet support rack	Plastic, vertical, holds up to 50 pipets.					each	$28.00
Refractometer							
Atago Digital Pocket Pal	Reliable, sturdy, portable, hand held, washable, no more guessing.			each		$295.00	
Chase	ATC, rugged, includes applicator & calibration solution, in a carrying case.					each	$99.00
Sample cover	Sometimes the plastic flap breaks—these replacement covers attach easily.					each	$5.50
Stirrers							
Stirrer only	Corning stir plate Scholar 171					each	$149.00
Hotplate Stirrer	Low-profile hot plate stirrer, Corning PC220					each	$325.00
Stir Bars	Autoclavable, octagonal		0.5" x 5/16"			each	$4.00
	Magnetic stir bars, teflon		1.5" x 5/16"			each	$4.25
Stir-bar retriever	Plastic wand with magnet					each	$12.00
Support Stands							
Porcelain	Base 7" x 13", rod 1/2 " x 24". Ideal for cash still.					each	$32.00
Black enamel	Base 6" x 9", rod 1/2 " x 29". OK for burets.					each	$30.00

NEW

NEW

Pipet Bulb

Volumetric Pipet

Wide-tip Must Pipet

Pipet Rack

Atago Digital Refractometer

Stirrer

Black enamel support stand

Item	Comments	Size / Price	Size / Price
Thermometers			
Ebulliometer (FR)	French manufacture (stopper attached).	each	$57.00
Lab	Dual range C/F, red spirit, partial immersion.	each	$7.50
Titrator, Mettler, DL15	Single Buret Endopoint Titrator for pH endpoint titrations and pH measurements. Accessories included: magnetic stirrer, stir bars, DG115pH electrode w/cable, 20 ml buret, titration stand with 2 beakers, printer cable and other misc. items. Includes parallel printer output and temperature sensor input, several Mettler methods as well as memory for custom methods.	each	$4,999.00
Replacement Accessories:			
	10 ml buret for SO_2	each	$670.00
	Electrode cable for SO_2	each	$91.60
	Plastic beakers, 100 ml, case of 1400	each	$301.00
	Double pin Platinum electrode with screw cap for SO_2	each	$199.00
	DG111-SC Combination pH Glass Electrode	each	$221.00

NEW

New Item

Auto Titrators can add speed, accuracy and repeatability to your routine lab procedures. Excellent technical support is available for all Mettler Toledo products.

Add on to the titrator—this carousel allows multiple sample testing in a single session. Inquire for price and availability.

Item	Comments			Size /	Price
Vac. Aspiration SO_2					
Replacement glassware:	For Free SO_2 Kit ONLY (kits sold prior to 2004)				
Sidearm flask		100 ml, 2 port		each	$36.00
Impinger set		Tube AND insert		set	$55.00
		Tube OR insert		each	$29.00
	For Free & Total SO_2 Kit ONLY				
Impinger bottom	Impinger bottom with spring tabs			each	$58.00
Springs	Replacement springs, 2 each			set (2)	$6.55
Impinger base	Plastic holder for impinger base			each	$5.00
Glass Apparatus	Impinger body & bottom, condenser, flask			each	$390.00
Condenser & Impinger body	Impinger body with condenser			each	$152.50
Sideport flask	Round-bottom flask with 3 side ports			each	$112.00
Fitted probe tube	Fitted glass probe tube that seats in the sideport flask			each	$58.00
Fitted stopper	Fitted glass stopper for sideport flask			each	$16.00
Red cap, hose barb	Red cap with hose barb—attaches tubing to glassware.			each	$4.50
AccuFlow/5000	Vacuum pump, flow meter and timer all in one. Allows lab technician to adjust flow rate.			each	$299.00
	Specifically designed for A/O test.				
Water vacuum	Water source vacuum pump. STRONGLY recommend		Disc.	each	$10.00
	using a flow meter with this pump.				
Flow meter	RMB flow meter, 0.25-2.5 L/minute			each	$65.00
Heating Mantle	For running Total SO_2 test			each	$135.00
Variable Volume Dispenser	500 ml reservoir bottle delivers the desired volume.			each	$15.00
Wash Bottles					
Unitary Nalgene	Very useful in general lab work.		Disc.	125 ml	$3.00
				250 ml	$7.00
				500 ml	$8.00

NEW!

AccuFlow/5000
Vacuum pump, timer & flow meter

Sideport flask with fitted probe and fitted stopper

Impinger set with tabs

Wash bottles

Sidearm flask

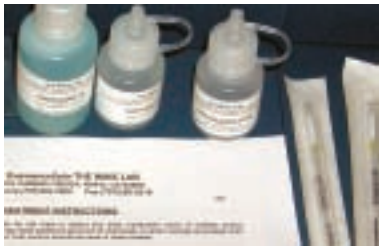
Impinger set

Packaged Kits for Specific Tests

A collection of labware, chemicals, and instructions to allow nonchemists to perform their own tests.

Test	Description	Price	
Free & total SO_2 Testing by aeration/oxidation method **[HM]**			
A/O complete kit Free & Total SO_2		each	$949.00
	Complete kit: AccuFlow/5000 pump and flow meter, heating mantle, pipet, cylinder, glassware, stand, clamps, variable volume dispenser, tubing and chemicals. Instructions included.		
NEW & IMPROVED!	A/O Apparatus only Free & Total SO_2	each	$885.00
	As above, minus the chemicals. (Purchase pump separately.)		
A/O Chemicals only		each	$65.00
	Complete set of all the chemicals needed to run A/O test See Page 37 for list of all replacement components.		
Clinitest Kit			
Complete kit for sugar tablet test **[HM]**		each	$34.00
	Contains: 100 tablets laminated color chart/instructions 3 flat-bottom test tubes 3 pipets See Lab Chemicals section for replacement items.		
ML Chromatography Kit **[HM]**	Self-contained unit for paper chromatography. Contains: acrylic jar (replaced by glass jar when supply of acrylic is depleted) 125 ml chromatography solvent 10 sheets #20 paper 4 acid standards capillary tubes plastic beaker instructions See Lab Chemicals section for replacement items.	each	$40.00

Test	Description	Price
NOPA Test Kit	Requires UV spectrophotometer at 335 nm, and micropipettor (not included) Kit Includes: ILE standard OPA No-OPA Buffer (in 2 parts: NAC and NaOH-Boric for better stability) methacrylic cuvettes instructions & Excel calculation diskette. See Lab Chemicals section for replacement items.	80 samples* $95.00
*NOTE: Samples are run in duplicate. Number of samples that can be tested with kit will depend on the number of times standards are run as well.		
Sulfide Detection/Treatment Kit	For detecting, distinguishing and treating odors of H_2S Contains: test solutions 3 pipets trial bottles, & instructions.	each $25.00
See Lab Chemicals section for replacement items. EVERY winemaker should have this kit, as sulfides may masquerade as other odors until checked with these solutions. This is a very popular item.		
Total Titratable Acidity Test Kit	For measuring total titratable acid Contains: 25-ml buret black enamel support stand single buret clamp 250-ml erlenmeyer flask (2) Chemicals: 500-ml NaOH 0.10 N 125-ml phenolphthalein 30-ml ea dilute acid & base for TA instructions	each $120.00
Optional: pH meter stirrer/hotplate		
Volatile Acidity Test Kit NEW	For measuring volatile acidity Contains: cash still, condensor, heating unit talon clamp, 2 extension clamps 3 variable clamp holders porcelain support stand 6 ft tubing 250-ml erlenmeyer flasks (2) 10-ml volumetric pipet 250-ml wash bottle stirrer/hotplate 0.5” stir bar Chemicals: 1,000-ml NaOH 0.067N 125-ml phenolphthalein Instructions	each $985.00



Chemical and Microbial Analysis

If you have questions regarding samples for analysis or sampling procedures, please telephone the lab at 707.224.7903, extension 106 or 109. The minimum analysis charge is $25. Discounts are available for 10 or more samples. Please note that all samples for analysis must be sent to the Napa facility (640 Airpark Road, Suite D, Napa, CA 94558).

GRAPE AND JUICE SAMPLES

Grape clusters may be refrigerated and sent with a cooler pack.

We recommend that juice samples not be sent, as they are liable to ferment.

If fermenting samples require analysis, please fill a plastic container 1/4 full and place in several plastic bags. We recommend shipping these samples with a cooler pack.

Juice and fermenting samples may be dropped off at our facility; or you may request a sample pickup.

CELLAR SAMPLES

Take a representative sample of the wine. If the wine is in several containers, and you expect the container samples to differ in significant ways, sample each container separately.

For most microbiological samples, mix the wine in tank or barrel, and place each sample in a new or sterile container. For surface-film identification please take a top sample.

Important: To analyze for *Dekkera/Brettanomyces*, stir the barrel or mix the tank prior to sampling, as cells tend to settle to the bottom of the vessel. Do not sample within two weeks of an SO_2 addition, as this may lead to false negative results.

BOTTLED WINES

An unopened bottle is required for post-bottling microbial analysis.

PREPARING AND SENDING SAMPLES

1. In order to ensure the most accurate analysis, please send full (topped) containers of wine. Plastic (nonbrittle) is preferable to glass, because breakage is minimized.

2. If specific label information is required on the report (vintage, variety, appellation, etc.) please make sure that this information is available.

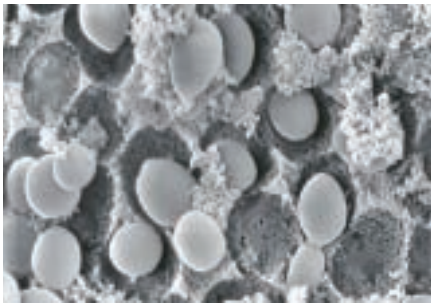
3. If possible, we would greatly appreciate a completed Analysis Request Form (available by fax or email) or a note describing the analyses required. If you have questions, please telephone the lab at 707.224.7903, ext. 106 or 109. If we have questions we will telephone or email you.

4. Samples may be sent via UPS or Fed Ex. The US Postal Service does not accept alcohol for shipping. Samples may also be dropped off in person; or courier service may be requested.

We are pleased to offer you our Courier Service!

We would be delighted to pick up your samples and deliver your ORDERS directly to your winery! To order courier service, please telephone us by 10 AM, Monday–Friday. The courier charge ($25) is waived if analysis or product sale exceeds $200. Please let us know if you need any sample containers, which are available at no charge!

The courier service is available year round and is limited to addresses on (or very close to) Highway 29 and the Silverado Trail between Napa and Calistoga, California.



Wine Analysis Panels

We have designed several panels—groups of analyses—that we believe will suit most of our clients' needs. Recommendations are included when necessary with the reported analysis. We believe that it is important to assist our clients in understanding how to utilize the information presented in their reports.

General Wine Panels

Juice Panel

This panel provides winemakers with information needed to adjust nutrient levels; recommendations regarding Brix adjustment (if necessary) are also offered.

	Volume	Price
Analysis includes:	125 ml	$68.00
Brix (refractometer), TA, pH, Yeast Available Nitrogen (YAN includes NOPA & Ammonia Nitrogen analyses) and Nutrient recommendation. (Panel saves $9.50)		

Monitoring Malolactic Fermentation

	Volume	Price
Analysis includes:	125 ml	$40.00
pH, Malic acid, Detailed microscopic exam. (Panel saves $8.00)		

Cellar Maintenance Panel

This panel monitors the status of your wine in cellar. We advise that it be performed every 4-6 weeks. Included with this analysis is a free SO_2 recommendation.

	Volume	Price
Analysis includes:	125 ml	$55.00
VA, pH, Malic acid, Free & Total SO_2, SO_2 recommendation. (Panel saves $23.00 – SO_2 recommendation Free!)		

Comprehensive Microbiology Panel

This panel provides the winemaker with an overview of the microbiological status of a wine and helps predict the potential for imminent or future spoilage.

	Volume	Price
Analysis includes:	375 ml	$115.00
VA, pH, Free & Total SO_2, Detailed sensory evaluation, Detailed microscopic exam, Direct culture for yeast, mold, & bacteria. (Panel saves $15.00)		

Problematic MLF Panel

This panel assists winemakers in determining the cause of sluggish ML fermentation. We will suggest a course of action to encourage complete malolactic conversion.

	Volume	Price
Analysis includes:	125 ml	$90.00
Alcohol, VA, pH, Free & Total SO_2, Malic acid, Detailed microscopic exam. (Panel saves $16.00)		

Basic Wine Chemistry

	Volume	Price
Analysis includes:	250 ml	$70.00
Alcohol, VA, TA, pH, Free & Total SO_2. (Panel saves $9.50)		

Comprehensive Wine Panel

This panel is created to provide an overview of a wine's analytical and microbial status.

	Volume	Price
Analysis includes:	375 ml	$140.00
Alcohol, VA, TA, pH, Free & Total SO_2, Malic acid and glucose/fructose, Basic sensory evaluation, Detailed microscopic exam. (Panel saves $19.50)		

Stuck/Sluggish Fermentation Panel

This panel assists winemakers in determining the cause of a sluggish/stuck fermentation. We will suggest a course of action to encourage fermentation completion.

	Volume	Price
Analysis includes:	375 ml	$85.00
Alcohol, VA, pH, Glucose/fructose, Detailed microscopic exam, Yeast viability. (Panel saves $20.00)		

Haze & Sediment Identification Panel

This panel works for both cellared and finished wine.

	Volume	Price
Analysis included for all wines:	750 ml	$100.00
pH, Free & Total SO_2, Detailed microscopic exam, Detailed sensory evaluation, Direct culture for yeast, mold, & bacteria. (Panel saves $15)		
White-wine Analysis includes the above and: Cold (freeze) and Heat (protein) stability. (Panel saves $20)	750 ml	$125.00

Bottling Panels

Prebottling Panel

This panel provides critical information regarding the chemical and microbial stability of a wine prior to bottling.

	Volume	Price
Analysis included for all wines:	375 ml	$140.00
Alcohol, VA, TA, pH, Free & Total SO_2, Malic acid and glucose/fructose, Detailed microscopic exam, Direct culture for spoilage organisms (*Brettanomyces*, *Pediococcus*, *Acetobacter*). (Panel saves $19.50)		
White-wine analysis includes the above and:	375 ml	$162.50
Heat (protein) and Cold (freeze) stability. (Panel saves $27.00)		

Post Bottling Panel

This panel evaluates the effectiveness of sterile filtration and determines if contamination has occurred on the bottling line.

	Volume	Price
Analysis includes:	750 ml	$80.00
Alcohol, pH, Free & Total SO_2, Membrane culture for sterility. (Panel saves $8.00)		

Chemical Tests

Juice Analysis

Juice Analysis	Volume	Price / Sample
Brix, Refractometer (juice/must)	5 ml	$11.00
Brix, Hydrometer (must/wine)	250 ml	$15.00
pH	50 ml	$10.00
Total titratable acidity	50 ml	$11.50
Ammonia Nitrogen	50 ml	$25.00 (5+ @ $22.00 each)
Alpha-amino acids NOPA (Butzke)	50 ml	$25.00 (5+ @ $22.00 each)
YAN (Ammonia N + NOPA)	50 ml	$45.00 (5+ @ $42.00 each)
Total titratable acidity (fermenting must)	100 ml	$20.00
Alcohol (fermenting must)	250 ml	$25.00

Acid Analysis

Acid Analysis	Volume	Price / Sample
Total titratable acidity	50 ml	$14.00
Volatile acidity	50 ml	$15.00
Acetic acid, Enzymatic	50 ml	$20.00 (5+ @ $18.00 each)
Malic acid	50 ml	$18.00 (5+ @ $16.00 each)
pH	50 ml	$10.00
Wine adjustment trials, (Acidification or de-acidification)	500 ml	$50.00

Alcohol Analysis

Alcohol Analysis	Volume	Price / Sample
Alcohol, NIR	100 ml	$18.00

SO_2 Analysis

SO_2 Analysis	Volume	Price / Sample
Free SO_2	50 ml	$15.00
Total SO_2	50 ml	$15.00
Free & Total SO_2	50 ml	$25.00
SO_2 Recommendation		$10.00

Sugar Analysis

Sugar Analysis	Volume	Price / Sample
Brix, hydrometer	250 ml	$15.00
Brix, refractometer	5 ml	$11.00
Glucose/Fructose, Enzymatic (Reported separately)	50 ml	$22.00 (5+ @ $20.00 each)

Stability Tests

Stability Tests	Volume	Price / Sample
Cold stability, Freeze/thaw	50 ml	$15.00
Heat Stability (protein), Incubation only	50 ml	$15.00
Bentonite fining trials, Set of 5 (Vitiben) (Includes incubation and postfining check)	375 ml	$60.00

Sensory Evaluation

Sensory Evaluation	Volume	Price / Sample
Detailed	375 ml	$35.00
Sulfide detection	375 ml	$25.00
Sulfide detection & treatment	750 ml	$45.00

Technical Assistance

Technical assistance is available, at a telephone consultation rate of $90.00 per hour ($30.00 minimum)

Contact:

David Jeffrey, at djeffrey@gusmerenterprises.com, or call 707.224.7903 ext. 106.

Microbiological Services

Microbiological Tests

Procedure	Comments	Volume	Price / Sample
Microscopic Exam	Detailed	2 ml	$25.00
Culture, Direct	Yeast/mold & bacteria (includes *Dekk./Brett.*)	2 ml	$25.00
	Yeast/mold only (includes *Dekk./Brett.*)	2 ml	$20.00
	Bacteria only	2 ml	$15.00
	Dekkera/Brettanomyces only	2 ml	$15.00
	Red-wine Spoilage*	2 ml	$20.00
	**(Brettanomyces/Pediococcus/Acetobacter)*		
Culture, Membrane Filtration	Yeast/mold & bacteria (includes *Dekk./Brett.*)	250 ml	$35.00
	Yeast/mold only (includes *Dekk./Brett.*)	250 ml	$25.00
	Bacteria only	250 ml	$25.00
Lysozyme trials	Lysozyme sensitivity	500 ml	$25.00
	(for Lactobacillus, Pediococcus, and Oenococcus)		

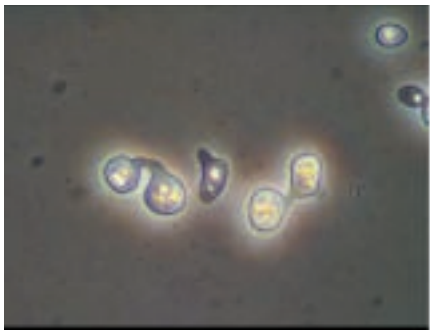
Selecting A Culturing Method

Wine Type	Description	Culturing Method
Unfiltered	Cloudy	Direct culture
Unfiltered barrel samples *	May be cloudy	Direct culture
Clear/Filtered bottled samples	Clear, < 2 CFU/ml	Membrane filtration

Microbe Growth In Culture

Microbe	Typical Growth Time	Final Count
Saccharomyces	1-2 days	7 days
Zygosaccharomyces *	1-2 days	7 days
Surface film yeasts	1-2 days	7 days
Dekkera/Brettanomyces	3-5 days	7 days
Acetobacter	2-4 days	7 days
Oenococcus	4-6 days	7 days
Pediococcus	4-6 days	7 days
Lactobacillus	7 days, if at all	10 days

** Since cells tend to settle at the bottom of barrels, we recommend stirring prior to sampling.*



Zygosaccharomyces

Calculating Molecular SO_2

Molecular SO_2 is calculated using the free SO_2 of a wine and a molecular SO_2 factor related to the pH of the wine. The effectiveness of the SO_2 to protect the wine from oxidation and microbial spoilage is dependent upon the pH of the wine. Therefore, the higher the pH a wine has, the less effective the SO_2. A molecular SO_2 of 0.8 ppm, while an acceptable maximum for some wines, is not recommended for all wines. Wineries adjusting to a standard free SO_2 level instead of monitoring molecular SO_2 will have varying SO_2 impact on their wines; adjusting to molecular SO_2 provides consistency in SO_2 management.

In general, we suggest a lower molecular SO_2 for reds than for whites, perhaps around 0.4-0.6 ppm at bottling. Wines with higher pH levels, red or white, may require too high a total SO_2 level to achieve desired free SO_2 levels. Rather than have excessive bound SO_2 (which may give a "chemical" taste), it is best to rely on a combination of factors, including susceptibility to spoilage. Some pH problems can be relieved by adjusting the pH downward with tartaric acid.

Distribution of free SO_2 at various pH's

Free SO_2 needed to achieve molecular SO_2 of:

pH	%SO_2	%HSO_3-	%SO_3	0.8 ppm	0.5 ppm
2.90	7.5	92.5	0.009	1 ppm free	7 ppm free
2.95	6.6			12	7
3.00	6.1	93.9	0.012	13	8
3.05	5.3			15	9
3.10	4.9	95.1	0.015	16	10
3.15	4.3			19	12
3.20	3.9	96.1	0.019	21	13
3.25	3.4			23	15
3.30	3.1	96.8	0.024	26	16
3.35	2.7			29	18
3.40	2.5	97.5	0.030	32	20
3.45	2.2			37	23
3.50	2.0	98.0	0.038	40	25
3.55	1.8			46	29
3.60	1.6	98.4	0.048	50	31
3.65	1.4			57	36
3.70	1.3	98.7	0.061	63	39
3.75	1.1			72	45
3.80	1.0	98.9	0.077	79	49
3.85	0.9			91	57
3.90	0.8	99.1	0.097	99	62
3.95	0.7			114	71
4.00	0.7	99.2	0.122	125	78

**Adapted from: Enology Briefs I (#1), Feb/Mar 1982. University of California Cooperative Extension*

Free SO_2 consists of 3 species: molecular SO_2 (directly active in preventing oxidation and spoilage), and two ions, HSO_3- (bisulfite) and SO_3= (sulfite), which comprise the majority of the free SO_2 but are MUCH less reactive than molecular SO_2. The percentage of free SO_2 existing as molecular SO_2 drops as pH rises (2nd column). Thus, at the SAME free SO_2 level, wines with higher pH have less molecular SO_2, and therefore less SO_2 protection.

The last 2 columns show free SO_2 level needed at different pHs to achieve two levels of molecular SO_2: 0.5 ppm and 0.8 ppm, a normal range in wine.

The molecular SO_2 level can be extrapolated from the chart or calculated by using this formula:

Molecular SO_2 = free SO_2 divided by $(1 + 10^{pH - 1.8})$

English to Metric to English Calculations

English	=	Metric
1 oz (fluid)	=	30 ml (29.6 ml)
1 quart (2 pints)	=	0.95 L
1 Gallon (128 oz)	=	3,785 ml
1 oz (weight)	=	28.35 g
1 lb (16 oz)	=	453.6 g
1 ton (2,000 lbs)	=	907 kg

Metric	=	English
1 ml (1 cc)	=	0.035 fluid oz
1 L (1,000 ml)	=	1.06 quart (0.26 G)
1 hl (100 L)	=	26.4 G
1 gram (1,000 mg)	=	0.035 oz
1 kg (1,000 g)	=	2.204 lbs
1 ton (1,000 kg)	=	2,204 lbs

Abbreviations:

oz	= ounce	g	= gram
lb	= pound	kg	= kilogram
G	= gallon	ml	= milliliter
L	= liter	hl	= hectoliter

Common units of measure

1 lb / 1,000 G = 0.45 g / G = 0.012 g / 100 ml = 0.12 g / L = 12 g / hl

0.1 g / 100 ml = 1 g / L = 100 g / hl = 0.75 g / 750 ml = 3.78 g / G = 8.3 lbs / 1,000 G

Addition Formulas

Compound	Lab Addition Rate	Cellar Addition Rate
Acids (increase TA)	+ 0.1 g / 100 ml	= 3.8 g tartaric / G wine = 8.3 lb tartaric / 1,000 G wine = 7.4 lb malic / 1,000 G wine = 7.1 lb citric / 1,000 G wine
Ascorbic acid (treat disulfides, add copper and carbon afterwards)	+ 10 ppm	= 0.1 ml of 1% solution in 100 ml wine = 3.78 ml / G = 37.85 g ascorbic acid crystals in 1,000 G wine
Potassium carbonate	See page 23 for suggested lab and cellar trial levels	
Copper (treat sulfides) DO TRIALS FIRST	+ 0.1 ppm as Cu	= 0.15 ml of 1% $CuSO_4$ solution / G wine = 0.1 ml of 0.05% $CuSO_4$ in 120 ml (4 oz) wine = 1.5 grams $CuSO_4$-$5H_2O$ per 1,000 G wine
Hydrogen peroxide (reduce SO_2) (Not legal for commercial wine)	~10 ppm SO_2	approx 1 ml H_2O_2 3% / G wine DO TRIALS FIRST!
Potassium metabisulfite (add SO_2)	+ 100 ppm SO_2	= 0.76 g / G = 760 g / 1,000 G = 20 g / hl = 0.2 g / L = 7.6 ml / G = 2 ml / L of 10% KMBS solution (~5% SO_2)
Any soluble compound	1% + 1 lb / 1,000 G	1 g / 100 ml = 7.50 g / 750 ml = 37.85 g / G = 0.45 g / G = 0.012 g / 100 ml = 0.09 g / 750 ml

Other Useful Calculations

Normality:

Normality (1) x Volume (1) = Normality (2) x Volume (2)

$$\text{OR amount to add} = \frac{\text{normality desired x volume desired}}{\text{Normality of concentrated solution}}$$

Percentage (% additions):

% (1) x Volume (1) = % (2) x Volume (2)

$$\text{OR volume to add} = \frac{\text{\% desired x total volume desired}}{\text{\% solution to be added}}$$

Parts per million (ppm) = mg / L

$$\text{Amount to add in grams} = \frac{\text{(gallons wine) x 3.785 x desired ppm}}{1{,}000}$$

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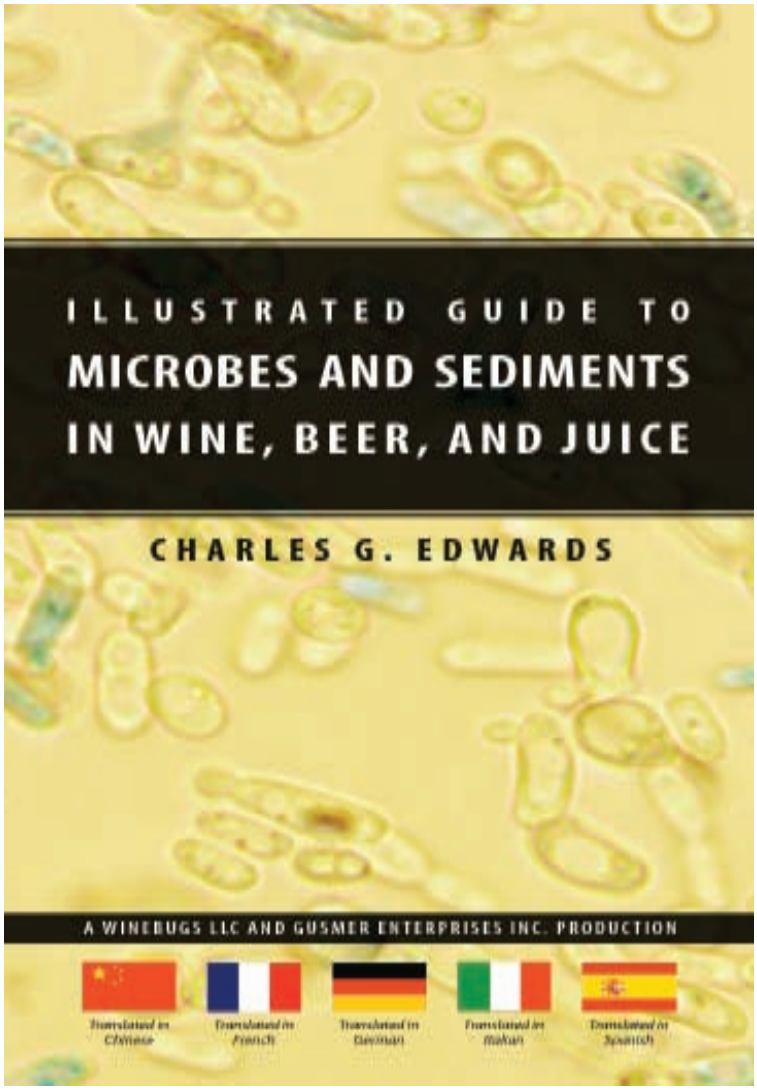

See page 40 for details.

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