WINEMAKING HANDBOOK

VOLUME XVII

AEB®

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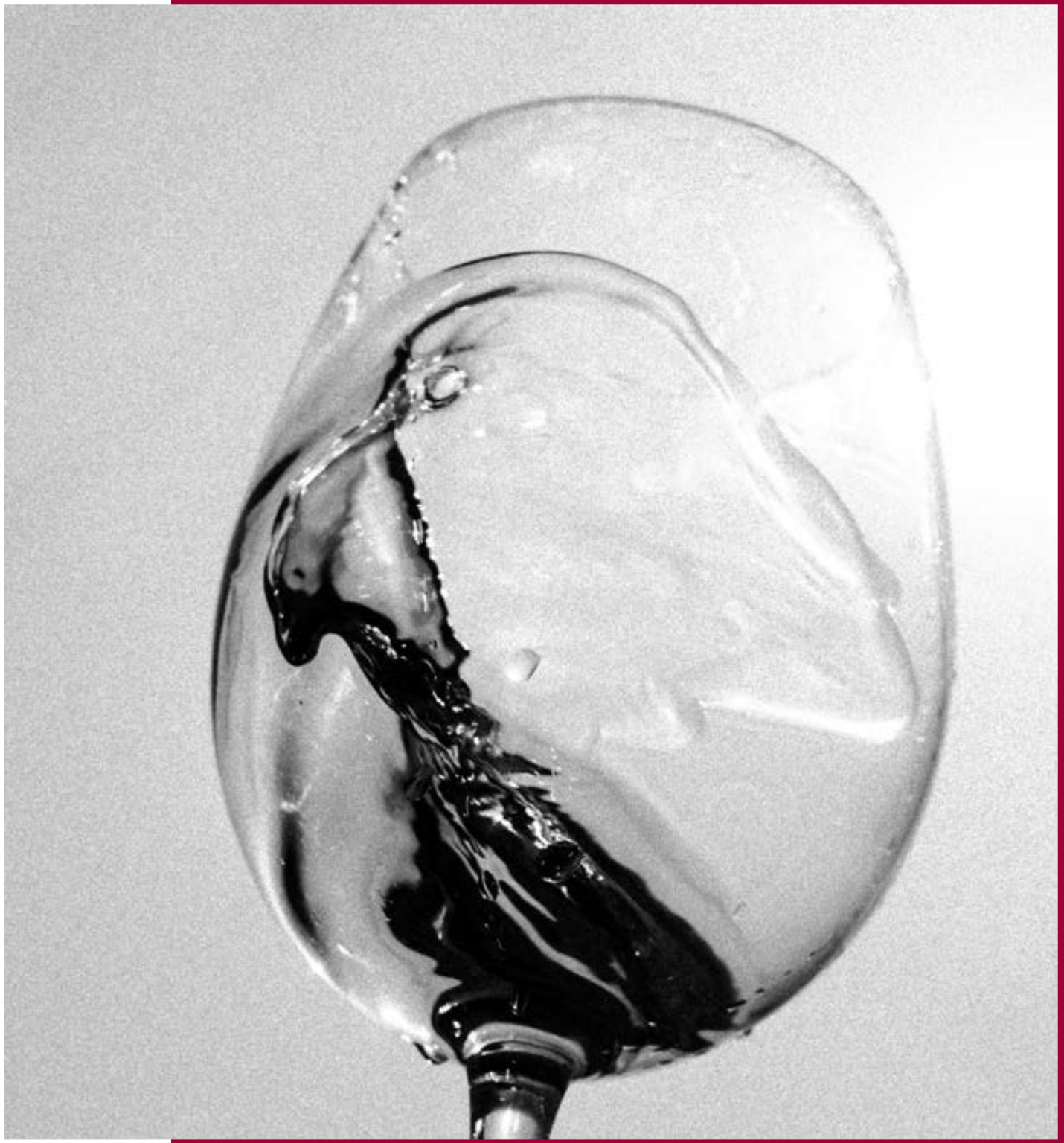
KEEPING WINEMAKING *SEXY* IN A CHALLENGING MARKET



Winemaking is such an art that is hard to explain it to the public with simple formulas. Winemakers transform grapes into wine in intimacy with the process, giving the necessary spin at every step, making sure nature doesn't turn the juice into vinegar. At AEB, we understand this delicate balance. That's why we provide the tools of the trade, natural biotechnologies designed to support every step of the process. As the industry faces a period of market adjustment, the wineries that rise above will be those who deliver quality, consistency, and sustainability. Our mission is to help you do just that, making the process smoother, more reliable, and always technically sound.

Have a great harvest!

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FERMENTATION YEAST

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Yeast Summary Chart

YEAST	CHARACTERISTICS	NUTRITIONAL NEEDS
GENERIC BAYANUS STRAIN		
FERMOL 2	Bayanus work-horse yeast	Very Low
FERMOL COMPLET KILLER FRU	Bayanus yeast with high affinity for Fructose. Mostly used to restart stuck fermentations	Average
LEVULIA PROBIOS	Certified organic Bayanus yeast	Medium
YEAST FOR RED WINES		
FERMOL GRAND ROUGE	Short lag-phase, minimal nutritional requirements, high tolerance for alcohol and heat. High dominance	Average
FERMOL MEDITERRANEE	Yeast for big reds, producer of cherry aromas. Low YAN requirement	Low
FERMOL PREMIER CRU	Quick starter, promoter of high extraction, high alcohol tolerant yeast for big reds	Average
FERMOL RED FRUIT	Low maintenance fermentation of reds	Low
FERMOL ROUGE	Very solid yeast for red wines that need to come out simple, dry and fruity in extreme conditions	Average
FERMOL SUPER 16	Cerevisiae strain for very high-sugar. It extracts tannins when in contact with grape skins	Average
LEVULIA T.P.CO	For complex and structured red wines with fruity and spicy notes	Low
YEAST FOR WHITE WINES		
FERMOL CHARDONNAY	Yeast ideal for wines in sur-lie programs. Quickly releases polysaccharides and anti-oxidants	Average
FERMOL AROME PLUS	Yeast Producer of Beta-Glucosidase enzyme, promotes full release of aromas	High
FERMOL BLANC	Bayanus yeast for most whites, cider and fruit wines. Ensures a low maintenance fermentation	Very Low
FERMOL SAUVIGNON	Promotes conversion of Cys-4-MMP and Cys-3-MH in 4MMP and 3MH (thiols, gooseberries and grapefruit aromas)	Low
FERMOL TROPICAL	The bouquet developing from the fermentation with Fermol Tropical expresses thiols reminiscent of ripe fruit	Average
FERMOL ELEGANCE	Cerevisiae yeast incapable to assimilate sulphur and therefore with limited H2S production	Average
FERMOL FLEUR	Cerevisiae yeast for mineral/floral thiols expression	Average
FERMOL LIME	Cerevisiae yeast for mineral/citrus bouquet thiols expression	Medium/High
YEAST FOR ROSÉ		
FERMOL CANDY	Amylic notes and aromas reminiscent of candies and yellow fruits. Ideal for the processing of white, rosé and young red wines	Average
FERMOL PB 2033	Strain for Rosé selected by the Université de Reims in the Côtes de Provence, France	Average
FERMOL RED BOUQUET	Yeast for deep but fresh reds, goes to high alcohol and posseses the gene for thiols release	Medium/Low
FERMOL CRYOFRUIT	S. cerevisiae x S. uvarum produce high concentrations of glycerine, bringing softness to wines. This strain enables to obtain the highest result when utilized at low temperatures	Low
SPARKLING		
FERMOL CHARMAT	For charmat method prosecco and spumante	Average
LEVULIA CRISTAL	Champagne yeast for primary and prise de mousse	Average
FERMOL PERLE	Yeast Resistant to high pressure and weak acids for sparkling secondary fermentation	Medium/Low

YEAST	CHARACTERISTICS
NON SACCHAROMYCES	
LEVULIA ALCOMENO	Non-saccharomyces with low alcohol conversion and significative Lactic Acid production (Organic)
LEVULIA TORULA	Organic Torulaspora delbrueckii yeast for increased complexity of thiols and esters
NS FERM BELLISSIMA	Metschnikowia pulcherrima non-Sacch yeast ideal for enhancing grape aromas and bioprotection
NS FERM TIOTORU	Torulaspora delbrueckii
SNS FERM THIOL	Blend between the Torulaspora delbrueckii (70% Levulia Torula) and Saccharomyces Cerevisiae (Fermol Sauvignon). Enhances complexity and Thiols production in Whites, Reds and Rosé
PRIMAFLORA VB	Metschnikowia pulcherrima, Torulaspora delbrueckii white musts bioprotection
PRIMAFLORA VR	Metschnikowia pulcherrima + Sacch. cerevisiae red musts bioprotection
PROELIF	Encapsulated yeast for bottle fermentation
ZYMASIL PRONTO BLANC	Blend for direct inoculation of white musts (yeast and specific nutrients). White flowers and light fruit esters
ZYMASIL PRONTO ROUGE	Blend for direct inoculation of red musts (yeast and specific nutrients). Develops red fruit esters

Saccharomyces Cerevisiae strains for white wines

Fermol Arôme Plus

MED HIGH

Floral · *White pulp fruit* · *Citrus fruits* · *Tropical fruit*

It produces wines with very intense aromas in which the primary varietal notes of the fruit, blend harmoniously with the secondary aromas produced by the fermentation.

Fermol Arôme Plus enhances floral notes, boosts terpenes optimizing the aromatic expression of the varietal. Is characterized by a good ethanol tolerance, resistance to sulfur dioxide and can start fermentation at very low temperatures (12ºC-53ºF) with a short lag-phase. It's recommended for Pinot Grigio, Moscato and performs particularly well in co-fermentation with Fermol Chardonnay, for modern and round aromatic whites.

When using this strain, be aware of the YAN demand which is higher than average. Killer factor neutral and POF negative, that is, it does not produce volatile phenols which, when found in high quantities, negatively affects the wine by giving it unpleasant olfactory connotations reminiscent of paint.

Available in 10 kg bags and 500 grams packs

Fermol Blanc

MED HIGH

White pulp fruit · *Summer fruit* · *Citrus fruits* · *White flowers* · *Sweet aromas*

A low maintenance "bayanus" yeast, with very low nitrogen requirement.

This strain develops well even at low temperatures. It does not produce H2S, except in case of extreme lack of nutrients, therefore, this strain is particularly recommended for maturation on the lees. The resulting wines are full bodied with very complex aromas which, depending on the cultivar, are reminiscent of flowers, citrus or white-pulped fruit.

Its resistance to adverse conditions, like low nutrition, cold temperatures or high alcohol, makes this strain also ideal for Cider, fruit wines and mead. Killer factor neutral.

Available in 10 kg bags and 500 grams packs

Fermol Candy

A hybrid yeast strain, selected for its organoleptic characteristics. It develops fermentation aromas and improves the organoleptic profile of wines, giving amyl notes and aromas reminiscent of candies and yellow fruits. It is ideal for the processing of white, rosé and young red wines. This yeast strain can be used for the fermentation of musts obtained by pre-fermentative cold fermentation, or in case of a considerable undesired microflora.

It multiplies very easily and gives good results at fermentation temperatures above 12°C.

Available in 500 grams packs

Fermol Chardonnay

It highlights the natural nuances of ripe and exotic fruits and, thanks to its high production of mannoproteins, produces wines with a full and smooth mid-palate.

Being especially cryophilic, it is particularly suitable to ferment white musts obtained by cold macerated and processed at low temperatures. The aromatic intensity, already high during fermentation, develops substantially during the refining and maturation stage. Because of its nature, this strain originates very fine lees that immediately release polysaccharides into the media, giving a smooth and viscous mid-palate which is desired not only in Chardonnay but for all the wines matured sur-lie. Killer factor neutral.

MED HIGH

Summer fruit · *Tropical fruit* · *White flowers* · *Floral*

Available in 10 kg bags and 500 grams packs

Fermol Fleur

Fermol Fleur is a strain isolated by the French Vine and Wine Institute (IFV Nantes), which enhances floral esters production. It's ideal for varieties like Grüner where the floral expression is expected, but also suggested for all types of winemaking for which we wish floral aromatic notes well marked both in the nose and mouth.

Widely used in whites but also for the development of modern rosé wines, where winemakers look for a very pronounced and intense bouquet. Because of its low consumption of malic acid, it's also Indicated for fermentations of musts from hot regions, to maintain freshness. The bouquet developed by Fermol Fleur is reminiscent of white flowers, with balsamic and menthol notes lingering also in the aftertaste.

MED HIGH

White flowers · *Floral* · *White pulp fruit* · *Tropical fruit* · *Sweet aromas*

Available in 500 grams packs

Fermol Lime

Fermol Lime naturally enhances the citrusy profile of varieties that are known for their bouquet rich in lemon and grapefruit notes. In New Zealand it has been successful for diversifying the characteristics of generic Sauvignon Blanc, moving away from the classic "cat pee" and tropical thiols more toward grapefruit and citrus aromas.

Because of its low consumption of Malic acid, it's also indicated for fermentations of musts from hot regions, to maintain freshness. It is also recommended on Pinot Grigio, Sauvignon Blanc, Grüner Veltliner and other cold-climate varieties.

When fed with the most modern, amino acids based, yeast nutrients like Fermoplus Floral, the characteristics of citrus and herbal aromas are boosted.

MED HIGH

Citrus fruits · *Aromatic herbs* · *Tropical fruit* · *Summer fruit* · *White pulp fruit*

Available in 500 grams packs

Fermol Sauvignon

Fermol Sauvignon is a strain isolated in nature which features the IRC7 gene, which encodes a β-lyase responsible for production of the varietal thiol 4-mercapto-4-methylpentan-2-one in wine. This ability helps to free thiols from their precursors, like cysteine and glutathione and boosts the perception of these aromatics. As it produces wines rich in olfactory intensity, it is indicated both for the production of New Zealand style Sauvignon Blanc and for lending complexity to Viognier, Verdelho, Traminer, Tocai, Garganega and more generally, to white wines rich in thiolic precursors.

MED HIGH

Citrus fruits · *White flowers* · *Aromatic herbs* · *Tropical fruit*

Available in 500 grams packs

Fermol Tropical

Fermol Tropical is a yeast strain selected by the French Vine and Wine Institute (IFV Nantes) and derived from hybridization, ideal in all vinifications where the complexity of the thiols needs to span from tropical and ripe to elegant and complex. The bouquet developing from the fermentation with Fermol Tropical is reminiscent of summer and tropical fruit with hints of sage and aromatic herbs.

It's recommended for Fumé Blanc style Sauvignon Blanc, Chardonnay, Marsanne, Viognier, Muller-Thurgau, Grillo and many other grape varieties.

Sulfur containing precursors are always important to push the yeast in a particular direction and for Fermol Tropical the ideal nutrition is with Fermoplus Tropical.

MED HIGH

Aromatic herbs · *Tropical fruit* · *Citrus fruits* · *Floral* · *White pulp fruit*

Available in 500 grams packs

Saccharomyces Cerevisiae strains for rosé and light reds

ROSÉ STYLE	CHARACTERISTICS	RECOMMENDED YEAST	RECOMMENDED NUTRIENT
AMYLIC	Pale color, light body, freshness, matched by amylic aromas such as cotton candy and banana	Fermol Cryofruit Fermol Candy	Fermoplus Integrateur Fermoplus DAP Free Fermoplus Rosé
THIOLIC	Light pink color, of medium flavor and with pleasant notes of citrus, exotic and white pulp fruits	Fermol Red Bouquet Fermol Lime Fermol Tropical	Fermoplus Integrateur, Fermoplus DAP Free, Fermoplus Tropical, Fermoplus Sauvignon, Fermoplus Rosé
FRUITY	Rounder, more structured taste and a very intense pink color, characterized by aromas of strawberries, raspberries and rose petals	Fermol Red Fruit Fermol Rouge	Fermoplus Integrateur Fermoplus DAP Free Fermoplus Rosé

Fermol PB2033

It is a strain selected in France, in the Côtes de Provence area. It's particularly suitable to produce French style rosé and young red wines. It has a wide temperature range of fermentation (12-34°C) with a short lag-phase and regular kinetics that allow easy control of fermentation temperatures. The typical bouquet is reminiscent of red currant, sour black cherries, raspberries, strawberries and white flowers.

Thanks to the limited hydrophilic characteristics of the cellular wall, this strain limits adsorption and fixation of the anthocyanins, promoting an optimized rosé color.
Killer factor neutral.

HIGH

White flowers *Small red berries*

Available in 10 kg bags and 500 grams packs

Fermol Red Bouquet

Strain for red and rosé wines selected by the French Vine and Wine Institute (IFV Nantes) which is extremely dominant and therefore minimizes the risks of off-odors and stuck fermentations caused by indigenous yeast.

Because of its ability to produce thiols from sulfur containing precursors, it characterizes red and rosé wines with nuances of blackcurrant, plums and violets. Another characteristic of Fermol Red Bouquet is a very high ability to produce glycerol therefore giving to the wine a smooth mid-palate.

It doesn't consume malic acid, keeping wines fresh or ready for ML bacteria. It has a low need for YAN.

HIGH

Citrus fruits *Tropical fruit*

MED

Summer fruit *Small red berries* *Sweet aromas*

Uvarum Strains for extra cold fermentations

Fermol Cryofruit

Selected and controlled by Prof. P. Giudici and A. Pulvirenti at the Microbiology department of Scienze Agrarie at the University of Modena & Reggio Emilia, Fermol Cryofruit is a yeast obtained by hybridization of *Saccharomyces cerevisiae* x *Saccharomyces uvarum*, that summarizes the specific characteristics of the two. It has been selected for its metabolism which shows great fermentation performance at low temperatures, alongside with high production of glycerin, which brings softness to the wine. This strain allows winemakers to get the best results when used at low temperatures, both at inoculation and fermentation.

Fermol Cryofruit enhances the production of thiols, boosting the perception of white fruit and floral nuances in whites, small berries and violets in reds. It is resistant to sulfur dioxide, has a short lag-phase and good ethanol tolerance. Ideal for Gamay, Syrah, Riesling, Traminer and all semi-aromatic varietals.

MED HIGH

Floral | *White pulp fruit* | *Small red berries*

White flowers | *Fruit of the forest*

Available in 500 grams packs

Fermol Perle

Fermol Perle is a yeast for secondary fermentation selected by the University of Reggio Emilia, originated with hybridization between Saccharomyces Cerevisiae X Saccharomyces Uvarum and selected for its resistance to weak acids. Weak acids can often decrease the performance of Saccharomyces strains and cause sluggish fermentations and off-odors. The high concentration of CO_2 present during fermentation in bottle or pressurized tanks causes the formation of Carbonic acid. The presence of this weak acid can influence the yeast's membrane potential, as the Carbonic acid can dissociate and release H+ ions. These protons can affect the yeast's membrane potential because they can enter the cell and cause an decrease the intracellular pH, which can influence the function of some membrane proteins and the transport of ions across the membrane. The hybridization with the Uvarum strain also gives to this strain a notable resistance to cold temperatures.

MED HIGH

Sweet aromas

White flowers | *Floral* | *White pulp fruit*

Summer fruit | *Tropical fruit* | *Aromatic herbs*

Saccharomyces Cerevisiae strains for red wines

Fermol Grand Rouge

Isolated by the Navarra Institute for Oenological Research (Spain) and selected by the Agricultural Science Department, University of Modena and Reggio Emilia (Italy), It features technological characteristics such as short lag-phase, minimal nutritional requirements, high ethanol tolerance and resistance to high temperatures. It is the ideal yeast to use when the indigenous flora needs to be minimized, as it is a dominant strain which naturally prevails over the indigenous yeasts. This characteristic allows limiting the use of SO_2. Fermol Grand Rouge produces wines with good tannic structure and extremely clean aromas, where the varietal nuances are easily identified.

Due to its characteristics, it can be used for refermentation and when musts are e enriched with concentrate.

MED HIGH

Fruit of the forest

Small red berries | *Spices* | *Dried fruit*

Fermol Mediterranée

It is a strain isolated for the production of warm, full-bodied wines, suitable for aging, but already very pleasant at the end of fermentation. Fermol Mediterranée produces a high quantity of polysaccharides and mannoproteins, which, besides harmonizing the mid-palate, it improves color stability and smooths the tannic structure. From an aromatic point of view, it highlights the varietal complexity and boosts the sweet nuances reminiscent of jams of ripe figs and small red berries, such as red currants and cherries.

Ideal for organic winemaking because of the low YAN requirements. It has extremely low nutrition needs and consequently low H2S production during fermentation. It carries a killer phenotype that helps the strain to quickly dominate the fermentation, minimizing VA.

HIGH

Summer fruit | *Fruit of the forest* | *Sweet aromas*

Fermol Premier Cru

Yeast selected to produce structured and complex wines which are suitable for aging. It develops intense and clean aromatic notes and is selected to have an extremely limited production of H_2S. It enhances the complexity and typicity of the grape varieties and expresses a good full-bodied mouthfeel due to its ability to produce significant amounts of glycerin, polysaccharides and to extract polyphenols.

MED HIGH

Small red berries | *Fruit of the forest* | *Spices* | *White pulp fruit* | *Aromatic herbs*

It has minimal or none SO_2 production, facilitating ML and is killer factor neutral.

Available in 10 kg bags and 500 grams packs

Fermol Red Fruit

Strain selected and controlled by University of Modena and Reggio Emilia and obtained from the hybridization of two strains: Fermol Iper R and Fermol PB2033, which are both yeast selected to express clean and well-defined fresh aromatics. It's recommended in wines to be enjoyed young, where aromatic notes such as blueberries, black currants and raspberries need be highlighted through the expression of natural precursors. Thanks to its modest nutritional demand, it is ideal for musts with low YAN which ferment free of reduction notes. However, a proper nutrition program with products like Fermoplus Red Berry or Fermoplus Cocoa, will help to increase the aromatic notes. Fermol Red Fruit has been selected with a hybridization strategy enabling to obtain a *Saccharomyces Cerevisiae* particularly performing under highly stressing conditions, such as in musts with high sugar content.

MED HIGH

Small red berries | *Fruit of the forest* | *Tropical fruit* | *Spices*

Available in 10 kg bags and 500 grams packs

Fermol Rouge

It's an old fashion work horse for the fermentation of red wines where conditions are extreme, such as must fermenting at high temperatures, low nutrition and when trying to optimize tanks turnover. Its performance is consistent thanks to its vigor and resistance to adverse conditions, which make Fermol Rouge rapidly prevail over the indigenous flora.

Fermol Rouge is particularly recommended for the production of blush, young reds and wines for medium-term aging, with intense red berries aromas and medium structure. Furthermore, when compared to other similar strains, Fermol Rouge produces wines with more intense color, given its limited ability to fix the coloring substances extracted during maceration.

MED HIGH

Small red berries | *Fruit of the forest* | *Dried fruit* | *Aromatic herbs* | *Spices*

Available in 10 kg bags and 500 grams packs

Fermol Super 16

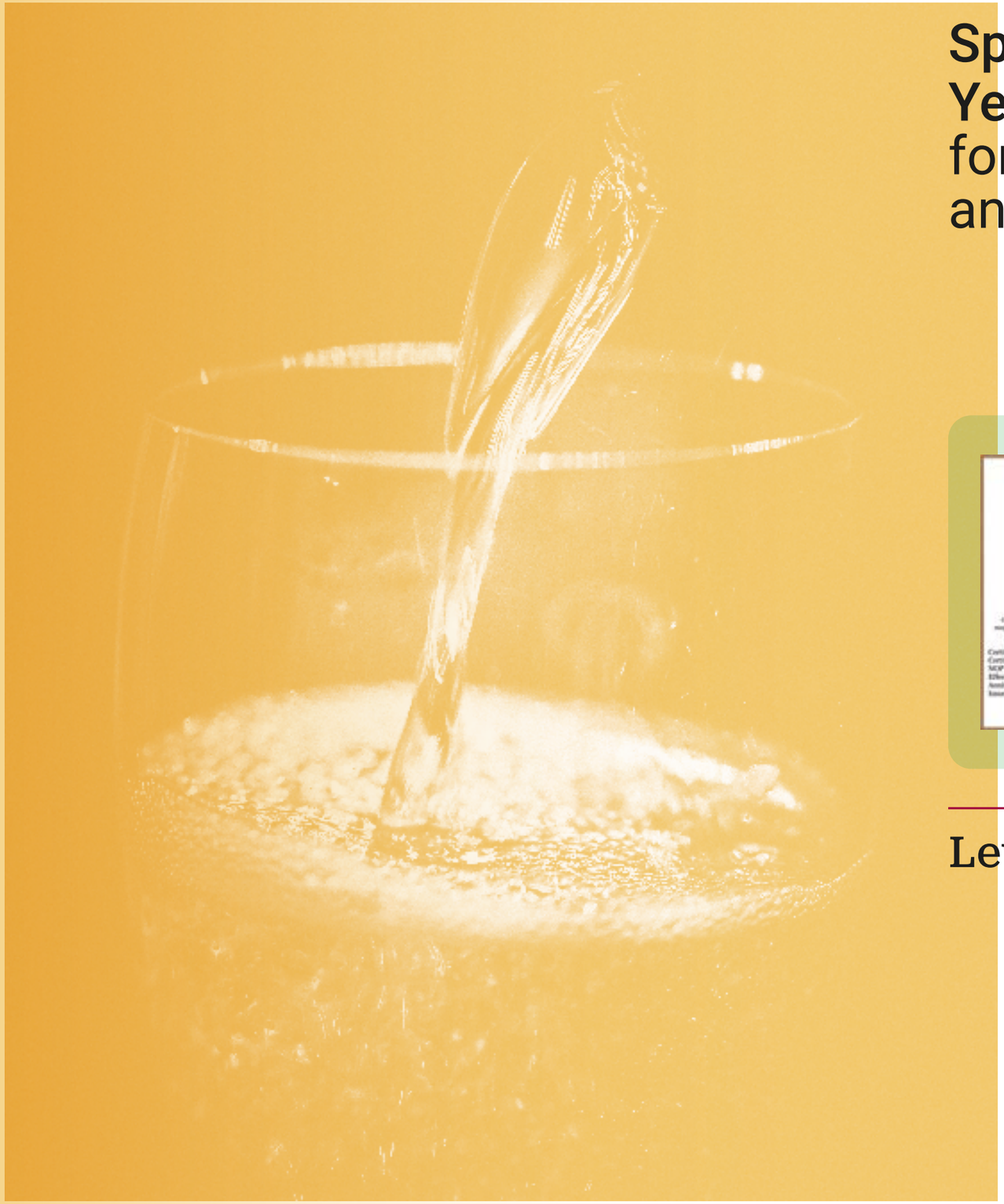
Fermol Super 16 is a very versatile yeast, which in California has found its match with high-end Cabernet Sauvignon. In fact, comparative trials have showed how Fermol Super 16 has an higher than average production of extractive enzymes and facilitates maceration. Fermol Super 16 has been isolated from grapes picked in the island of Samos (Greece), the island is a historic producer of wines coming from extremely mature grapes often dried in a "passito" style. As a result of its origins, this strain is adapted to high sugar content and extreme osmotic conditions. It's ideal for batches made with high percentages of raisins and overripe grapes. Complements a clean fermentation with a bouquet of fresh and straight fruit. It yields wines with a crisp and clean edge that show a long and complex finish in the mouth. It can perform at very high temperatures and high alcohol. The cells flocculate very well and the wine is easy to filter just a few days after the end of the fermentation.

Available in 10 kg bags and 500 grams packs

Levulia T.P.CO

Utilized for big, fruity reds, from Australian style Shiraz to Bordeaux varieties Levulia T.P. CO is the result of a process of hybridization and selection conducted by the French Institute of Vine and Wine (IFV Nantes). The yeast was chosen following a multi-stage strategy where selected strains were tested on red grape varieties (Syrah, and Merlot), evaluating various technological parameters such as implantation capacity (prevalence over wild yeast) and fermentative performance (kinetics and analytical profile at the end of fermentation). It is known for its production of intense and persistent floral and fruity aromas, phenolics extraction and high glycerol production. It features a killer phenotype and the gene IRC7 to encode Beta-Lyase utilized to release thiols from their precursors. Because of this it produces a rich bouquet of black fruits like blueberries and blackberries. It's a strain with very low nutritional needs, resistant to high alcohol (up to 16.5% by volume) and high SO_2. Its optimal fermentation temperature is between 18 and 25°C.

Available in 500 grams packs



Special Yeast for refermentation and sparkling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AEB USA is a certified Handler of organic products according to the USDA organic regulations.

Levulia Cristal

Levulia Cristal is a *Bayanus* yeast selected in the Champagne region of France and widely used in the area for the production of method Champenoise sparkling wines.

It features a high resistance to alcohol and a high flocculation, which make it ideal for the traditional method, with priese de mousse and disgorgement.

For alcoholic fermentation: safe fermentation with complete sugar consumption, low production of volatile acidity, low foam production.

For secondary fermentation: good flocculation, good resistance to alcohol, suitable for the preparation of pied de cuve.

Available in 500 grams packs

Levulia Probios

CERTIFIED ORGANIC

An organic certified yeast, derived from a selection conducted in the Champagne region of France. Its excellent fermentation vigor, even under difficult conditions of pH, temperature and alcohol, makes it a good choice for base red, white and rosé wines production, but also for the "prise de mousse" in bottle and pressurized tanks. It allows secure fermentation, with total sugar consumption and a very low production of undesired by-products, such as volatile acidity, H_2S, pyruvic acid and SO_2. Levulia Probios is also suitable to produce still white wines. Its features guarantee the production of dry, aromatic wines, respecting the characteristics of the varietal.

Available in 500 grams packs

Fermol Charmat

Originally developed for refermentations in pressurized tanks, over the years Fermol Charmat has been utilized for many difficult fermentations including the ones of Hard Seltzers and Ciders, where nutrition is often not adequately balanced.

It has an exceptionally high fermentation rate, accentuates the white fruits and citrus notes in white wines and does not cover the varietal aroma. The low nutritional requirements, the high alcohol tolerance and the strong cryophilic phenotype, make Fermol Charmat particularly suitable for Charmat or Champenoise methods. Excellent results have also been obtained to restart stuck fermentations. Killer factor neutral.

HIGH

Citrus fruits *Floral*

Available in 500 grams packs

Fermol Complete Killer Fru

Selected for its fructophilic characteristics, it is utilized to restart stuck fermentations in red, rosé and white wines. In fact, Fermol Complete Killer Fru can metabolize the sugar fraction composed by fructose, when other strains often leave it behind. Thanks to its killer phenotype, it quickly gains dominance reducing the existing population of wild yeast, and because of its high alcohol tolerance, it can be inoculated in partially fermented musts. It's highly cryophilic so is ok to use in wines that are not at ideal temperatures due to sluggish conditions. It's a fructophilic strain, Killer factor positive and is therefore ideal for restarting stuck fermentations.

MED HIGH

White flowers

White pulp fruit

Available in 10 kg bags and 500 grams packs

Non-Saccharomyces Yeast

Role of *Non-Saccharomyces* Yeasts in Wine Fermentation

Wine fermentation is a dynamic biological process involving a succession of yeast species that interact with each other and with their environment. The classical view of fermentation emphasizes the dominance of *Saccharomyces cerevisiae*, a robust fermenter capable of completing alcoholic fermentation under high Ethanol and nutrient-limited conditions. However, experience made over the years with our clients on microbial ecology and enology have shown the critical role of *Non-Saccharomyces* yeasts during the early stages of fermentation, and their contribution to wine aroma, mouthfeel, and microbial stability.

Fermentation begins with a diverse "consortium" of yeasts naturally present on grape skins and winery surfaces. *Non-Saccharomyces* species, such as *Hanseniaspora*, *Metschnikowia*, *Lachancea*, *Candida*, and *Torulaspora*, dominate the initial phase of fermentation due to their high oxygen tolerance, rapid growth under aerobic or microaerophilic conditions, and lower sensitivity to SO_2.

As Ethanol accumulates and anaerobiosis intensifies, the more Ethanol-tolerant *Saccharomyces cerevisiae* gradually takes over, becoming the dominant species responsible for the bulk of sugar-to-Ethanol conversion. This shift is known as microbial succession, and while traditional winemaking sought to suppress *Non-Saccharomyces* yeasts, modern strategies often leverage their metabolic traits to enhance wine complexity.

- *Lachancea Thermotolerans*
- *Torulaspora Delbrueckii*
- *Metschnikowia Pulcherrima*

Levulia Alcomeno

CERTIFIED ORGANIC

This strain belongs to the specie *Lachancea thermotolerans*, a yeast strain naturally present on the grape berries, contributing in the early stages of alcoholic fermentation, to the organoleptic complexity of wine. Levulia Alcomeno carries out the lactic fermentation from sugars and allows bringing freshness to the wine by adding to the total acidity and lowering the alcohol content. Levulia Alcomeno can guarantee the alcoholic fermentation at least up to 7% of the volume. It is used in sequential inoculation, finishing the sugars with a *Cerevisiae* strain.

Must be inoculated at the beginning of fermentation instead of *Saccharomyces cerevisiae*. After 3 days of active fermentation (5-7 °Brix drop), re-inoculate with the desired *Saccharomyces cerevisiae*.

Killer factor neutral.

Available in 500 grams packs

Levulia Torula

Levulia Torula is a yeast strain belonging to the specie *Torulaspora delbrueckii*, which is known for its high production of tropical thiols and It contributes significantly to the organoleptic complexity of the bouquet. In fact, because of its enzymatic activities (glucosidase and sulfur-lyase), Levulia Torula is the optimal yeast for enhancing the varietal of aromatic and semi-aromatic grapes like Sauvignon Blanc, Chardonnay, Gewurztraminer, Colombard, Riesling, Muscat, Sémillon, etc. It also works on the mid palate by releasing polysaccharides.

CERTIFIED ORGANIC

Levulia Torula can ensure the alcoholic fermentation at least up to 9% of the volume and can be used alone, in co-inoculation or sequential inoculation (24 to 48h) along with *Saccharomyces cerevisiae*.

Levulia Torula has very low acetic acid production in high sugar must, making it ideal for sweet/late harvest wines.

Available in 500 grams packs

SNS Ferm Thiol

Is a 70/30% blend of Non-*Saccharomyces* and *Saccharomyces Cerevisiae* yeasts. The Non-*Saccharomyces* strain is a *Torulaspora delbrueckii* isolated in Burgundy by the research group of the University of Dijon—IUVVB—(France). The *Saccharomyces Cerevisiae* strain, PB2530, is a strain selected and identified on Sauvignon grape must. SNS Ferm Thiol can be used directly, after rehydration in the fermentation phase, without having to be assisted by a sequential inoculation of *Saccharomyces cerevisiae*. This not only makes operations faster and easier, but also allows the non-*Saccharomyces* species to release its related metabolites in a gradual and important manner.

Thanks to its rapid implantation, SNS Ferm Thiol is able to compete by inhibiting the undesirable indigenous flora. In addition, SNS Ferm Thiol has a remarkable ability to limit the development of volatile acidity-producing species. In the first few days of fermentation, it acts, thanks to the enzyme pool of the *Torulaspora delbrueckii* species, in the release of thiols and aromatic compounds. The non-*Saccharomyces* component, through autolysis will gradually release nutrients, in amino acid form, and detoxifying adsorbent peels into the medium. This action will further reduce astringency, giving wines a feeling of roundness and fullness of flavour, thanks to the release of membrane polysaccharides. SNS FERM Thiol thanks to the combination of Non-*Saccharomyces* and *Saccharomyces cerevisiae* contributes to lowering the potential alcohol content by approximately 0.5%.

SNS FERM Thiol s suitable for different grape varieties, both terpenic and thiolic (Sauvignon Blanc, Chardonnay, Gewurztraminer, Colombard, Riesling, Muscat, Sémillon, etc.). It greatly enhances the aromatic expressions of wines by improving balance and complexity. The great complexity and variety of aromatic notes makes it optimal for both whites and reds.

NS Ferm Bellissima

Is a strain belonging to the species *Metschnikowia pulcherrima*, increases higher alcohols and terpenes giving sweet and summer fruit aromas to the wine. When used in combination with Saccharomyces cerevisiae such as Fermol Chardonnay, Arôme Plus, it contributes to a balanced bouquet with higher alcohols, ethyl esters, acetates (especially phenylacetate and isoamyl acetate) and terpenes, increasing the complexity and intensity of the aromatic profile. A greater volume and viscosity is also evident in the palate, and these sensations are also contribute to a remarkable persistence.

Its natural production of Pulkerrimic acids contributes to the bioprotection of the must.

Available in 500 grams packs

NS Tiotoru

Is a yeast strain belonging to the specie *Torulaspora delbrueckii* and is the result of a research program on microbial ecology that has allowed the isolation of different non-*Saccharomyces* yeast species. This selection from different regions of Burgundy was made in collaboration with the University of Vine and Wine (IUVVB) of Dijon (France).

NS Tiotoru is known for its high production of tropical thiols and it contributes significantly to the organoleptic complexity of the bouquet. In fact, because of its enzymatic activities (glucosidase and sulfur-lyase), NS Tiotoru is the optimal yeast for enhancing the varietal of aromatic and semi-aromatic grapes like Sauvignon Blanc, Chardonnay, Gewurztraminer, Colombard, Riesling, Muscat, Sémillon, Chenin, etc. It also works on the mid palate by releasing polysaccharides.

NS Tiotoru should be used in sequential inoculation, 48 hours before the classic strain of *Saccharomyces cerevisiae*. Its rapid implantation in the must makes it an ideal tool to limit the spontaneous development of other unwanted indigenous yeast strains.

As soon as *Saccharomyces cerevisiae* develops, the *Torulaspora delbrueckii* population dies and begins its autolysis rapidly during alcoholic fermentation. Therefore, it contributes to its proper development by supplying nutrients and detoxifying the environment and redu ing the sensations of astringency in the mouth due to the release of polysaccharides. During this phase it also has the ability to keep spoilage microorganisms at bay.

NS Tiotoru has very low acetic acid production in high sugar must, making it ideal for sweet/late harvest wines.

Available in 500 grams packs

Experience made over the years with our clients on microbial ecology and enology have shown the critical role of Non-Saccharomyces yeasts during the early stages of fermentation.

NS and SNS lines of yeast

At AEB we call this Non-Saccharomyces line “NS” instead of Fermol. Parallel to the “NS” line, we have launched the SNS line, a calibrated combination of Sacch. and Non-Sacch. strains.

Selected Non-Saccharomyces strains are intentionally introduced into musts to:

Enhance aromatic and mid-palate complexity through unique metabolic pathways, peculiar to Torulaspora delbrueckii. AEB carries specific strains for this:

• **NS Tio-Toru**
Pure strain of *Torulaspora delbrueckii*. ***Available in 500 grams packs.***

• **SNS Ferm-Thiol**
Torulaspora delbrueckii paired with *Saccharomyces* for single inoculation. ***Available in 500 grams packs.***

• **SNS Ferm LeFleur**
Includes 3 strains: *Torulaspora delbrueckii*, *Lachancea thermotolerans* and *Saccharomyces cerevisiae*. ***Available in 500 grams packs.***

Reduce Acetaldehyde production and inhibit spoilage organisms such as Brettanomyces via bio-protection. These are peculiarities of:

• *Metschniokowia pulcherrima*, our **NS Bellissima**
Because of its low VA production and delicate aromas is particularly recommended for Sparkling Base. ***Available in 500 grams packs.***

Increase acidity (Lactic acid) and yield lower Ethanol levels through specific metabolic outputs. Specifically, Lachancea thermotolerans, available as:

• **NS Alcomeno:** our pure strain of *Lachancea thermotolerans*. ***Available in 500 grams packs.***

• **SNS Ferm-Fruit**: *Lachancea thermotolerans* paired with *Saccharomyces* or single inoculation. ***Available in 500 grams packs.***

Cultures for Bio-Protection and Low SO_2 Winemaking

Primaflora VR (specific for reds) and VR (more suitable for whites)

Primaflora is a Bio-protection non-Saccharomyces yeast, belonging to *Metschnikowia pulcherrima* specie. Among the characteristics of this strain there are strong anti-Brettanomyces and antibacterial activities, since it produces Pulcherrimic acid, which depletes the media from iron, creating unfavorable conditions for Brett (Oro et al., 2014). Through its enzymatic activity, *Metschnikowia pulcherrima*, also contributes up to a certain extent to the release of aromas and Nitrogen enrichment of the must.

Packaging: 1 kg packets

Main enzymatic activities:

- Activity Cys-ß-Lyase: release of thiols (Zott, 2009)
- Activity ß-glucosidase: release of terpenes (Günata et al, 1990)
- Aspartate protease activity: release of peptides or amino acids (Theron et al., 2017)

Dosage and utilization:

1. Rehydrate 500 g of Primaflora in 10 liters of mineral or non-chlorinated water (4.2 lb. of Primaflora per gallon of water) at 25-30°C or 77-86°F, sugared with 50 g/L (5%) for 15 minutes.

2. Distribute onto the grapes or add to the must and homogenize. Do not store the Primaflora solution for more than 45 minutes or viability will decline.

3. Double the volume with grape must to prolong the life of the solution by 3 hours.

4. Increase five folds the volume with grape must to prolong the life of the solution by 12 hours. Do not use on must rich in SO_2, (which would also defeat the purpose).

Shelf life and storage:

Store in the original sealed pack, in a dry, cool and odorless place. After opening the pack, use quickly. Store in the fridge and in the original sealed container. Mortality < 20% per year.

Yeast Rehydration and Acclimation

Using clean and sanitized equipment, prepare 10 liters of warm water per kilogram of yeast to be rehydrated (1.2 gallons of water per pound of yeast). Ideal temperature is 39°C (102°F) for Saccharomyces cerevisiae and 41°C (105°F) for the Bayanus strain. While stirring, slowly add 1 part of the rehydration nutrient Fermoplus Energy Glu 4.0 per 4 parts of yeast.

- Be sure that all clumps are broken up and well-mixed. Slowly mix-in the yeast, again making sure to break up all clumps. Do not mix using a drill or any aggressive mixing technique that might cause shearing of the yeast cells. Make sure that the mixture gets plenty of oxygenation. O_2 along with the amino acids supplied by the Fermoplus Energy Glu 4.0, will build a bigger and stronger yeast biomass.

- After 20-30 minutes the yeast is fully rehydrated and will immediately need a sugar source to stay viable.

- Portions of must are gradually added to the yeast mixture in small increments while gently stirring. Normally an equal amount of must is slowly mixed into the yeast mixture over 5 minutes. While adding the must, monitor the temperature and make sure it does not drop more than 5°C at any time during this must addition. A bigger drop would stress the yeast and decrease viability.

- After 15 mins., slowly add again an equal amount of must to the mixture, making sure the temperature does not drop more than 5°C.

- Repeat this step every 15 minutes until the yeast mixture is within 5°C of the tank temperature and then add the inoculum to the must in the tank, making sure that the tank is properly vented to release pressure.

Restarting a Stuck or Sluggish Fermentation Procedure

For 10,000 Gallons you'll need approximately the following ingredients, keep in mind that these are suggested rates and especially on the yeast the range can be quite wide depending on how problematic the stuck ferment is.

- 18 kg of yeast Complete Killer Fru (or 9 kg if you go with just 2 lbs/1,000).
- Fermoplus Energy Glu 4.0: 4.5 kg if you use 18 kg of yeast or 2.25 kg if you use 9 kg of yeast
- 4.5 kg Fermoplus Integrateur 20 Kd 2.0
- 4.5 kg of Celloferm

Regarding re-start a fermentation, in case the winery has an AEB Reactivateur we recommend using it this way:

Fermenter:

- Wine temperature 64-68 F
- Nutrient: Fermoplus Integrateur: 1lb 1,000 gallons of wine
- Celloferm 1#/1000 (cellulose to adsorb toxins)

Reactivator, manual operations setting:

Rehydration (20 min):

- 4#/1000 gal yeast inoculation = yeast Fermol Complete Killer Fru
- ¼ Fermoplus Energy Glu (1:4 compared to the yeast inoculum)
- 15 gallons of water (1/4 total volume)

Note: Reactivator will input 1/4 total volume of water and warm it up to ~ 105 F. Add first Energy Glu, then the yeast.

1. Add 1/3 initial volume wine (5 gallons)
2. Mix 30 sec every 5 min, aeration 10 seconds. Wait 30 min
3. Add double volume :10 gallon (30 gallon total)
4. Mix 30 sec every 10 min, aeration 10 seconds. Wait 1 h
5. Stagger wine addition ~5-6 gal every 30 min for 2h to reach 3-4x initial volume (50-60 gal).
6. Meanwhile, mIx 30 sec every 15 min, aeration 10 seconds.
7. Wait 2 extra h (total 6+ h) Note: Start the adaptation cycles. Reactivator starts input wine from the tank.

If you don't have the Reactivateur available here is the procedure, we recommend:

Prepare the wine:

- Rack the wine off the gross lees into a sanitized tank.
- While racking, add 18 g/Hl (1.5 lb. /1000 gal.) of Celloferm to the receiving tank. Celloferm will help to purify the compromised must from toxins and contaminants.

Prepare the yeast:

- In a separate tub, bring some water to 40°C (104°F). Use about 250 ml of water for every Hl of stuck wine to treat (2.5 gal water/1000 gallons of stuck wine) and add 6 g/Hl (0.5 lb./1000 gallons) of Fermoplus Energy Glu rehydration nutrient.
- To this mixture add 25 g of Fermol Complete Killer Fru yeast for every Hl of stuck must to be treated (2 lbs./1000 gallons) and mix the yeast and nutrient thoroughly.
- Allow the yeast to rehydrate for 20 minutes and note the temperature of the yeast mixture before going on to next step.

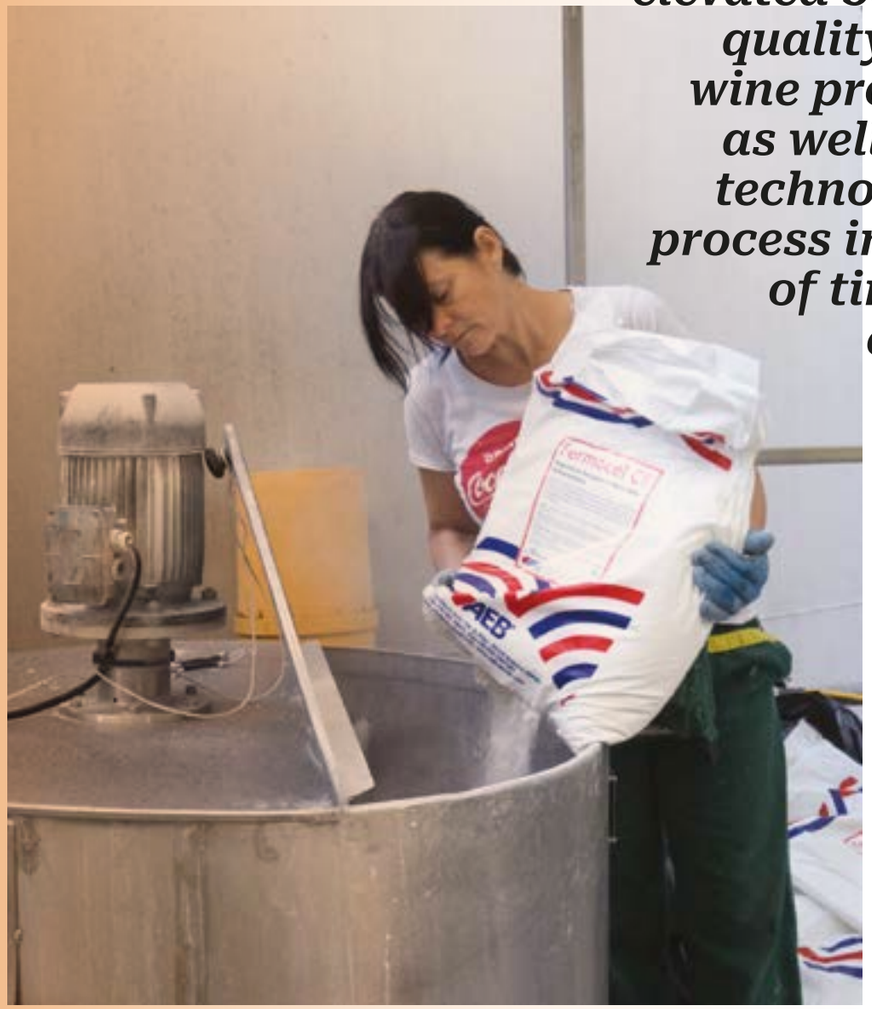
Re-inoculate:

- Take out of the problematic tank 250 mL of stuck must per Hl of its total volume (2.5 gallons for every 1000 gallons of problematic wine) and add this to the yeast mixture, making sure that during the addition the temperature does not change more than 5°C over a 10 minutes period.
- Add 25 grams of light white grape concentrate (or similar) per Hl (2 lbs/1,000 gallons) of total stuck wine to the yeast slurry.
- Take a sample of this starter and measure the residual sugars if possible, then cover and hold for 12 hours in a warm part of the cellar. Around 21°C (70°F) is best.
- Check again the residual sugars, making sure that there are signs of active fermentation before moving to the next step (a RS drop will confirm yeast activity).
- When there are signs of active fermentation, transfer this starter from the tub into a small wine tank and slowly add on top of a portion of stuck wine (about 750 mL of stuck wine per Hl of total volume of stuck wine or 7.5 gallons/1000 gallons of total stuck wine), along with 15 grams of light grape concentrate per Hl of total stuck wine. Then stir well.
- Record the residual sugars and hold over night. Make sure the small wine tank is vented. Again, confirm that the mixture is actively fermenting before moving on.
- Add 10% of the total stuck wine to the small tank with the starter and mix well. Hold for another night.
- Transfer the small tank to the stuck wine tank and mix well. If possible, maintain the tank temperature between 21-24°C (70-76°F).

YEAST NUTRIENTS

02

Wine yeast nutrition has elevated both the quality of the wine produced as well as the technological process in terms of time and energy.



In the last 20 years we have witnessed an evolution from using mineral ammonia like DAP as the main source for yeast available nitrogen, to a more sophisticated way of getting more out of the yeast by supplying naturally derived amino acids, vitamins, micro elements which also act as precursors for aromatics. AEB has been one of the leading companies investigating and promoting this evolution.

Yeast nutrient summary chart

	YEAST NURIENT	NITROGEN	MAIN COMPOSITION	PPM OF YAN ADDED FOR 120 PPM ADDITION OF PRODUCT	CHARACTERISTICS	INORGANIC THIAMINE: MAX DOSING RATE	OTHER FEATURES
REHYDRATION NUTRIENT	Fermoplus Energy Glu 4.0	organic	yeast extract	N/A	Added during hydration to boost the biomass from 3 to 6 folds	0.3%; 1.6 lbs/1,000 Gallons (20g/hl)	Organic Vitamins; Organic Sterols; Rich in glutathione; Fast absorption
VARIETAL NUTRIENTS	Fermoplus DAP Free	organic	yeast autolysate	8–10	Adds to the amino acids content. Geared to bring a generic boost of aromatics and to promote a healthy fermentation	not added	Organic Vitamins; Organic Sterols
	Fermoplus Floral	organic	yeast autolysate	8–10	Adds to the cysteine and amino acids content. Geared to boost floral aromatics and to promote a healthy fermentation	not added	Organic Vitamins; Organic Sterols
	Fermoplus Tropical	organic	yeast autolysate	8–10	Adds to the amino acids contents. Geared to boost tropical aromatics and to promote a healthy fermentation	not added	Organic Vitamins; Organic Sterols
	Fermoplus Prosecco	organic	yeast autolysate	8–10	Adds to the amino acids contents. Geared to boost sparkling wine aromas and to promote a healthy fermentation	not added	Organic Vitamins; Organic Sterols
	Fermoplus Sauvignon	organic	yeast autolysate and skin tannins	8–10	Adds amino acids content and varietal precursors to boost thiol aromas (passion fruit, grapefruit, box tree).Promotes a healthy fermentation	not added	Organic Vitamins; Organic Sterols
	Fermoplus PyrOFF	organic	yeast autolysate and yeast hulls	4	Adds amino acids and promete an healty fermentation. Geared to the removal and masking of methoxypirozines	not added	Organic Vitamins; Organic Sterols
FERMENTATION NUTRIENTS	Fermoplus Integrateur 20 kd 2.0	inorganic and organic	yeast autolysate and DAP	18	High increase of YAN paired with the benefits of amino-acids	0.06% ; 8.3 lbs/1,000 Gallons (100g/hl)	Organic Vitamins; Organic Sterols
	Fermoplus Blanc Varietal	inorganic and organic	yeast autolysate, DAP and ellagic tannins	13	High increase of YAN paired with the benefits of amino-acids and ellagic tannins	0.06% ; 8.3 lbs/1,000 Gallons (100g/hl)	Organic Vitamins; Organic Sterols
	Fermoplus Premier Cru	inorganic and organic	yeast autolysate, DAP and ellagic tannins	14	High increase of YAN paired with the benefits of amino-acids and ellagic tannins	0.06% ; 8.3 lbs/1,000 Gallons (100g/hl)	Organic Vitamins; Organic Sterols
	Enovit Perlage	inorganic	DAP	25	DAP and Vit. B1 (thiamine)	0.1%; 5 lbs/1,000 Gallons (60g/hl)	N/D
FERMENTATION AIDS	Celloferm	N/D	Cellulose	0	Adds a component for toxins adsorption plus facilitates nucleation and dispersion of the yeast cells	Not added	Remove metal ions
	Fermocel P	Inorganic	DAP and cellulose	11	Adds a component for toxins adsorption plus facilitates nucleation and dispersion of the yeast cells. Also provides high YAN	0.2%; 2.5 lbs/1,000 Gallons (30g/Hl)	Remove metal ions

Rehydration Nutrient

Store in a cool dry place, away from direct sunlight and heat.

Fermoplus Energy Glu 4.0

NEW **Rehydrate the yeast at lower temperature!**

Fermoplus Energy Glu 4.0 represents a groundbreaking advancement in rehydration nutrients, enabling yeast rehydration in water at approximately 20°C-68°F. This innovative formula, enriched with specific amino acids, sterols, natural glutathione, and minerals, aligns with the growing industry focus on energy efficiency while still supporting optimal cell growth.

Thanks to its composition, rich in natural amino acids and vitamins, Energy Glu 4.0 produces yeast with exceptional vigor immediately upon reactivation, significantly enhancing its multiplication rate. By directly providing readily assimilable amino acids, the product eliminates the need for the yeast to synthesize them, conserving energy that can be redirected to cell multiplication. This is particularly advantageous during the hydration phase, where energy demand is at its peak.

Energy Glu 4.0 also incorporates natural sterols and trace minerals that improve membrane fluidity compared to previous formulations. This ensures activity of the membrane and therefore yeast vitality, in the toughest conditions.

Additionally, through a specialized enzymatic lysis of yeast cells, Energy Glu 4.0 increases glutathione content. As a powerful antioxidant, glutathione creates optimal conditions for fermentation, reduces cell aging, and supports yeast in fully expressing its potential—often compromised by metabolic imbalances.

Dosage: 1:4 compared to yeast inoculum, i.e., 200 ppm of yeast will need 50 ppm of Fermoplus Energy Glu 4.0

TTB 27 CFR § 24.246
Packaging: 5 kg bags

Store in a cool dry place, away from direct sunlight and heat.

Fermoplus Energy Glu 3.0

Optimized for low additions, Fermoplus Energy Glu 3.0 is a yeast rehydration nutrient, rich in micro elements and Glutathione. Its original formula has been further enriched with naturally derived amino acids, sterols and vitamins to increase yeast activity, multiplication rate and therefore biomass formation. It includes glutathione to reduce cell aging due to free radicals that may occur during the oxygenation, normally forced during rehydration.

It is also ideal for restarting stuck fermentations or accelerating sluggish ones.

Usage: dissolve directly in the rehydration water along with the yeast.

Dosage: 1:4 compared to yeast inoculum, i.e., 200 ppm of yeast will need 50 ppm of Fermoplus Energy Glu 3.0

Packaging: 1kg, 5 kg & 20 kg bags

High YAN Fermentation Nutrients
(containing mineral nitrogen)

Enovit Perlage

This is the evolution of our Enovit P, made with a technology that allows for better dispersion and solubilization. This characteristic of the product also helps when the nutrient is added to the re-fermentation of sparkling wines. It includes DAP and Thiamine (0.3%). Enovit Perlage re-establishes the ideal level of Nitrogen, as well as a balanced supplement of Thiamine. The thiamine contained in Enovit Perlage partially inhibits the production of the superior alcohols (which confer coarseness) and favors the formation of ß-phenylethylic alcohol which brings to an organoleptic improvement of the wine.

Usage: dissolve in must or wine and add to tank.

Dosage: about 100 ppm depending on YAN content. Enovit Perlage will bring 22 ppm of YAN for every 100 ppm of product added.

TTB 27 CFR § 24.246
Available in 1kg packs and 25 kg bags

Fermocel P

It's a formulation of DAP, cellulose and Thiamine that has been used for decades in the industry especially in the fermentation of white varieties that benefit from must fining. The cellulose will provide support to the yeast cells when the NTU's are low and the cold temperature of white and rosé ferments doesn't bring enough vigor for the yeast to stay suspended. Also, cellulose will help adsorbing long chain fatty acids and toxins.

Usage: dissolve in must or wine and add to tank at the beginning of the fermentation.

Dosage: 150-200 ppm (100 ppm will bring 11 ppm of YAN).

Available in 25 kg bags

Fermoplus Integrateur 20 Kd 2.0

It includes a calibrated portion of Thiamine, yeast derived amino acids, sterols and vitamins, that contribute to the health of the yeast cells as well as to the development of clean aromatics. Also, its DAP content brings along a high amount of YAN.

Usage: dissolve in must or wine and add to tank at the beginning of fermentation and if possible, distribute the total addition in two or three steps.

Dosage: about 200 ppm depending on YAN content, Fermoplus Integrateur 20 kd 2.0 will bring 15 ppm of YAN for every 100 ppm of product added, but also add a considerable amount of amino acids easily assimilable by the yeast.

TTB 27 CFR § 24.246
Available in 5 and 20 kg bags

DAP-Free fermentation nutrients

Fermoplus DAP Free

Yeast derived amino acids, B-vitamins, sterols and natural micro elements for optimizing the formation of biomass when added in the early stages and the production of esters and integration of free amino nitrogen when introduced during fermentation.

Dosage: 240-600 ppm-2-5 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 10 and 25 kg bags

Fermoplus varietal line

The nutritional contribution in terms of YAN brought by this line of products is far less important than what they can do for the healthiness of the fermentation, the production of biomass and especially for the natural expression of esters and thiols. The availability of specific amino acids allows the yeasts to conduct a regular fermentation and to enhance the varietal characteristics typical of the grape variety. In musts coming from aromatic grapes, it is essential to be able to count on compounds such as:

- Isoleucine: precursor of amyl acetates.
- Leucine: originates isoamyl esters responsible for banana notes.
- Valine: originates isobutyl acetates with nuances reminiscent of flowers and white fruits.
- Arginine: plays a role in boosting typicity and helping a more complex aromatic profile.

With the addition of these nutrients the yeast will benefit from the free amino acids nitrogen fraction (FAN) but also from the content in:

- Sterols: to reinforce the membrane and withstand stresses due to high temperature and alcohol content, conditions which make the proton pump less efficient lowering the pH of the cytoplasm and damage the membrane potential ultimately stressing and killing the cell.
- Amino acids: source of Nitrogen, precursors of aromatics like acetate esters and important boosters for biomass production.
- Sulphur containing compounds like Glutathione and Cysteine: important natural antioxidants for the optimization of the redox potential and the production of aromatic Thiols.

Timing of addition

To optimize the aroma boosting promoted by the following nutrients we recommend that they're added between the second and fifth day of the alcoholic fermentation.

For musts that are particularly lacking in yeast available Nitrogen, we recommend adjusting its level with Enovit Perlage, Fermoplus Integrateur, Fermoplus Presto Start+ or Fermocel P, at the beginning of fermentation.

Store in a cool dry place, away from direct sunlight and heat.

Fermoplus Cocoa

Bold ferments

A yeast derived nutrient which shares the same fruity and spicy precursors of the Negramaro grape variety, enhancing the natural aromas of plum, cherry, violet in younger wines; chocolate, tobacco, cigar box and carob in wines meant for aging.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

HIGH
MED

Vanilla and coconut | *Floral* | *Plum*
Cherries | *Carob*

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermoplus Floral

Tutti-flowers

The yeast-derived amino acids which are prevalent in the composition of this nutrient will boost an aromatic profile reminiscent of roses and white flowers. It's a nutrient recommended for varieties like Pinot Grigio, Trebbiano, Grüner Vetliner, Marsanne and wherever the winemaker aims to boost a floral bouquet.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

HIGH
MED

Floral | *Fruit* | *Aromatic herbs*
Banana | *Lemon*

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons.

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermoplus Tropical

Ripe ferment

The high content in yeast-derived selected ammino-acids allows for a boosted release of ripe fruit aromatics, making it ideal for the fermentation of varietals like Chardonnay and Viogner, but also Syrah and Tempranillo.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

HIGH
MED

Ripe tropical fruit | *Pineapple*
Banana | *Citrus* | *Mineral*

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermoplus Sauvignon

Thiols Up

Is a nutrient made up with yeast derivatives rich in cysteine and glutathione which are sulfur containing compounds precursors of aromatic thiols like 4MMP (Box tree), 3MH (Citrus) and 3 MHA (Tropical). This nutrient works better with yeast featuring the IRC7 gene to encodes the synthesis of particular ß-lyases (Fermol Sauvignon, Fermol Lime, Fermol Fleur, Fermol Tropical etc.). This nutrient also contains some tannins from grape skins which carry more precursors of the same aromatics.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

MED HIGH

Pink grapefruit | *Tropical fruits*
Lime | *Apple* | *Aromatic herbs*

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 5 kg bags and 500 grams packets

Fermoplus Non-Sacch

Thiols Up

Fermoplus Non-Sacch is a 100% organic complex nutrient based on yeast hulls and autolyzed yeasts rich in amino acids and micro elements geared to optimize the biological activities and the aromatic expression of strains belonging to the *Metschnikowia pulcherrima*, *Lachancea thermotolerans* and *Torulaspora delbruecki* species.

Usage: dissolve in the must and add before inoculating the non-Saccharomyces yeast strain

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons.

TTB 27 CFR § 24.246
Available in 1 kg bags

Fermoplus Prosecco

Fresh and Clean Type

Formulated taking inspiration from the HPLC peaks of amino acids contained in the Glera must, it enhances the typical aromas of white flowers and citrus desired in base wines to refer-ment with the Charmat method.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

MED HIGH

Fruit | *Citrus fruits*
Banana | *Peach* | *Mediterra-nean herbs*

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermoplus Pyr-Off

Face Pyrazines and Win

Nutrient based on autolysate and yeast cell walls with a high adsorbent power. The functioning of this nutrient is based on the synergistic action of lysate and yeast cell walls. While lysate promotes fermentation and aroma production, cell walls are essential for adsorbing methoxypyrazine, which are responsible for green/bell pepper notes in Cabernet Franc, Cabernet Sauvignon, Merlot, Pinot Noir, Sauvignon Blanc, Chardonnay, and Riesling.

Usage: Add Fermoplus Pyr-Off right after pectolytic enzymes have finished their activity and pyrazines have been released.

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons.

TTB 27 CFR § 24.246
Available in 5 and 20 kg bags

Fermoplus Red Berry

Berries up

Nutrient formulated to enhance the full expression of the esters reminiscent of red fruit that are in every red wine. It's ideal for young reds like Gamay from carbonic maceration, fun Bordeaux Blend, young Pinot Noirs, Petite Syrah, and all reds to be enjoyed young and fresh.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

MED HIGH

Raspberries | *Violet*
Spices | *Strawberries* | *Cherries*

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermoplus Rosé

Not just Salmon Rosé

It's a nutrient based on yeast derivatives that brings into the fermentation precursors of esters reminiscent of roses, but also red fruits and wild berries.

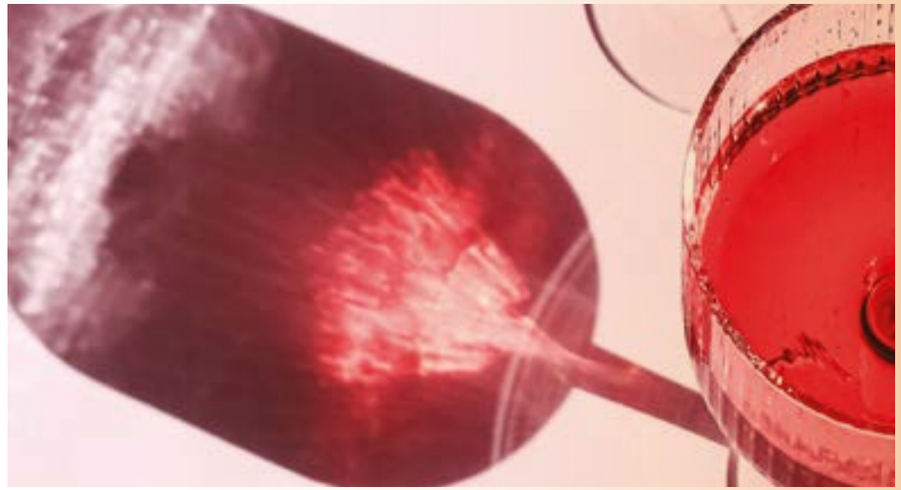
It's suitable for the fermentation of thiolic and amylic rosé, known to have a lighter color and more delicate bouquet.

Usage: dissolve in must or wine and add to tank right at the start of vigorous fermentation, after having adjusted the YAN content with DAP based nutrients during the lag-phase.

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246
Available in 5 kg bags

With the addition of these nutrients the yeast will benefit from the free amino acids nitrogen fraction (FAN) but also from the content in Sterols, Amino acids and Sulphur containing compounds like Glutathione and Cysteine



Fermoplus Spicy Fruit

Earthy Kind

Yeast derived nutrient rich in ammino acids that other than helping the yeast fermenting brings into the media precursors which will boost cleaner earthy aromatics typical of varieties like Pinot Noir, Malbec, Syrah, Durif or Nebbiolo.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246

Available in 5 kg bags

HIGH: *Black fruits*, *Honey & rose*, *Spices*

MED: *Strawberry – Apple*, *Jam*, *Caramel*

Fermoplus Mentol

Balsamic Elegance in Fermentation

The precursors of aromatics enhanced by this nutrient will help boosting aromatics typical of those styles of Bordeaux varieties where touches of mint or sage along with black tea are desired.

Usage: dissolve in must or wine and add to tank after having adjusted the YAN content with DAP based nutrients.

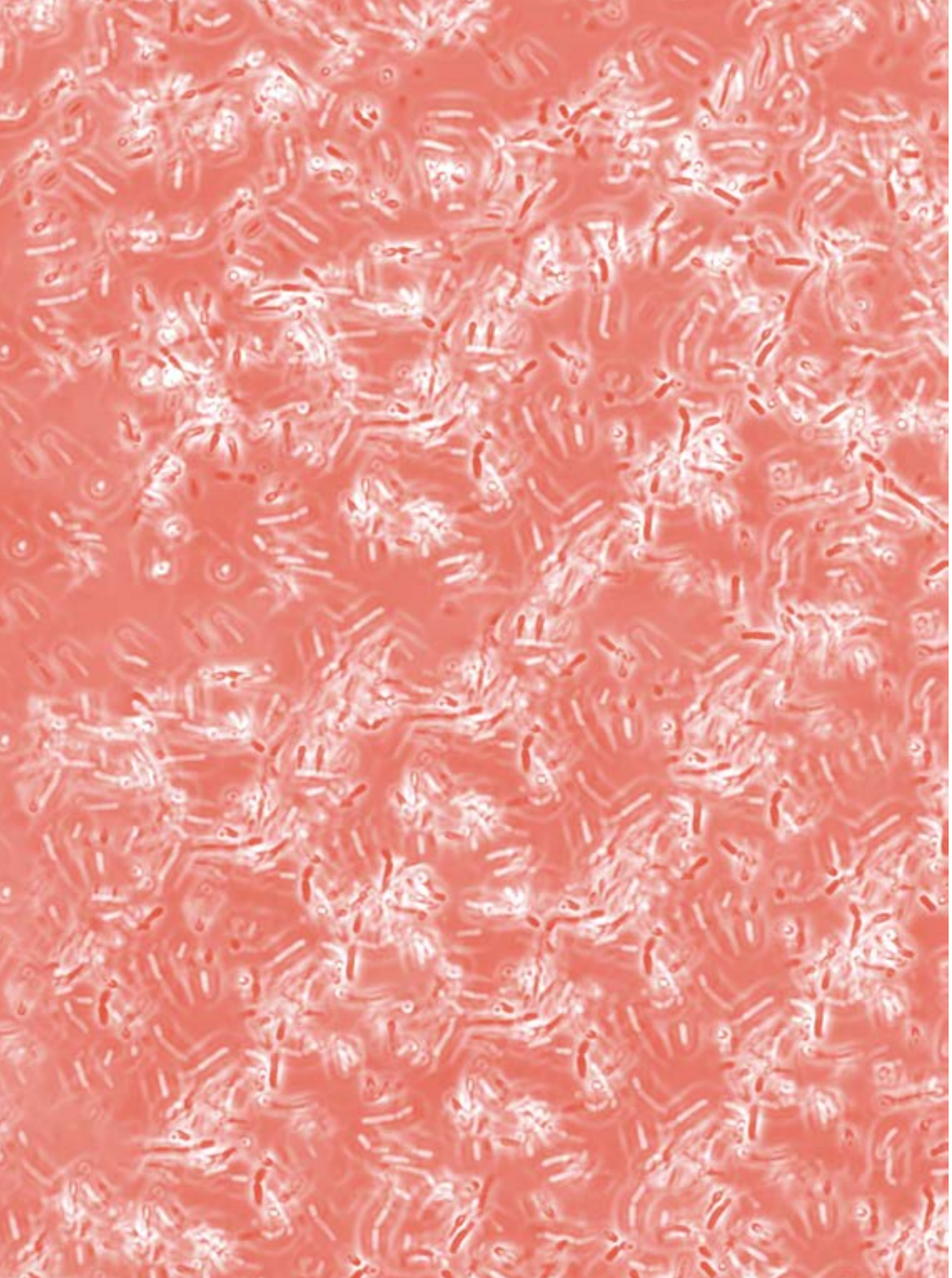
Dosage: about 250-500 ppm or 2-4 lbs/1,000 Gallons

TTB 27 CFR § 24.246

Available in 5 kg bags

HIGH: *Black currant*

MED: *Spices*, *Blackberries*, *Cherries*, *Violet*, *Balsamic notes*



MALO-LACTIC BACTERIA

03

Malolactic fermentation involves the conversion of malic acid into lactic acid through the metabolic activity of lactic acid bacteria.

This process reduces acidity while altering the wine's aroma. Beyond these effects, malolactic fermentation is often performed to eliminate compounds that could cause instability in the wine over time.

Research has shown that controlled inoculated malolactic fermentation enhances wine quality by preventing off-flavors and ensuring a clean, refined palate. This approach also avoids the formation of biogenic amines, which are commonly associated with fermentations involving indigenous bacterial microflora.

The bacteria species found in must and wine can vary, but AEB Group focuses on two key strains.

Oenococcus oeni
The most efficient species for oenological purposes, which forms the basis of many AEB bacteria products.

Lactobacillus plantarum
An intriguing species known for its unique properties.

Malolact Rapid

Malolact Rapid is a new *Oenococcus oeni* culture in a high-performance, freeze-dried form. Decades of research into the best biomass production techniques have resulted in the nutrients and protective substances applied in bioreactors used at AEB labs, to obtain a vigorous culture that is resistant to fermentation stress. Malolact Rapid is ideal for both co-inoculation and post primary fermentation inoculation, where it increases finesse, complexity and harmony of taste. The resulting wines have an open, fresh and fruity bouquet. On the palate, the sweetness of the lactic acid attenuates tannin astringency in red wines.

Malolact Rapid, when used for co-inoculation, should be added 2 days after the start of alcoholic fermentation.

Tolerance: 15% alcohol, pH > 3.15

Ideal temperature range: 18°-24°C (64-75 °F).

Dosage: 2.5hl, 25hl, 250hl, 1000hl doses (66, 660, 6,600, 26,400 Gallons) of wine.

Usage: take Malolact Rapid out of the freezer 30 minutes before use and add to the tank.

Malolact Acclimatée 4R

Direct add MLB, ideal for big red wines and harsh ML conditions: the selection has been mostly focused on having a strain not only resistant to harsh conditions (pH: 3.2; Temperature: 18 °C; Alcohol level: 14.5%; Total SO_2 60 ppm), but also to high levels of tannins (TPI 80).

Utilization: remove Malolact Acclimatée 4R from the freezer 30 minutes before use. It works as a direct add.

Dosage and packaging: comes in pre-dosed packets for 2.5hl, 25hl, 250hl, 1000hl doses (66, 660, 6,600, 26,400 Gallons) of wine.

Storage and shelf life: the lactic bacteria's activity of Malolact Acclimatée 4R is stable for two years (with minimal loss of activity) when stored in a freezer (-4°C /-17°C).

CO-Inoculation yeast/bacteria

During co-inoculation, is important to provide amino-acids to the yeast for optimizing biomass formation.

Bacteria inoculated in wine at the end of alcoholic fermentation face difficult conditions, such as high ethanol content combined with low pH, these conditions threaten their survival. In contrast, inoculation in grape must allow the bacteria to adapt gradually to ethanol before it becomes toxic for the cell. This way ML is substantially facilitated. However, there is still skepticism on co-inoculation due to the risk of increased VA and competition with the yeast.

Regarding competition for nutrition, Lactic acid bacteria have limited biosynthetic ability, therefore require pre-formed amino-acids and B-vitamins. During co-inoculation, is important to provide amino-acids to the yeast for optimizing biomass formation. An ideal timing for this would be during yeast rehydration, using Fermoplus Energy Glu 3.0 and during fermentation using Fermoplus DAP Free.

Tips

- We recommend waiting the end of yeast lag-phase before adding the Malolact of choice.
- Temperature should never reach 30 degrees Celsius (86 F).
- Regarding SO_2, the lower the better. 50 ppm might be added, provided that the bacteria addition happens at least 12 hours after KMS addition.
- Depending on the SO_2 level, <50 ppm or >50 ppm, we recommend co-inoculation after 24 or 48 hours respectively

A “different bug”: Malolact Plantarum Uno*

NEW

Lactobacillus plantarum

**still not allowed by TTB in the USA*

Malolact Plantarum Uno is the result of extensive research conducted by AEB’s R&D team in collaboration with Bionova in Italy, the Group’s exclusive producer. This strain was selected for its remarkable resilience and outstanding fermentation performance.

Malolact Plantarum Uno belongs to the group of *Lactobacillus plantarum*, ideal for co-inoculation and characterized by a facultative heterofermentative metabolism with minimal production of acetic acid from glucose and fructose. This characteristic makes it particularly useful as a starter in wines with high pH, which are more prone to risks of lactic spoilage and increased volatile acidity in case of fermentation issues.

Enhanced Sensory Profile

It exhibits a broader enzymatic range than O. oeni, influencing the wine’s aroma and flavor.

Key enzyme activities include:

- β-glucosidase, esterase, and protease, which enhance the aromatic profile.
- Decarboxylase, which inactivates phenolic acids, improving the aromatic profile over time.

Antimicrobial Properties

It demonstrates strong bacteriostatic activity by producing peptides or proteins that inhibit closely related bacterial species.

Ochratoxin A Reduction

It reduces Ochratoxin A levels by over 50%, exceeding the reduction achieved by *Oenococcus* oeni by approximately 20%.

Sulphur Tolerance

It tolerates Sulphur Dioxide levels up to 50 mg/L.

Versatile Applications

- Performs well in co-inoculation.
- Effective for fermenting raisined grapes with high malic acid levels and for vinification without Sulphur Dioxide, acting as a bioprotector against undesirable bacterial species.

Brettanomyces antagonist

Its rapid growth and ability to complete malolactic fermentation (MLF) makes it effective in preventing the development of Brettanomyces.

Low byproduct production

It produces minimal amounts of:

- Biogenic amines
- Diacetyl
- Acetic acid

Usage:

If adding up to 50 ppm of SO_2 wait 24 hours after yeast addition before introducing Plantarum.

1. Avoid SO_2 additions greater than 5 g/hL.
2. Pour Plantarum Uno directly into the must at a temperature between 20°C (68°F) and 26°C (80°F). For Better Distribution quickly rehydrate the bacteria in a 50/50 mix of must and chlorine-free water, then add the suspension to the fermenting must.
3. Avoid temperatures below 20°C (68°F) or above 26°C (80°F) to ensure optimal bacterial activity.

Packaging: doses for 25 hl or 660 gallons packets

How to increase Buttery (Diacetyl) flavor using *Oenococcus oeni*

AEB's *Oenococcus oeni* bacteria can produce none or considerable Diacetyl depending on conditions. One variable that can boost this buttery aroma component is citric acid paired with oxygen. Biosynthesis of Diacetyl is dependent on the citric acid metabolism and the fact that under partially aerobic conditions, Malolact strains convert citric acid into Diacetyl. Citric acid is first degraded to acetic acid and pyruvic acid.

Most of the pyruvic acid is then metabolized to lactic acid with a portion going to diacetyl, acetoin, and 2,3-butanediol. In anaerobic conditions the pathway will favor formation of acetoin and butanediol. This is because the formation of diacetyl requires an oxidative reaction.

- According to our research, additions of 1 gram per liter of Citric acid in partially aerobic conditions, can double the amount of diacetyl in the final wine.
- The bulk of the conversion will start after Malic acid is all depleted and will be diminished by the presence of SO_2. If diacetyl is desired it is better to wait a few days after completions of MLF before SO_2 addition.
- Diacetyl is adsorbed by the lees. The practice of leaving wine on the lees diminishes Diacetyl concentration, both because the lees will adsorb it and because the cell of bacteria that are still viable will convert Diacetyl into acetoin. Adding products like AEB Super-mann, Elevage Glu or Bâtonnage Elevage, can give the same impact of a good sur-lies, without the risk of losing diacetyl.
- If diacetyl is desired do not co-inoculate ML with yeast. Faster ML produces less diacetyl. For higher Diacetyl play with temperature and pH to ensure Malo-Lactic fermentation lasts about 2 weeks.

How to save money on ML bacteria by propagation

Direct add bacteria can be added directly pouring the acclimated bag into the wine or can be propagated to increase population and efficiency. Here is a procedure that can benefit all kinds of direct add ML Bacteria:

1. Draw a small portion of the wine to be inoculated.
2. Use 100 liters (26 Gal) for 250 hL (6600 Gal).
3. Add 60 ppm of Fermoplus Malolactique.
4. Adjust pH to 3.5-4 and inoculate with the Malolact of choice.
5. Maintain a constant temperature of 24°C (75°F) for 24 hrs.
6. The next day that portion of wine will have a much more aggressive population to quickly start the ML process in the rest of the tank.

Fermoplus Malolactique 2.0

Fermoplus Malolactique 2.0 is a specialized nutrient designed to support and enhance malolactic fermentation. It boosts the amino acid and vitamin content of wine, ensuring optimal development of selected lactic acid bacteria and the complete conversion of malic acid.

The formula optimizes critical phases such as rehydration, implantation, and hydration of Oenococcus oeni, promoting the bacteria's growth and multiplication—key steps for successful malolactic fermentation.

Its balanced composition strengthens bacterial cells against various stress factors and aids the enzymatic processes responsible for breaking down malic acid. Natural antioxidants, such as glutathione, provide additional cell support and protect delicate flavor compounds, preserving the wine's aromatic integrity.

Fermoplus Malolactique shortens the time required for malolactic fermentation to begin and complete, delivering consistent and reliable results. It works exceptionally well in combination with the Malolact line of cultures.

The formulation addresses the specific stresses faced by malolactic bacteria during fermentation, ensuring a smoother and more efficient process.

Dosage: 200 ppm

Packaging: 5 kg bags

ENZYMES

04

APPLICATIONS	ENZYME	TYPE	ADVANTAGES	USAGE	
				PH	TEMPERATURE (°F)
WHITE MUST CLARIFICATION	Endozym Active	Granular pectinase	To break down pectins before cold settling	>3.2	>57
	Endozym E-Flot	Liquid pectinase for flotation	Fast acting for flotation	>3.2	>54
	Endozym Ice	Cold liquid pectinase	Pectinase not inhibited by cold temperature	>3.2	>46
	Endozym ICS 10 Éclair	High concentration liquid pectinase	Very high activity	>3.2	>57
	Endozym Micro	Liquid pectinase enzyme	High activity	>3.2	>57
	Endozym Muscat	Granular pectinase for difficult must	Side-activity to untangle pectins	>3.2	>57
AROMATIC COLD MACERATION ENZYME	Endozym Cultivar	Pectinase plus Cellulase	It weakens the cell walls in the pulp facilitating aromas extraction	>3.2	>57
COLOR ENZYME	Endozym Contact Pelliculaire	Pectinase plus Cellulase	Improves extraction from skins	>3.2	>57
	Endozym ICS 10 Rouge	high concetrated liquid enzyme	Very high activity maceration-color extraction	>3.2	>57
AROMA ENHANCEMENT	Endozym ß-Split	B-glucosidase	Varietal aroma release-terpenes	>3.2	>57
	Endozym Thiol	Liquid carbon-sulfur lyase	Varietal aroma release- thiols	>3.2	>57
MATURATION ENZYMES	Endozym Glucalyse	Glucanase/Pectinase	Degrades Glucans, improve filterability	>3.2	>57
	Endozym Antibotrytis	Pectolitic enzyme with high secondary activity and β-glucanase	Treatmeant of Botrytis-affected grapes	>3.2	>57
MICROBIAL CONTROL	Lysocid W	Lysozyme	damages or kills LAB	>3.2	>57
SPECIALTY ENZYMES	Endozym TMO	Pool of enzymatic activities for Flash-Détente technology and Thermo	For the clarification of heat extracted musts.	>3.2	>142

Must clarification (Pectinases for winemaking)

Endozym Active

(granular)

Granular pectinase enzyme to be used to break down pectins before must settling or flotation. It promotes the hydrolysis of the pectic chains, facilitating the drainage of juice from pomace and yielding higher free-run juice as a result of its pectolytic and polygalacturonasic action.

Clarification of musts and wines is significantly accelerated, also resulting in more compact lees. As a result of a cleaner must, the wine will have cleaner aromas, less unstable proteins and it will be easier to filter.

Utilization: dissolve directly in 20-30 parts of non-sulfurized must or de-mineralized water and add to must or directly onto the grapes. The activity of Endozym Active is reduced by lower temperatures (pretty much no activity under 12 C or 54 F. If the grapes'aren't too rich in phenolics, the product can be added directly into the receiving line, thus allowing for good contact time with must before refrigeration. Precaution needs to be taken in order to avoid the contact between the enzyme and high dosage levels of SO_2 or bentonite.

Dosage: 20-40 grams per ton of grape depending on contact time, temperature and SO_2 content.

Shelf life and storage: Endozym Active is stable at room temperature for at least two years, with a loss lower than 5% per year starting from the third year.

TTB 27 CFR § 24.246
Packaging: 500g vacuum-sealed cans

Endozym Ice

(liquid, fast)

Extra rapid liquid pectinase enzyme for must settling that, due to its strength, also works at cold temperatures. Endozym Ice is a preparation developed on a solid media, which has been enriched in secondary activities that are able to process the most intricate pectin in the so-called "hairy zones". This ability results in a very fast de-pectinization that also prevents the inhibition of limiting factors like cold, low pH or SO_2.

Utilization: Dilute directly in 20-30 parts of non-sulfurized must or in de-mineralized water and add to must or directly onto the grapes.

Dosage: 2-6 ml per ton of grapes (the dosages vary according to the grapes to be treated or the vinification technology applied). Treatments of musts with a high percentage of pectin and suspended solids require the higher end of the dosage range.

Shelf life and storage: Endozym Ice should be stored at 5°C/40°F for a period not longer than 24 months.

TTB 27 CFR § 24.246
Packaging: 1 Kg plastic bottles

Endozym ICS 10 Éclair

(liquid high concentration)

High concentration liquid pectinase enzyme. It contains 35,000 Pectin lyase units per gram, making its clarification activity significantly greater than most enzymes in the market. It has been specifically formulated to break down grape pectin chains, enabling a rapid reduction of must viscosity and fast sedimentation. With the utilization of this preparation, yields in free run juice are increased and more compact sediment is obtained. The higher concentration guarantees a longer shelf life than any other liquid product and makes the package very easy to store in a small, refrigerated space.

Utilization: Dilute directly in 20-30 parts of non-sulfurized must or in demineralized water and add to must or directly onto the grapes. If grapes are too rich in phenolics the product may be added at the press discharge to avoid extraction from skins and stems. For juice, the dosage should be maintained as the same that would be used for grapes to compensate for shorter contact time or lower temperature.

Dosage: 1.5 to 5 ml per ton of grapes (about 1.7-5.75 grams/ton).

Shelf life and storage: Endozym ICS 10 Éclair should be stored at 5°C/40°F for a period not longer than 24 months.

TTB 27 CFR § 24.246
Packaging: 250 ml & 1kg plastic bottle

Endozym E-flot

(liquid)

Liquid pectinase enzyme for must clarification through flotation or cold settling. To carry over the flotation process successfully we need to be able to push solids against gravity. To do that, first we need to make sure that fermentation has not started, that the must is not below 55°F/12°C and thoroughly de-pectinized before it hits the flotation unit. Endozym E-flot is a fast-acting liquid pectinase enzyme that promotes the hydrolysis of the pectin and the separation of juice from the pomace, resulting in an increase of free-run juice yield and a juice that will be ready to "flot" in a reasonable time, preventing risks of early fermentation starts.

Utilization: Dilute directly in 20-30 parts of non-sulfurized must or in demineralized water and add to must or directly onto the grapes. The activity of Endozym E-flot is reduced by lower temperatures. The product can be added directly into the press, thus allowing for good contact time with the must before its refrigeration. Precaution needs to be taken in order to avoid the contact between the enzyme and high dosage levels of SO_2 or bentonite.

Dosage: 5-10 ml per ton of grapes (5.75-11.5 grams per ton). The dosages vary according to the grapes to be treated or the vinification technology applied. Treatments at low temperature and musts with a high percentage of pectins and suspended solids require the higher end of the dosage range. Also, pH's lower than 3.2 require higher dosages.

Shelf life and storage: Endozym E-Flot should be stored at 5°C/40°F for a period not longer than 24 months.

TTB 27 CFR § 24.246
Packaging: 10 kg pails

Endozym Micro

(liquid)

Liquid pectinase enzyme. Endozym Micro is a concentrated liquid pectinase enzyme, characterized by its high pectinlyase (PL) content. It promotes the hydrolysis of the pectins and the separation of juice from the pomace, resulting in an increase of free-run juice yield. This enzymatic suspension also speeds up clarification, resulting in more compact lees. As a result of a cleaner must, the wine will be more protein stable and easier to filter.

Utilization: Dilute directly in 20-30 parts of non-sulfurized must or in demineralized water and add to must or directly onto the grapes. The product can be added directly into the crushed grape line, thus allowing for good contact time with must before refrigeration. Precaution needs to be taken in order to avoid the contact between the enzyme and high dosage levels of SO_2 or bentonite. Lower temperatures reduce the activity of Endozym Micro.

Dosage: 2-6 ml per ton of grapes (about 2.3-6.9 ml per ton). Dosages vary according to the grapes to be treated or the vinification technology applied. Treatments at low temperatures and on musts with a high percentage of pectins and suspended solids require the higher end of the dosage range. Also, pH's lower than 3.2 require higher dosages.

Shelf life and storage: Endozym Micro should be stored at 5°C/40°F for a period not longer than 24 months.

TTB 27 CFR § 24.246
Packaging: 10 & 25 Kg pails

Endozym Muscat

(granular pull of activities)

Granular pectinase for must settling/flotation of "harder to clarify" varietals like Muscat, Gewürztraminer, Malvasia, Müller Thurgau. these grapes are all characterized by their high content in ramified pectin, and by the so called "hairy spots". These are ramifications of the polygalacturonic acid molecule (pectin) that are much harder to process than regular ones. Secondary activities such as Arabinase and Rhamnosidase are key ingredients that allow Endozym Muscat to quickly remove pectin in the most challenging varietals. These secondary activities are all encoded on the DNA of the *Aspergillus niger* producing the enzyme and expressed thanks to the inducers applied during the solid phase fermentation system in our production plant in Paris.

Utilization: Dissolve directly in 20-30 parts of non-sulfurized must or de-mineralized water and add to must or directly onto the grapes. Lower temperatures reduce the activity of Endozym Muscat. The product can be added directly into the receiving line, thus allowing for good contact time with must before refrigeration. Precaution needs to be taken in order to avoid the contact between the enzyme and high dosage levels of SO_2 or bentonite.

Dosage: 20-40 grams per ton of grape depending on contact time, temperature and SO_2 content.

Shelf life and storage: Endozym Muscat is stable at room temperature for at least two years, with a loss lower than 5% per year starting from the third year.

TTB 27 CFR § 24.246
Packaging: 500g vacuum-sealed cans

Enzymes for cold maceration of white grapes

Cold macerating enzymes work most effectively at lower temperatures, typically between 10°C to 15°C (50°F to 59°F). At these temperatures, they help to enhance the extraction of desirable compounds while minimizing unwanted harsh phenolics. The enzymatic activities used during the pellicular maceration phase (PG, PL and CMC) release the aromatic substances and bouquet precursors, which normally remain trapped in the pomace. They also facilitate the release of the juice and increases yields, avoiding long cycles and high PSI's in the press. Also, due to the presence of a protective lipid layer on their surface, enzymes do not have any effect on grape seeds.

The aromatic potential of grapes, localized in the skin, is represented by free and volatile odoriferous substances easily perceivable since the first stages of vinification and by aroma precursors, odorless, which can contribute to the wine bouquet.

Endozym Cultivar

(granular, cold maceration)

Granular enzyme for cold maceration of white grapes. Endozym Cultivar is best used at the press or added to the must going to the cold maceration tank. It weakens the cell walls in the pulp facilitating aromas extraction. It also has a very high β-Glucosidase activity to release terpenes from sugars and provides a PL and PG action that is comparable to enzymes used for must settling and yield.

Utilization: Dissolve directly in 20-30 parts of non-sulfurized must or de-mineralized water and add directly onto the grapes going to the press.

Cold maceration is normally performed by leaving the crushed grapes at 5-8°C/40-46°F for about 24 hours. These low temperatures reduce the activity of Endozym Cultivar. The enzyme should be added directly on the truck/gondola or into the receiving line, thus allowing for good contact time before refrigeration. Precaution needs to be taken to avoid the contact between the enzyme and high levels of SO_2 or Bentonite.

Dosage: 20-40 grams per ton of grapes depending on contact time, temperature and SO_2 content.

Shelf life and storage: Endozym Cultivar is stable at room temperature for at least two years, with a loss lower than 5% per year starting from the third year.

TTB 27 CFR § 24.246
Packaging: 500g vacuum-sealed cans

Color and macerating enzymes

Anthocyanidins are the red grape pigments, which mainly occur in the grape skin.

In order to dissolve anthocyanins better and improve tannin extraction from the skin, which contribute to color stability, enzymatic preparations with a high hemicellulasic and cellulasic (CMC) enzymatic activities are needed. In fact, if the extraction is uncompleted, the grape skin forms a physical barrier against the diffusion of anthocyanins, tannins and flavors from the cells. The extraction enzymes act on the cells of the berry peel, allowing a very rapid extraction of anthocyanins and tannins and a slow extraction of the tannin-polysaccharide complexes of the cell walls. The addition of these enzymes is carried out either directly on the red grapes at the crusher, or at the beginning of maceration, at the first pump-over. After that, the enzymatic activity is inhibited by the presence of alcohol, and by the extracted tannins that will bind to the enzyme's proteins, denaturing it. AEB enzymes do not extract any component from the grape seeds, which are protected by an external lipid layer. The activity of these enzymes increases with higher dosages, longer contact time and warmer temperatures.

Endozym Contact Pelliculaire

(granular)

Granular maceration/color-extraction enzyme. It facilitates the dissolution of anthocyanins and improves tannin extraction from skins, contributing to color stabilization. This pectolytic enzyme pool with natural secondary cellulase and hemicellulase activities, speeds-up the color extraction process, decreases maceration time, and consequently prevents the extraction of unwanted bitter tannins.

Usage: dilute directly in 20-30 parts of non-sulfurized must or de-mineralized water and add to the tank at first pump-over, or add directly onto the grapes. The optimal temperature is above 60°F-18°C.

Dosage: 20-40 grams per ton of grapes depending on pH, temperature and SO_2 content. Low pH, temperature and high sulfur, need the higher end of the dosage range.

Shelf life and storage: Endozym Contact Pelliculaire is stable at room temperature for at least two years, with a loss lower than 5% per year starting from the third year.

Packaging: 500g vacuum-sealed cans

Endozym ICS 10 Rouge

(liquid high concentration)

Liquid maceration and color extraction enzyme, Endozym ICS 10 Rouge comes in the form of a super concentrated liquid product. It has been basically reduced to the active ingredient and winemakers can dilute it down according to their needs. This makes the enzyme more practical to store and ship, avoiding the risk of being left around under the heat where it would quickly loose its activity. It contains 20,000 Pectinlyase units, making this product's clarification activity significantly greater than average. The secondary activities (cellulase, polygalacturonase and hemicellulase) that characterize Endozym ICS 10 Rouge, allow it to penetrate the cellular walls, enabling rapid color and phenolic extraction. Wines obtained from grapes treated with Endozym ICS 10 Rouge will be more structured and complex. The pomace treated with this enzyme displays a higher permeability and increases the free-run juice quality and quantity. Its high PL concentration breaks down grape pectin chains, enabling a rapid reduction of must viscosity, faster and more compacted sedimentation.

Utilization: Enzymes are proteins and tend to be inactivated by tannins and alcohol. In a red must environment, their activity will be limited in time. For this reason, we recommend adding the macerating enzymes only in optimal conditions. This would be at the first pump over, right before fermentation starts, and when the temperature is above 60°F-18°C. A pump over is also a perfect way to mix and homogenize the product.

Dosage: 1 to 3 ml per ton of grapes (1.15-3.45 grams/ton). The product should be diluted in 20-30 parts of sulfur-free must or in de-mineralized water. Higher doses must be used for grapes with low pH and cultivars or vintages for which the extraction of color might be particularly difficult.

Shelf-life and storage: Endozym ICS 10 Rouge should be stored at 5°C/40°F for a period not longer than 24 months.

TTB 27 CFR § 24.246
Packaging: 250 ml & 1kg plastic bottle

Enzyme for thermo vinification

Endozym TMO

Liquid pool of enzymatic activities for clarification of heat extracted musts. It's characterized by strong secondary activities, able to intervene on pectic chains present in the skin. Coming out of thermo processing, these molecules heavily interfere with the brightness of the processed must and are usually harder than normal to degrade. Endozym TMO displays an optimal concentration in pectolytic units and is ideal to remove clogging polysaccharides. In fact, this enzyme degrades them, resulting in a marked improvement of must clarity.

Utilization: Dilute directly in 20-30 parts of must to which no sulfur has been added or demineralized water. The product should be used immediately after the thermal treatment and after temperature has lowered under 40°C/104°F.

Dosage: from 20-40 ppm.

Shelf life and storage: can be kept for two years in the original sealed packaging and temperature below 10°C.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles and 10 kg pails

Aromatic and post-fermentative enzymes

The organoleptic properties of wine are determined by a variety of different compounds that are already present in the grape. Some aromatic compounds do not exist in a free form but are conjugated forming water-soluble and odorless complexes.

Enzymatic hydrolysis releases many aromatic volatile terpenes (aglycones) and volatile thiols. Glycosidase activities have been detected in various S. cerevisiae (Fermol Arome Plus or Fermol Sauvignon) and non-Saccharomyces yeasts (Primaflora, Levulia Torula).

Another compound present in wine, glucan, is used by several strains of lactic acid bacteria and the grape fungus Botrytis cinerea to produce viscous capsular or extracellular polysaccharides impairing wine filtration. The colloidal polysaccharides cannot be removed from wine by flocculants, adsorbents or filtration. Thus, AEB enzymes with glucanase activities are useful to reduce viscosity of musts and wines caused by microbial contamination.

Endozym Antibotrytis

Eliminates laccase and prevents clogging. Endozym Antibotrytis is a purified enzymatic preparation, with activities useful to solve problems deriving from the presence of Botrytis Cinerea in the must. Endozym Antibotrytis indirectly acts towards polyphenol oxidases (tyrosinase-laccase) present in the must, inactivating them and enabling aromatic precursors to be preserved together with the coloring matter. To guarantee pectin hydrolyzation and color extraction, Endozym Antibotrytis should be used in association with normal clarification or color extraction enzymes. The treatment with Endozym Antibotrytis is decisive in musts obtained by grapes heavily attacked by grey mold, responsible for problems which cannot be solved either by sulfur dioxide or by other technological solutions.

Utilization: Dilute directly in 20-30 parts of non-sulfurized must or in de-mineralized water and add to must or wine.

Dosage: 30-50 grams per ton of grapes or 20-40 grams per hl of wine (1.5-3 lbs./1,000gallons). Treatments of musts or wines with a high infection, low temperature and high sugars need the higher dosages.

Shelf life and storage: Endozym Antibotrytis is stable at room temperature for at least two years, with a loss lower than 5% per year starting from the third year.

Packaging: 500g vacuum-sealed cans

Endozym ß-Split

Granulated beta-glucosidase specific for aroma extraction

This enzyme catalyzes the hydrolysis of glycosidic bonds. It has a role in the release of aromatic molecules of the terpenol family and C13-norisoprenoids. Suppressed by glucose, it must be used either mid-way through the fermentation or to the finished wines before bentonite addition. The successful use of Endozym ß-Split is of course based on the presumed presence of aromatic precursors in the must: no effect will be observed on a must devoid of glycosylated precursors. Its action can be stopped by a light binding with Bentogran (3-10 g/hl).

ß-Split can cleave aromatics not only from the beta-glucosides, but also from the pentoses non fermentable sugars.

Utilization: dissolve directly in 20-30 parts of non-sulfurized must or in demineralized water and add to wine.

Dosage: 20-50 ppm (1/3-1/2 lb/1,000 gallons) depending on contact time, temperature and SO_2 content. The activity of Endozym ß-Split is reduced by high sugar and low temperatures, so dosage must be increased accordingly.

Even if its usage is more effective toward the end of fermentation, this enzyme is often used successfully in finished winets to ameliorate aroma expression. Precaution needs to be taken in order to avoid the contact between the enzyme and high dosage levels of SO_2 or Bentonite. In white and rosé wines, Bentogran should be utilized to neutralize the enzyme when the desired aromatic profile is achieved.

Shelf life and Storage: Endozym ß-Split is stable at room temperature for at least two years, with a loss lower than 5% per year starting from the third year.

Packaging: 500g vacuum-sealed cans

Endozym Glucalyse

Endozym Glucalyse is an effective enzyme for enhancing wine clarification and optimizing wine refinement. Glucans are complex polysaccharides that can hinder clarification and significantly impede filtration in wine. Their presence in musts and wines is often due to the attack of Botrytis cinerea on grapes.

Endozym Glucalyse is a highly concentrated pectolytic preparation with β-1,3 and β-1,6 glucanase activities, specifically designed for the complete hydrolysis of clogging β-glucans. Its application is particularly beneficial for improving wine filtration and clarification.

Additionally, Endozym Glucalyse is the ideal agent for “sur lies” rest. By acting on the yeast cell walls, it facilitates their lysis, accelerating the release of polysaccharides into the wine. This process provides several advantages, including:

- Increased body
- Enhanced aromatic persistence
- Improved protein stability
- Greater color stability

The physical and chemical conditions of the wine, particularly temperature, play a crucial role in enzymatic activity. Therefore, it is recommended to apply Endozym Glucalyse starting from the first rackings, when temperatures are more favorable. Endozym Glucalyse is purified to remove undesirable activities, such as CE (Cinnamyl Esterase) found in unpurified enzymes, this activity leads to the formation of volatile phenols, which can introduce undesirable aromatic nuances reminiscent of horse sweat when present in high concentrations.

Packaging: 1 liter bottles

Endozym Thiol

Liquid carbon-sulfur lyase to favor the hydrolysis of the thiols precursors and enhance their expression in the wine. Thiols are an important component of the bouquet of Sauvignon Blanc, Riesling and Gewürztraminer; however, they come anchored to a Cysteine group, which makes them non-volatile. Endozym thiol promotes the conversion of Cys-4-MMP and Cys-3-MH into 4MMP (4-Mercapto-4-methyl-pentan-2-one) reminiscent box tree and 3-MH (3-mercaptohexan-1-ol), reminiscent of grapefruit.

Utilization: Add to the fermenting tank midway through fermentation. Use Elevage Glu for protecting oxidation of the aromatic if this risk occurs.

Dosage: 20-40 ml (23-46 g) per ton of grape, or 20-40 ppm on 1/3 lb/1,000 Gallons of must to be treated depending on time, temperature and SO_2 content.

Shelf life and storage: Endozym Thiol should be stored at 5°C/40°F for a period not longer than 24 months.

Packaging: 1 liter bottles

POLYSACCHARYDES AND TANNINS

05

POLYSACCHARIDES

gum Arabic and yeast derived peptides

Nowadays consumers prefer wines with a smooth mid-palate and some kind of sweetness to it. Adding sugar in the form of concentrate has been the solution for many years, but sugar comes with an high caloric content and when this data will be shared through the nutritional information on the label, some wines may scare away certain consumers.

Also, leaving residual sugars in a finished wine is often a risk that requires products like Dimethyl dicarbonate or sorbate to be added to prevent spoilage in the bottle.

Certain natural polysaccharides can be added to the wine to give smoothness and a sweet sensation without having to leave or add sugars, these products can be derived from the yeast cell walls (mannoproteins and peptides) or from Acacia Seyal and Senegal trees (gum Arabic).

Acacia derived products:

Gum Arabic is a natural sup derived from Acacia trees from the Sub-Saharan area of Africa where the growing conditions yield the perfect balance of non-fermentable sugars.

Gum Arabic can be dextrorotary or levorotary and this changes a lot the characteristics of the product. Generally speaking:

- Dextrorotatory gum: easier to filter, better stabilization of tartrates, good viscosity.
- Levorotatory gum: more viscous, better stabilization for color.

The regulations finalized in the US authorize the use of acacia for clarifying and stabilizing wine at a use rate of 16 pounds per 1,000 gallons of wine (1.9 g/L), or 0.19 percent, which is within the 1 percent use rate limitation set forth in the FDA regulations for these purposes.

PRODUCT	QUICK DESCRIPTION
ARABINOL AROME	Liquid Gum Arabic based product to stabilize aromas and to smoothen out the mid-palate
ARABINOL CA	Liquid Gum Arabic, it smooths out the mid-palate, helps with tartrate stability and preserves free SO_2
ARABINOL DOLCE	Liquid Gum Arabic contributing sensations of richness, sweetness and body
ARABINOL HC	Highly concentrated liquid Gum Arabic (30%)
ARABINOL MULTINSTANT	Micro-granulated gum Arabic
ARABINOL SUPER ROUGE	Levorotatory liquid gum Arabic
BATONNAGE PLUS ELEVAGE	Yeast derived mannoprotein, to add roundness and to protect from oxidation
BATONNAGE PLUS STRUCTURE	Yeast derived mannoprotein with Ellagic tannins to add roundness and Structure
BATONNAGE PLUS TEXTURE	Yeast derived mannoproteins to add roundness and protect color during fermentation of red and white wines
ELEVAGE GLU	High glutathione, yeast-derived peptide. Provides volume & protection from oxygen
SUPER-MANN	Pure mannoprotein for tartrate stabilization and mouthfeel

Arabinol line

Arabinol

Dextrorotatory liquid Arabic gum (about 20% concentration), it brings smoothness with a good compromise between viscosity and filterability. It helps with tartaric stability and inhibits metal and protein casse. When added to wines, Arabinol slows down aggregation of crystals of tartrates. It also diminishes the perception of astringency and bitter tannins adding persistency. Contains 0.3-0.5% SO_2.

Usage: Add to the finished wine after all the fining has been completed. Mix well into 10 parts of wine or must and add to the tank making sure is well homogenized.

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place

Dosage: 200-1500 ppm

TTB 27 CFR § 24.246

Available in 1 kg bottles, 10 and 25 kg pails and 230 kg drums

Arabinol Arôme

Liquid gum at about 20% concentration. It's a blend between dextrorotatory and levorotatory gums which has the characteristic of preserving the aromatic components of the wine. It inhibits precipitation of tartrates and in young reds it is also ideal to stabilize red pigments. Contains 0.3-0.5% SO_2.

Add to the finished wine after all the fining has been completed.

Usage: mix well into 10 parts of wine or must and add to the tank making sure is well homogenized.

Dosage: 200-2000 ppm

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

TTB 27 CFR § 24.246

Available in 1 kg bottles, 10 and 25 kg pails and 230 kg drums

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

Arabinol Dolce

Liquid gum at about 20% concentration, is the best alternative concentrate addition in wines. It's a dextrorotatory gum where the processing has been engineered with the goal of giving less boldness but more smoothness and length. In high alcohol wines it reduces the "heat". Contains 0.2-0.35% SO_2

Usage: Add to the finished wine after all the fining has been completed. Mix well into 10 parts of wine or must and add to the tank making sure is well homogenized.

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

Dosage: 200-1500 ppm

TTB 27 CFR § 24.246
Available in 20 kg pails

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

Arabinol HC

Dextrorotatory gum solubilized at high concentration (33%), made with a selected raw material which brings a higher level of viscosity. It protects from any precipitation occurring due to wine instabilities. Contains 0.3-0.5% SO_2

Usage: Add to the finished wine after all the fining has been completed. Mix well into 10 parts of wine or must and add to the tank making sure is well homogenized.

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place

Dosage: 200-1500 ppm

TTB 27 CFR § 24.246
Available in 1 kg bottles and 25 kg pails

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

Arabinol Super Rouge

Liquid levorotatory gum with high viscosity and a specific characteristic to stabilize red color. Contains 0.3-0.5% SO_2

Usage: Add to the finished wine after all the fining has been completed. Mix well into 10 parts of wine or must and add to the tank making sure is well homogenized.

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

Dosage: 200-1400 ppm

TTB 27 CFR § 24.246
Available in 25 kg pails

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

Yeast derived polysaccharides

The polysaccharides of oenological interest in winemaking come from the degradation of yeast cell walls. One of the main objectives of "élevage sur lies" is to have an exchange with the medium. As a consequence of the various interactions, the mannoproteins leave the wall and influence the wine in several ways.

These molecules can bring several benefits to the wine including:

- Enhance the body and richness of the wine, providing a smoother and rounder mouthfeel.
- ***Antioxidant activity:*** it has been demonstrated that AEB products based on yeast derivatives can partially substitute SO_2 as an antioxidant. They contain reducing molecules like GSH (Glutathione) as well as lipid compounds with anti-radical activity.
- ***Color stability:*** Mannoproteins may contribute to the color stability of red wines. Their interaction with polyphenolic compounds can influence the color intensity and stability over time. Moreover, it has been shown that yeast derived products can adsorb phenolic compounds and browning products in white wines.
- ***Aroma binding:*** Mannoproteins can bind with certain aroma compounds, contributing to the aromatic complexity of the wine. This interaction can help retain and release specific aromas, influencing the sensory profile of the wine.
- ***Flavor integration:*** Mannoproteins may play a role in integrating and harmonizing flavors in the wine. Their interactions with other wine components can contribute to a more balanced and integrated flavor profile.
- ***Tartaric stabilization:*** Mannoproteins with specific molecular weights play a significant role in inhibiting potassium bitartrate precipitation in wine, preventing the formation of unwanted crystal.
- ***Protein stabilization:*** They help improve the protein stability of white wines.
- ***Microbial protection:*** Mannoproteins can interact with and adsorb certain compounds, preventing microbial spoilage and contributing to the microbial stability of the wine.

The extent to which these activities will be enhanced will depend upon the composition of the blend in terms of different forms of yeast derivatives (cell walls, inactivated yeast, lysate, autolyzed, mannoproteins).

AEB line of yeast derived polysaccharydes

The following AEB products are all made out of autolyzed yeast rich in peptides, mannoproteins and anti-oxidant amino acids. They all increase the positive effect of the sur-lie, making wines smoother and more harmonious. At the same time preventing the formation of off-odors mercaptans and enhancing the bouquet of the varietal.

Batonnage Plus Elevage

A yeast derivative rich in antioxidants and polysaccharides which will add to the volume of the wine at the same time optimizing the redox potential to preserve wines from oxidation.

Usage: the product is highly hygroscopic, to dissolve it leave it in a container with 10 parts of wine or warm water and wait one hour before mixing. When in solution add to the fermenting wine with a venturi or pump-over.

Dosage: 100-300 ppm or 1-2.5 lb/1,000 gallons depending on the wine

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

TTB 27 CFR § 24.246
Packaging: 5kg bags

Batonnage Plus Structure

It integrates the smoothness of the yeast derived mannoproteins with the aroma and structure of oak tannins and levorotatory gum Arabic. It enhances the natural aromas of chocolate. It can also harmonize the aroma of wines high in methoxypyrazines.

Usage: the product is highly hygroscopic so to dissolve it leave it in a container with 10 parts of wine or warm water and wait one hour before mixing. When in solution add to the fermenting red wine with a venturi or pump-over.

Dosage: 100-300 ppm or 1-2.5 lb/1,000 gallons depending on the wine

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

TTB 27 CFR § 24.246
Packaging: 5kg bags

Batonnage Plus Texture

Early on in fermentation, it helps the yeast to enhance the natural varietal of reds, white and rosé wines, providing amino acids. It will also add to the volume and midpalate.

Usage: the product is highly hygroscopic so to dissolve ideally leave it in a container with 10 parts of wine or warm water and wait one hour before mixing. When in solution add to the fermenting wine with a venturi or pump-over.

Dosage: 100-300 ppm or 1-2.5 lb/1,000 gallons depending on the wine

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

TTB 27 CFR § 24.246
Packaging: 20 kg bags

Elevage Glu

Rich in GSH, it protects whites and rosé wines from browning and pinking. It also enhances the natural complexity of the wine by adding to the mouthfeel and protecting the aromatics.

Usage: the product is highly hygroscopic so to dissolve it leave it in a container with 10 parts of wine or warm water and wait one hour before mixing. It's a product that should be added toward the end of the fermentation, when the wine is unprotected by the CO_2 sitting on the headspace.

Dosage: 100-300 ppm or 1-2.5 lb/1,000 gallons depending on the wine

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

TTB 27 CFR § 24.246
Packaging: 5kg bags

Super-Mann

A pure mannoprotein extracted from the hulls of *Saccharomyces cerevisiae*, completely soluble, it adds to the stability of the wine. As explained in the introduction of this paragraph, mannoproteins also add to volume, complexity as well as to the general protection of the wine.

Usage: the product is highly hygroscopic so to dissolve it leave it in a container with 10 parts of wine or warm water and wait one hour before mixing. When in solution add to the finished wine with a venturi or pump-over.

Dosage: 100-300 ppm or 1-2.5 lb/1,000 gallons depending on the wine

Shelf life and storage: can be kept for two years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

Packaging: 500g packets

TTB approves the use of bakers yeast mannoprotein to stabilize wine from the precipitation of potassium bitartrate crystals at an amount not to exceed 400 mg/L.
Contains product/s that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

TANNINS

Tannins summary chart

PRODUCT	QUICK DESCRIPTION
ELLAGITAN BARRIQUE BLANC	Oak tannin with low color impact
ELLAGITAN BARRIQUE FRUIT RESERVE	Liquid oak tannin with nuances of maple syrup, caramel and vanilla
ELLAGITAN BARRIQUE GOUD-RON	Liquid oak tannin with nuances of tar in the style of the big wines from Rhone and Piedmont
ELLAGITAN BARRIQUE LIQUID	Liquid oak tannin with nuances of vanilla, Whisky Lactone and coconut
ELLAGITAN BARRIQUE ROUGE	Powdery oak tannin with nuances of vanilla, Whisky Lactone and coconut
ELLAGITAN BARRIQUE XO	Liquid oak tannin with nuances of Syringaldheyde (Smoky), spices and vanilla
ELLAGITAN EXTREME	Powdery oak tannin to elevate fruit expression
ELLAGITAN GRAND ROUGE	Ellagitan Grand Rouge can be used before and after fermentation its highly reactive tannin that features excellent organoleptic properties
ELLAGITAN REFILL	Liquid Ellagic tannin to refill the redox power of used oak barrels
ENOGRAPE POWDER	Grape extract for anthocyanin addition
FERMOTAN	Fermentation tannin with 60% proanthocyanidins and 40% ellagic. Color stabilization & structure
FERMOTAN ANTIBOTRYTIS	Ellagic and proanthocyanidin tannins able to block the action of Botrytis cinerea
FERMOTAN BLANC	Ellagic for structure and oxygen protection
FERMOTAN LIQUID	Liquid version of Fermotan
FERMOTAN AC	Acacia derived tannin. Supple structure and color stability
FERMOTAN AG	Color stability for Aglianico, Malbec, Tempranillo kinds
FERMOTAN CB	Color stability for Cab, Merlot, Montepulciano, Barbera kinds
FERMOTAN NB	Color stability for Nebbiolo and fragile anthocyanins kinds
FERMOTAN SG	Color stability for Sangiovese, Pinot Noir kinds
FERMOTAN SH	Color stability for Shiraz, Syrah
GALLOVIN	Tannin from gallnuts to protect from oxygen and to neutralize laccase from Botrytis
GALLOVIN LIQUID	Liquid version of Gallovin
PROTAN BOIS	Quebracho derived tannin for aging structure and color stabilization
PROTAN FRESH	Blend of proanthocyanidins, with a sweet and fresh taste
PROTAN LXP	Blend of hydrolysable tannins and proanthocyanidins for the vinification and fine tuning of white and rosé wines
PROTAN MALBEC	Nutty and structured grape-seed derived tannin
PROTAN PEPIN OXILINK	Old-world style grape-seed derived tannin
PROTAN PLUS	Fermentation of red musts, wines with a more intense and stable colour, softer and rounder, with a balanced tannic structure
PROTAN Q BIO	Organic certified proantochianidin from Quebracho
PROTAN RAISIN	"Velvety" and structured grape-skin derived tannin
TANETHYL	Fast polymerizing, grape-seed-derived tannin
TANETHYL EFFE	Tanethyl product blended with ellagic tannins
TANIBLANC FRESH	Proanthocyanidins and gallotannins with a sweet and fresh taste
TANIQUERC	Chocolate-mocha style, granulated oak tannin. Ideal for MOX processing

Fermentation Tannins

Fermotan and Fermotan Liquid

The most traditional line of fermentation tannins composed by 60% of proanthocyanidins and 40% Ellagic. It works toward preserving the original content of:

Color: by locking the unstable monomeric pigment into a stable polymer.

Tannins: by sacrificing itself with the proteins that would otherwise precipitate with the original polyphenols from the grapes.

Fermotan should be added right at the beginning of red fermentation in order to shield the wine from oxidation and to lock the unstable colored pigments right from the get-go.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Fermotan Powder
Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.
Available in 1 kg packets and 15 kg bags.

Fermotan Liquid
Dosage: 200-500 ppm or 1.5-4 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 5 and 25 kg pails

Fermotan AC

With a chewy and lingering taste, Fermotan AC is the ideal agent for the color stabilization, as it brings soft notes to the mouthfeel. It allows more additions during fermentation, without giving bitterness and green notes to the finished wines. Fermotan AC is ideal for the fermentation of grapes that don't reach the complete phenolic maturity, as it complements the phenolic deficiencies adding volume without bitterness.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermotan AG

This formulation is ideal for varieties which are rich in Malvidin, a particular kind of anthocyanin which is released slowly and that is best integrated by grape skin derived tannins which are a big component of the Fermotan AG formulation. Grape skin derived tannins make this product very smooth and efficient. Other components are ellagic tannins from Oak as antioxidants and Quebracho tannins as sacrificial phenolics.

Formulated specifically for Aglianico, Malbec, Zinfandel, Tempranillo, Negroamaro, Nero d'Avola, Pinotage.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 5 kg bags.

Fermotan CB

Formulated with grape skin and grape seeds tannins to capture and stabilize Mavidin pigments and build a soft structure which will also work with the tannins of the varietal in order to evolve properly over time. Completes the formulation a portion of Quebracho derived tannins with a "sacrificial" function which will preserve the original tannins from the grapes. Formulated specifically for Cabernet Sauvignon, Merlot, Barbera, Montepulciano, Teroldego.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 5 kg bags

Fermotan SG

Formulated for those varieties like Pinot Noir and Sangiovese which are rich in "fragile" di-substituted pigments such as Cyanidin and Peonidin anthocyanins.

It contains an important fraction of hydrolysable tannins with a strong antioxidant power.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 5 kg bags

Tanethyl Effe

Ellagic tannins mixed with seed derived proanthocyanin with an aldehydic bridge integrated in the structure which guarantees high reactivity for polymerization with anthocyanins and other polyphenols. This characteristic makes the proanthocyanidinic portion of Tanethyl Effe immediately available for the color to be locked and stabilized against the effects of Sulfur, pH changes, oxygen and aging in general.

Because of the ellagic tannins fraction, Tanethyl Effe is recommended for red wines fermentation where ellagic tannins can work in synergy with oxygen promoting the formation of the ethanal bridges needed for polymerization of color and structure. It is often used in cold soak when alcohol isn't present and ethanal bridges cannot be formed.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over or with a Venturi system.

Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 1 kg packets

Fermentation tannins for whites and problematic grapes

Fermotan Antibotrytis

A formulation including low molecular weight ellagic and proanthocyanidin tannins which can stop the oxidative effect of Botrytis-derived polyphenol oxidase (Tyrosinase).

Usage: mix well into 10 parts of wine or must and add to the receiving conveyer and at racking.

Dosage: 240-400 ppm or 2-3 lbs/1,000 gallons on the grapes or during pump-over or 120-240 ppm or 1-2 lbs/1,000 gallons at racking.

TTB 27 CFR § 24.246
Available in 1 kg bags

Fermotan Blanc

A blend of hydrolysable tannins both from untoasted oak and gallnuts, geared to protect the wine from oxidation and to lift the mid-palate.

Usage: make a slurry of Fermotan Blanc in 10 parts of wine or must and add at exit of the press in order to start protecting the must as soon as possible.

Dosage, depending on the variety 50-200 ppm.
Dosage: 60-240 ppm or 1/2 -2 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 1 kg bags

Gallovin and Gallovin Liquid

Gallic tannins derived from the core of gallnuts, purified from the external catechins which can be found in formulations extracted starting from the whole nut.

It's a strong antioxidant which brings little to no color and that has a strong reactivity combining proteins and polyphenol oxidases like laccase and tyrosinase. For that is a recommended solution to protect wines from the damages associated with *Botrytis cinerea*.

Usage: mix well into 10 parts of wine or must and add to the receiving conveyor and at racking.

Dosage
Powder: 100-250 ppm on the grapes or during pump-over or 100-150 ppm at racking.
Liquid: 150-400 ppm on the grapes or after must fining, 50-75 ppm at racking.

TTB 27 CFR § 24.246
Available in 500 grams packs and 5 kg bags (powder) or 25 kg pails (liquid)

Protan Bio Q

It's an organic certified proantohocyanidin derived from Quebracho wood. Its characteristics bring to the wine an added protection against oxidation and add a layer of structure which will help the wine to age better and preserve the color.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Dosage: 120-400 ppm or 1-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 0.5 kg bags

Finishing Tannins

Protan Bois

A proanthocyanidin tannin derived from Quebracho which is partially polymerized to act as a structure enhancer without adding any bitterness.

Because of its condensed nature, it works well also for stabilizing color and supporting the aging of red wines during long storages or with micro-oxygenation.

Usage: mix well into 10 parts of wine or must and add during a pump over or with a Venturi system.

Dosage: 100-300 ppm on the grapes or during pump-over or 100-250 ppm at racking.

TTB 27 CFR § 24.246
Available in 500 packets and 5 kg bags

Protan Fresh

A proanthocyanidn that brings back freshness to "tired" wines. It can be used in reds, whites and rosè to keep wines to get too old too soon.

Usage: mix well into 10 parts of wine or must and add to the tank with a venturi system.

Dosage: 60 ppm-½ lb per 1,000 gallons on whites and 120-240 ppm-1-2 lbs per 1,000 gallons on reds.

TTB 27 CFR § 24.246
Available in 1 kg packets

Protan LXP

A proanthocyanin extracted from exotic woods including Lemon tree and Acacia. It can be used in white wines to add a layer of body, enhance crispiness and brighten-up the finish making it last longer and therefore enhancing the characteristics of the wine.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over.

Dosage: 60-200 ppm or ½ to 1.5 lbs/1,000 gallons.

Available in 1 kg packets
TTB 27 CFR § 24.246

Protan Malbec

A proanthocyanidin sourced from extra ripe seeds of grapes, bringing the typical nuttiness that is normally extracted from the pips but without any bitterness nor green notes.

It can be used in reds when seeds are discarded in maceration because they haven't reached the phenolic maturity and the wine shows a "donut" structure, with a hole in the middle. In whites it brings some sharpness, which adds crispiness to otherwise dull wines.

Usage: mix well into 10 parts of wine or must and add to the tank with a venturi system.

Dosage: 30-60 ppm ¼-½ lbs per 1,000 Gallons in whites 200-400 ppm or 1.5-3 lbs/1,000 gallons in reds.

TTB 27 CFR § 24.246
Available in 500 g packets

Protan Pépin Oxilink

A tannin extracted from grape seeds which brings an old-world edge to the structure without adding to bitterness. It's ideal for reds meant to age and whenever winemakers feel that the wine needs some "European" character.

Thanks to its high affinity for combining aldehydes, Protan Pépin Oxilink is an ideal tool for aging wines in barrels or with micro-oxygenation.

Usage: mix well into 10 parts of wine or must and add to the tank with a venturi system.

Dosage: 30-60 ppm ¼-½ lbs per 1,000 Gallons in whites 200-400 ppm or 1.5-3 lbs/1,000 gallons in reds.

TTB 27 CFR § 24.246
Available in 500 grams packets

Protan Plus

A combination of wood derived proanthocyanidins and yeast mannoproteins, it adds to the volume of red wines and supports color stabilization. It should be added during the second part of fermentation or at the beginning of the aging process.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over or with a Venturi system.

Dosage: 200-400 ppm or 1.5-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 500 grams packets and 5 kg bags

Protan Raisin

Adding Protan Raisin to a red wine is like adding extra days of maceration on the skins. It's a tannin extracted from grape peels which brings the typical polymerized structure of the tannins naturally extracted from the skins. These contribute not only to the body but also to the color stabilization and overall polyphenolic polymerization.

Small additions to white and Rosé wines help with the mid palate as well as the complexity of the sip.

Usage: mix well into 10 parts of wine or must and add to the tank with a venturi system.

Dosage: 30-60 ppm ¼-½ lbs per 1,000 Gallons in whites 200-400 ppm or 1.5-3 lbs/1,000 gallons in reds.

TTB 27 CFR § 24.246
Available in 500 grams packets

Tanethyl

A seed derived proanthocyanin with an aldehydic bridge integrated in the structure which guarantees high reactivity for polymerization with anthocyanins and other polyphenols. This characteristic makes Tanethyl immediately available for the color to be locked and stabilized against the effects of Sulfur, pH changes, oxygen and aging in general.

Tanethyl is also recommended for wines in need of structure to polymerize as it can start the process without the oxygenation needed to form aldehydic bridges.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over or with a Venturi system.

Dosage: 200-400 ppm or 1.5-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 500 grams packets

Taniblanc Fresh

A blend of proanthocianins and gallic tannins to bring a refreshing edge to white wines. Taniblanc Fresh, allows maintaining the aromas fresh, reminiscent of eucalyptol, balsamic and spicy notes. Used during fermentation, it protects the citrus aromatic notes.

Usage: mix well into 10 parts of wine or must and add to the tank during a pump-over or with a Venturi system.

Dosage: 60-200 ppm ½ lb-1.5 lbs per 1,000 Gallons

TTB 27 CFR § 24.246
Available in 1 kg packets

Taniquerc

An Ellagic tannin which brings nuances of toasted oak to the wine and helps with aging by providing a substrate for the oxygen to interact with the wine and form ethanal bridges. Ethanal bridges are the link in the polymerization of phenolics, including tannin with tannin and color with tannin.

Usage: mix well into 10 parts of wine and add to the tank during a pump-over or with a Venturi system.

Dosage: 200-400 ppm or 1.5-3 lbs/1,000 gallons.

TTB 27 CFR § 24.246
Available in 1 kg packets and 5 kg bags

The Ellagitan Barrique Line:
American and French Oak derived tannins, in liquid and powdery forms, for fermentation, aging and fine tuning.

The different Ellagitan Barrique liquid products vary their aromatic profile depending both on the source of wood but also on the toasting levels.

More toasting in general decreases the Whiskey/Lactone compounds making the profile richer in toffee and toasted-wood aromas. In general, when using oak extracts, oak derivatives or barrels, French products contribute with more vanilla and more structure, resulting in a balanced extraction. American oak products contribute with more volatile phenols, like eugenol and guaiacol (spices/smoky) or aldehydes like furfural (almonds). Because these aromatic profiles are usually not supported by a good structuring tannin extraction, all Ellagitan Barrique line tannins are adjusted for a balanced structural content.

	MG/G	EB LIQUID	EB XO	EB FRUIT RESERVE	EB BERRY MIX	EB GOUD-RON
CARAMEL	Furfural	+++	–	+++	++	++++
	5-Methyl furfural	++	++++	+++	–	++
	2(5H)-furanon	+	++	++	+++	+
	5-Hydroxy methyl furfural	+++	++++	++++	++	+++
SYRUP	Coniferaldheyde	–	++++	++	–	–
TOASTED	Guaiacol	+++	+	+	++	++++
	Syringaldheyde	+++	++++	++	++	++++
SPICES CLOVES	Phenol	++	+	+	+++	++
	Eugenol	+	+	+	+	+
	Isoeugenol	+	+	+	–	–
	4-Vinyl guaiacol	+	++	++	–	–
COCONUT	cis-Whisky lacton	+	–	–	++	+++
	trans-Whisky lacton	++	+	+	+++	++++
VANILLA	Vanilin	+++	++	+	+++	++++
	Vanillic Acid	++++	++	+	–	–
	Acetovanillone	++++	+++	+++	–	–
	Homovanillic Acid	+++	+++	+++	++	++
FRUITY	2,Phenil-ethanol	–	–	+	+++	++++
	Ethyl-succinate	–	+	++	++++	++

Ellagitan Barrique Liquid

The most “French” of the five; with the most vanilla. Opens the fruit of the wine, enhancing the red and black berries. Also, it brings a peppercorn note to the spices in the bouquet.

Utilization: dilute in 10 parts of wine and add to fermentation or at any other stage. It is better to avoid additions 2 weeks before micro-filtration.

Dosage: consider this conversion factor to do additions: 10 ppm = 1g/hl = 0.083 lb./1,000 gallons = 0.85 ml/hl or 32 ml/1,000 gallons. According to our experience this tannin can be used on red wines up to 8.5 lbs./1,000 gallons (about 1,000 ppm). Average dosages range 120-720 ppm or 10-60 ml/hL (380-2,280 ml/1,000 gallons or 1-6 lbs/1000 gal). Minimum dosage for light nuances in reds is 120 ppm (1lb/1,000 gallons). Higher dosage will increase the impact. In whites it may be dosed at 30-120 ppm (1/4-1 lb./1,000 gallons).

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

A sediment will accumulate in the bottle, that’s normal and it could be partially dissolved in wine or hot water.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles, 10 kg pails

EB Berry Mix

It helps stabilizing the color but also introduces a soft note that brings structure and smoothness. In the nose, it enhances the sweet notes of the fruit and brings along a pleasant bouquet of spices and toasted oak.

Utilization: dilute in 10 parts of wine and add to fermentation or at any other stage. It is better to avoid additions 2 weeks before micro-filtration.

Dosage: consider this conversion factor to do additions: 10 ppm = 1g/hl = 0.083 lb./1,000 gallons = 0.85 ml/hl or 32 ml/1,000 gallons. Average dosages range 120-720 ppm or 10-60 ml/hL (380-2,280 ml/1,000 gallons or 1-6 lbs/1000 gal). Minimum dosage for light nuances in reds is 120 ppm (1lb/1,000 gallons). Higher dosage will increase the impact. In whites it may be dosed at 30-120 ppm (1/4-1 lb./1,000 gallons).

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

A sediment will accumulate in the bottle, that’s normal and it could be partially dissolved in wine or hot water.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles, 10 kg pails

EB Fruit Reserve

It has the least impact on the aromatics of the wine among the five liquid Ellagitan Barrique products, meaning that it marks less and should not be used to cover defects. It helps the wine to "take-off" with what the wine already has, enhancing the fruit and opening the bouquet. It also brings notes of almonds and caramel.

Utilization: dilute in 10 parts of wine and add to fermentation or at any other stage. It is better to avoid additions 2 weeks before micro-filtration.

Dosage: consider this conversion factor to do additions: 10 ppm = 1g/hl = 0.083 lb./1,000 gallons = 0.85 ml/hl or 32 ml/1,000 gallons. Average dosages range 120-720 ppm or 10-60 ml/hL (380-2,280 ml/1,000 gallons or 1-6 lbs/1000 gal). Minimum dosage for light nuances in reds is 120 ppm (1lb/1,000 gallons). Higher dosage will increase the impact. In whites it may be dosed at 30-120 ppm (1/4-1 lb./1,000 gallons).

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

A sediment will accumulate in the bottle, that's normal and it could be partially dissolved in wine or hot water.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles, 10 kg pails

EB Goud-Ron

It helps stabilizing the color, but also introduces a soft note that brings along structure and smoothness. In the nose, it shows notes of "goudron" (tar), a typical descriptor of old world wines, reminiscent of the ones found in the great reds from Rhône and Piedmont.

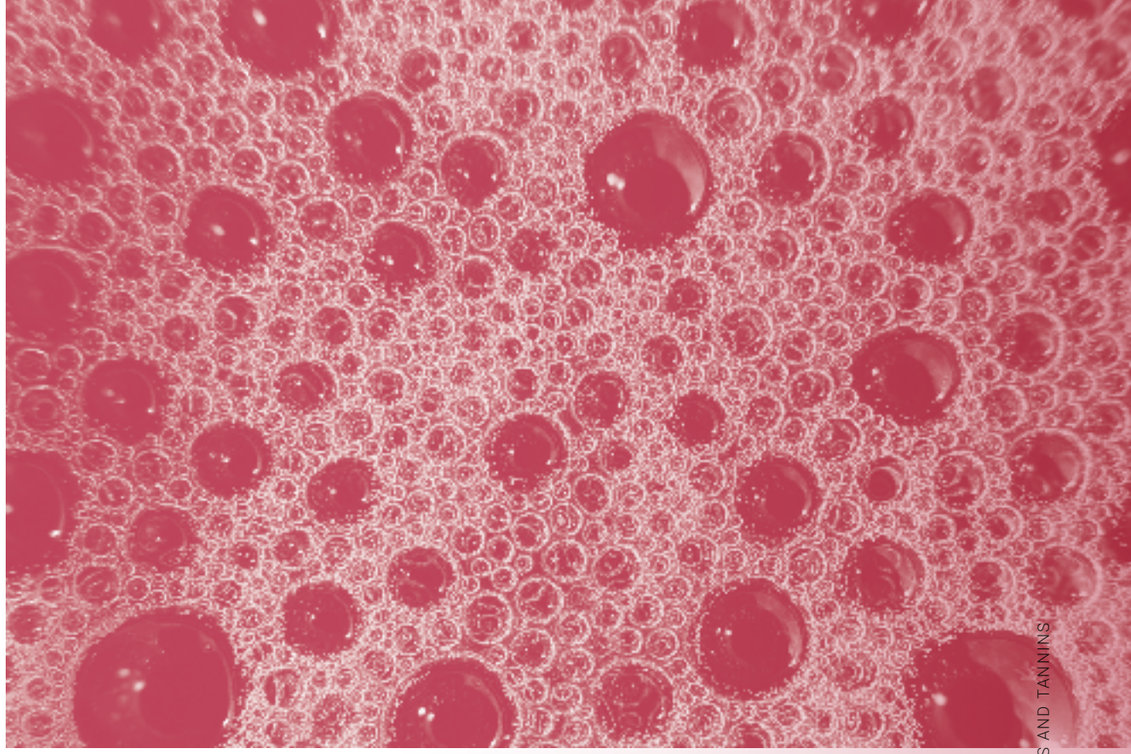
Utilization: dilute in 10 parts of wine and add to fermentation or at any other stage. It is better to avoid additions 2 weeks before micro-filtration.

Dosage: consider this conversion factor to do additions: 10 ppm = 1g/hl = 0.083 lb./1,000 gallons = 0.85 ml/hl or 32 ml/1,000 gallons. Average dosages range 120-720 ppm or 10-60 ml/hL (380-2,280 ml/1,000 gallons or 1-6 lbs/1000 gal). Minimum dosage for light nuances in reds is 120 ppm (1lb/1,000 gallons). Higher dosage will increase the impact. In whites it may be dosed at 30-120 ppm (1/4-1 lb./1,000 gallons).

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

A sediment will accumulate in the bottle, that's normal and it could be partially dissolved in wine or hot water.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles, 10 kg pails



EB XO

The most noticeable in the nose among the five liquid Ellagitan Barrique products. It gives a smoky/toasted note that works great for wines where we want to enhance the spices, chocolate, leather and earthy sensations. Not recommended in smoke tainted or Brett-affected wines, it helps hiding most other defects, like burnt rubber or methoxypyrazines.

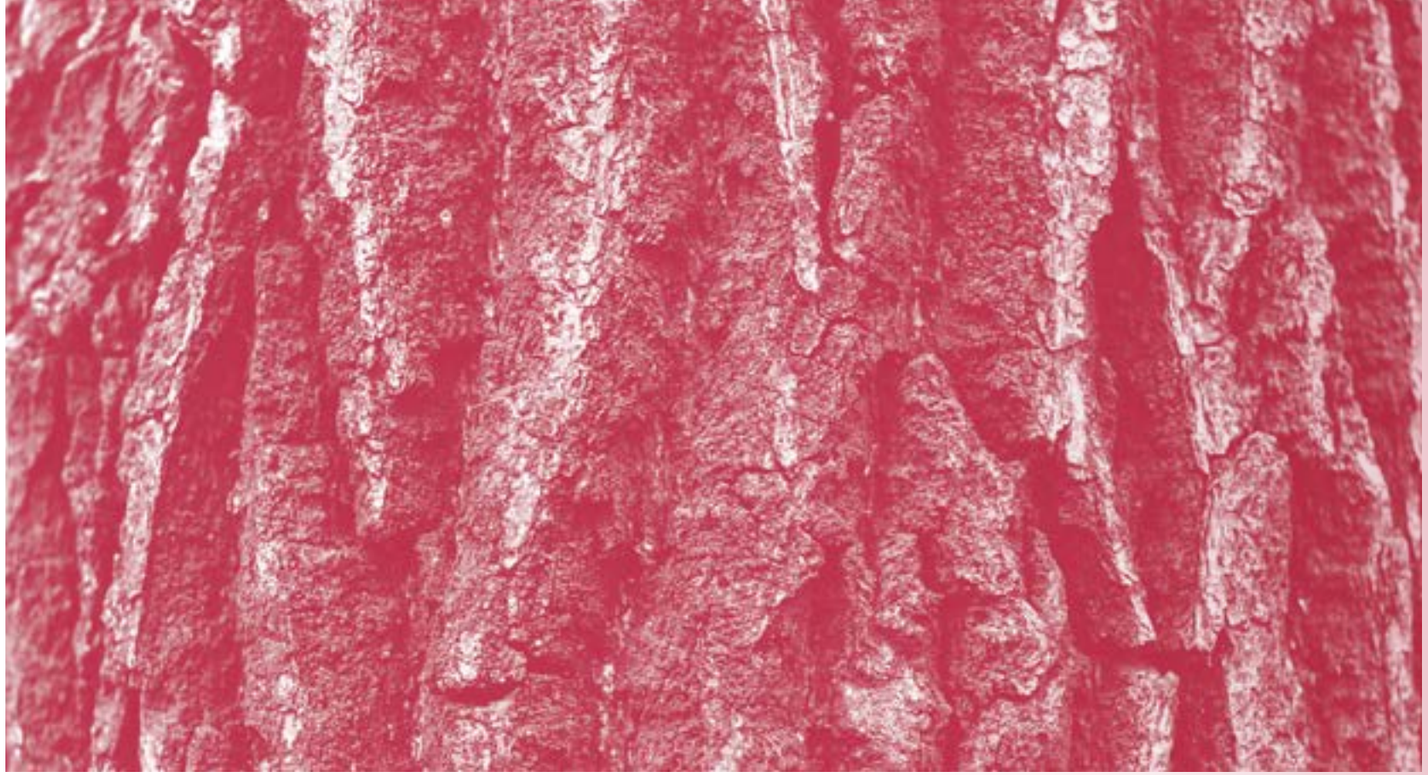
Utilization: dilute in 10 parts of wine and add to fermentation or at any other stage. It is better to avoid additions 2 weeks before micro-filtration.

Dosage: consider this conversion factor to do additions: 10 ppm = 1g/hl = 0.083 lb./1,000 gallons = 0.85 ml/hl or 32 ml/1,000 gallons. Average dosages range 120-720 ppm or 10-60 ml/hL (380-2,280 ml/1,000 gallons or 1-6 lbs./1000 gal). Minimum dosage for light nuances in reds is 120 ppm (1lb/1,000 gallons). Higher dosage will increase the impact. In whites it may be dosed at 30-120 ppm (1/4-1 lb./1,000 gallons).

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

A sediment will accumulate in the bottle, that's normal and it could be partially dissolved in wine or hot water.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles, 10 kg pails



Ellagitan Barrique Rouge prolongs the aromatic persistency, improves the mellowness of wines and integrates their aromatic complexity with delicate nuances reminiscent of chocolate and vanilla.

Ellagitan Barrique Rouge

This granulated tannin is extracted from highly toasted oak wood. The seasoning process exceeds two years and is identical to the technique used when producing the most prized barrels. The innovative physical system used for extracting this ellagic tannins, hydrolyzes and then precipitates the other bitter substances. Added polysaccharidic micro-molecules encapsulate the aromatic properties of toasted oak, preventing their dissipation during spray drying. Ellagitan Barrique Rouge prolongs the aromatic persistency, improves the mellowness of wines and integrates their aromatic complexity with delicate nuances reminiscent of chocolate and vanilla. Ellagitan Barrique Rouge can also be used to extend the life of used barrels. It offers numerous advantages over other oak alternatives: it is immediately soluble, does not release undesirable substances, such as resins or bitter compounds, and inhibits bacteria or mold contamination reducing the need for SO_2. Furthermore, there is no color or wine loss due to wood absorption.

Directions for use: Re-hydrate in warm water (35°C/95°F) or wine, for at least ½ h before mixing. Then make a slurry 1:10 in wine and add directly to circulating tank or barrel. Allow at least a week before filtering.

Dosage: Minimum dosage for light nuances in reds is 100 ppm (0.8 lb./1,000 gallons). Higher dosage will increase the impact. In whites it may be dosed at 30-120 ppm (1/4-1 lb./1,000 gallons).

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

Packaging: 500 grams and 10 kg bags

Contains product/s that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

Ellagitan Barrique Blanc

Colorless version of the Ellagitan Barrique Rouge. Extracted from French oak staves. Will have minor effects on the color. Ellagitan Barrique Blanc is used to highlight the varietal aromas of white and rosé wines. It is also used successfully on Craft Ciders. It has a soft velvety taste and carries antioxidant properties, which preserve varietal aromas, and develop bouquet complexity by regulating the redox potential during the fermentation and post-fermentation stages. It inhibits bacteria or mold contamination reducing the need for SO_2. It is recommended for those wines that have had a prolonged cold skin-contact maceration, which are often rich in polyphenols and tend to brown. Wines treated with Ellagitan Barrique Blanc are intense and complex to the nose, due to the synergy of the tannin with primary fermentation aromas. Wines will result fresher and lively to the palate, free of unpleasant bitterness and rich in body, like after oak barrel-aging.

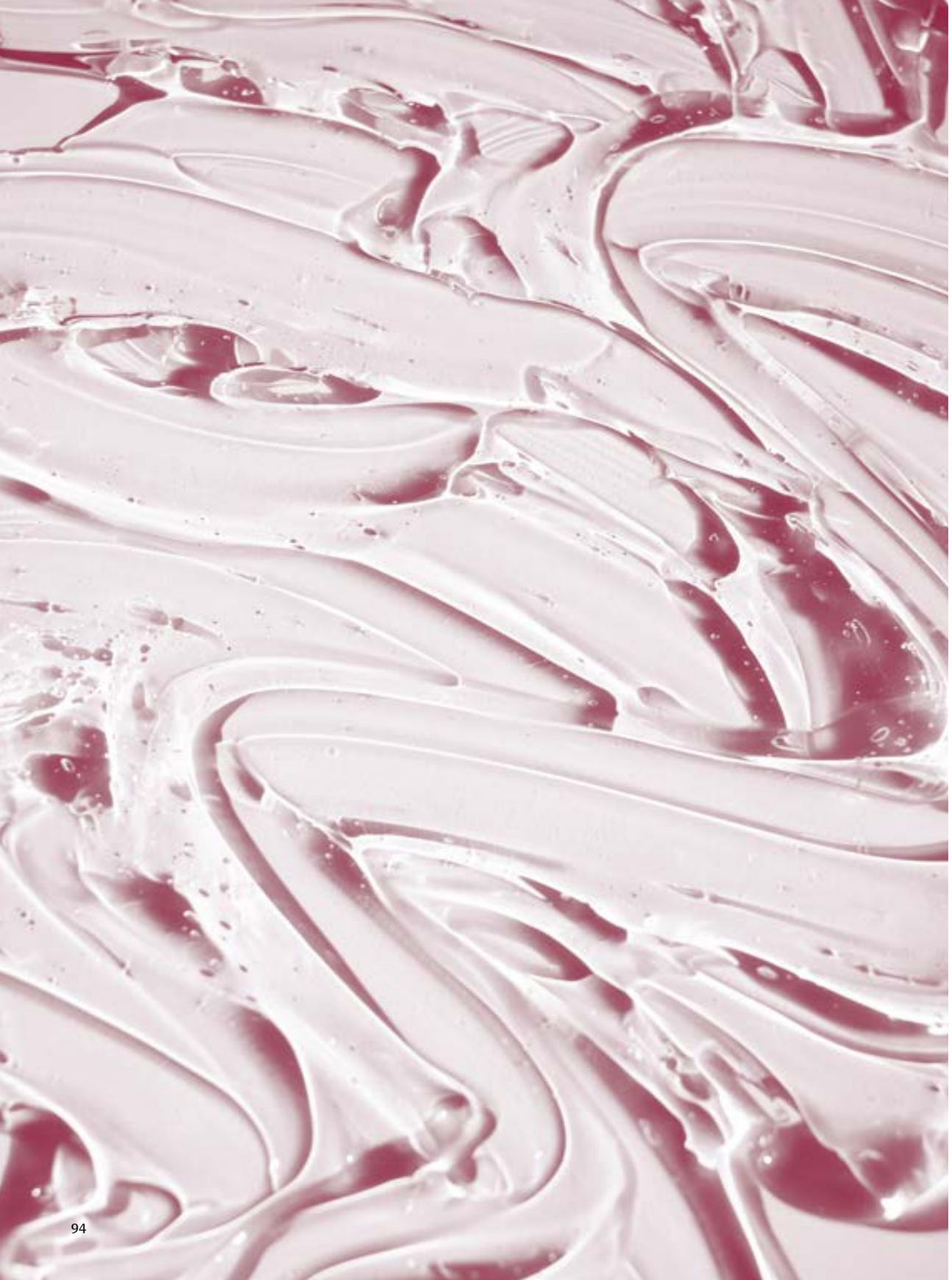
Directions for use: re-hydrate in warm water (35°C/95°F) or wine, for at least ½ h before mixing. Then make a slurry 1:10 in wine and add it directly to circulating tank or barrel. Allow at least a week before filtering.

Dosage in white wines: 6- 50 g/hL-1/2-4 lbs./1000 gal.

Shelf life and storage: can be kept for three years in the original sealed packaging away from light, and in a cool, dry, odor-free place.

Packaging: 500 grams packets

Contains product/s that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117



STABILIZERS & FINING AGENTS

06

Stabilizers summary chart

STABILIZING AGENTS				
FINING/STABILIZING ACTION	MEAN	ACTIVE INGREDIENT	COMMERCIAL NAME	EU LABELING REQUIREMENT
COLD STABILITY (STABILIZATION OF TARTRATES)	By avoiding growth of the crystals using a polysaccharide that can coat them.	Metatartaric acid	Cremor stop extra	Yes
	By accelerating formation and precipitation of tartrates in tank.	Carboxymethyl Cellulose	New–Cel 17	Yes
	By removing potassium to avoid formation of potassium tartrates.	Cream of tartar in a proprietary blend	Crystalflash	No
	By removing potassium to avoid formation of potassium tartrates.	Ion Exchange	Stabymatic	No
MICROBIOLOGICAL CONTROL	By killing gram positive lactic bacteria	Lisozyme	Lysocid	Yes
	By killing aerobic microorganisms forming film on top of partial vessels	Allyl isothiocyanate	Steryl	No
	By killing yeast and inhibiting bacteria	Sorbate, Fumaric & KMS	Microcid F	Yes
	By inhibiting yeast and bacteria	Chitosan and fumaric based products	Chitocel Chito-F Protect-F	Yes if containing Fumaric Acid
	By inhibiting yeast and bacteria on grapes	KMS and Ascorbic mixed with dispersion agent (perlite)	Aromax B4	No
TO CLEAN THE WINE FROM REDUCTIVE AROMAS	By catalyzing oxygen activity	liquid copper sulphate	Desulfin	No
TO DROP ACIDITY	By dropping tartaric acid	Potassium bicarbonate in proprietary blend	Deacid	No
BRETT AND SMOKE TAINT CONTROL	By adsorbing volatile phenols like 4-ethylphenol/guaiacol, guaiacol and 4-methylguaiacol	adsorbing media derived from saccharomyces cerevisiae	Antibrett 2.0	No
	By killing Brettanomyces and adsorbing odors	Chitosan and adsorbing media derived from saccharomyces cerevisiae	Chitocel	No
LEES COMPACTION	By binding proteins like gelatin, albumin and casein	Silica	Spindasol	No

Stabilization and fining start at the must level with must clarification with gelatin, casein, pvpp, and other compounds that are positively charged at wine's pH.

Proteins can be removed at this stage with Bentonite, color may be fine-tuned with carbon and tannins, tartrates stabilized with ion exchanging through the Stabymatic described in the equipment chapter. More modern technologies like Chitocel based technologies can also help with microbiological control and fining varous compounds including heavy metals. In the finished wine these treatments can be fine-tuned if needed.

Must protection

Aromax

Ascorbic Acid and Potassium Metabisulfite immobilized on an inert substrate for easy dispersion on grapes and juice, to protect the fruit during machine harvesting or grapes transportation. It optimizes anti-oxidation and antiseptic protection. The perlite used to immobilize the ascorbic acid and the potassium metabisulfite floats, only releasing the components when in contact with the juice. In this way it forms a protective layer on the surface of broken berries, juice in the gondolas, or holding tanks.

Utilization: Disperse the powder on the bins, boxes, trucks, and conveyers or at any stage that needs antioxidant protection for the juice.

Use at 0.5-1 kg/Ton. (1 Kg/Ton will release 54 ppm of SO_2 and 60-70 ppm ascorbic).

Shelf life and storage: 2 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 5kg bags

Tartaric Stability and De-acidification

Crystalflash

Potassium Bicarbonate, Tartaric Acid and Neutral Potassium Tartrate, plus Bentonite, for optimized tartrates seeding and settling. It accelerates the crystallization of tartaric acid salts, potassium bitartrate and neutral calcium tartrate, in wines during refrigeration (around freezing temperature). Potassium Bicarbonate in the formulation instantly forms a very thick cloud of rising micro-crystals, facilitating the first and more delicate stage of the nucleation process.

Thanks to its balanced and exclusive formulation, Crystalflash eliminates the occurrence of oxidative phenomena in the wines going through cold stabilization. Also, Crystalflash shortens the cold holding time in a tank to a very short period, usually between 3 and 5 days.

Dosage: 20 and 40 g/hL
(1,5-2,5 lbs./1,000 Gallons).

Crystalflash composition:

- Potassium Bicarbonate 40%: helping to disperse the product, also crystalizes tartrates helping precipitation
- Cream of tartar: 30% helps with nucleation
- Bentonite 15%: helps settling
- Potassium tartrate (tartaric Acid) 10%: works in Synergy with Cream of Tartar to speed up nucleation and balances acidity
- Cellulose 5%: to help with dispersion

Shelf-life and storage: 4 years stored at room temperature in a non-humid environment.

Packaging: 1 kg packets

Deacid

A formulation of potassium bicarbonate and neutral potassium tartrate salts, both highly soluble, able to induce a decrease in the total acidity with neutralization reactions and a subsequent complete and quick precipitation of the salts. The wine acid profile is thus modulated, and the aromatic structure is not damaged.

The total acidity diminishes, and the pH will rise proportionally to the quantity of product applied. Deacid contributes to equilibrate the full body expression in all wines, eliminating green and aggressive notes, keeping the right freshness in whites and rounding excessively acid notes in red wines.

Utilization: add directly to the must or wine, little by little, by pumping over in order to avoid an excessive localized (but temporary) deacidification of a small amount of product.

If used in solution, dissolve it in water. Pay attention to the development of CO_2 and the consequent increase in wine volume.

Dosage: 130 g/hL are required to lower the total acidity of 1 g/L (i.e. 1‰ in tartaric acid and 0,72‰ in sulfuric acid). For higher additions, we recommend a preliminary laboratory trial.

Shelf life and storage: 2 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 5 and 25 kg bags

Redox Adjustment

New-Cel & New-Cel +17

(concentrated version)

Sodium carboxymethyl cellulose to stabilize wine by preventing tartrate precipitation, New-Cel is a colloidal protector that wraps the tartrates crystal structure with a protective film and deforms them making their growth impossible. Studies have demonstrated the savings when using this technology instead of the traditional cold stabilization.

CMC is negatively charged so it will bind molecules like proteins (but also unstable color in reds). If the wine is perfectly protein/color stable there will be no problem, but if is borderline, CMC will cause haze that needs to be filtered. We therefore recommend checking protein stability after CMC addition on a sample and make sure protein haze doesn't develop. It can be used in sparkling wines by adding it a few days before the riddling agents or in the liqueur d'expédition at the dégorgement.

Utilization: Directly dissolve the solution into the wine 48 hours before bottling or before crossflow or final filtration. Wines must be brought at 16°C-64°F for 8 hours for CMC to dissolve. Wines must be protein stable and with turbidity <1 NTU. In reds CMC may interact with unstable color making it precipitate. Stabilize the color with tannins, MOX or Arabinol Super Rouge, prior to CMC addition in red wines.

Dosage: 100-150g/hL or 8/12 lbs/1,000 Gallons for New-Cel, 12-60 g/hl or 1-5 lbs/1,000 Gallons for New-Cel +17

Shelf life and storage: 1 year at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 1 kg bottles and 25 kg pails

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117

Desulfin

Stabilized liquid copper sulfate to remove H_2S and reductive odors in general. If wines show a bouquet that seems to be too "closed" or affected by reductive odors, try adding a drop of Desulfin in the glass. If the wine changes positively, the wine is most likely reduced by H_2S or mercaptans and can be treated with an adequate addition of Desulfin.

If the problem is with mercaptans, do not aerate. Mercaptans can be removed to some extent with appropriate Desulfin additions (about twice the amount needed for H_2S removal). The reaction forms an insoluble Cu-mercaptide salt that can be filtered out of the wine.

If the problem are DMDS or DEDS, we need to convert them back to mercaptans with approximately 500 ppm of ascorbic. This can take up to 60 days. After that we can use Desulfin.

Utilization: preliminary H_2S tests should be conducted. Add Desulfin directly to the affected product and circulate in an open environment.

Keep in mind that, according to TTB, the quantity of copper sulfate added (calculated as copper) must not exceed 6 parts copper per million parts of wine (6.0 mg/L). The residual level of copper in the finished wine must not exceed 1 part per million (1 mg/L).

The addition of 10 ml/Hl of Desulfin provides 0.25 mg/l of copper therefore the max addition rate of Desulfin is 40 ml/Hl (assuming that there is no copper in the wine already).

Bench trialing Desulfin: adding an average drop size (0.05 ml) into 1 liter equals to a Desulfin addition of 50 ppm. Average dosage is 100 ppm.

Shelf life and storage: Sealed containers will last for 2 years stored at room temperature in a non-humid environment. Temperature should not fall under 5°C/41°F.

Packaging: 1 kg bottles

Microbiological Stabilization

Antibrett 2.0

An innovative product based on yeast hulls, ß-glucanase enzyme and fungal Chitosan. Its components are particularly active in inhibiting the action against Brettanomyces yeasts; they also have high adsorbing properties against 4-ethylphenol and 4-ethylguaiacol, compounds which can give wines unpleasant smells of horse sweat and medicine. The production system used to obtain these hulls is aimed at degrading only the yeast cell walls, chitin in particular, safeguarding the structure of the cytoplasmic membrane, which has a high specific adsorbing capacity. The use of free sulphur dioxide, at least 25 mg/L, supports the antiseptic action against Brettanomyces. Antibrett 2.0 can be used both as a curative and preventive product: Brettanomyces, in fact, has very long incubation times (3-8 months), during which no abnormal smells appear. Antibrett 2.0 is also used in wines at the end of fermentation. Antibrett 2.0 is also effective against other anomalous odors, such as those of smoke, dirty barrels and molds.

TTB 27 CFR § 24.246
Packaging: 500 grams cans

Steryl

Practical tool to protect wine with headspace from *Pichia membranaefacens* and aerobic spoilage.

These anti-flor tablets consist of an inert pure paraffin support in which a natural form of mustard oil has been dissolved. Mustard oil is a volatile substance with high antiseptic properties especially with regard to aerobic microorganisms.

The microorganisms responsible for the formation of white film on the surface of wines stored in partially full containers belong to the specie *Pichia*, *Hansenula* and *Candida*. These are yeasts with a prevalently oxidative metabolism and almost free from fermentative activity. In addition to this alteration, a loss of alcoholic content takes place as well as the formation of acetaldehyde, which gives a vinegary smell to the contaminated wines.

By floating on the surface of the liquid, Steryl tablets slowly release the Allyl isosulphocyanate, which sterilizes the air above it. As a result, the development of the film is inhibited together with other oxidation related bacterial and enzymatic surface alterations.

Dosage: Use one or two tablets of the adequate size and replace it every 15 days. Let it just float on the surface.

Storage: Store in a cool dry place, away from direct sunlight and heat.

Packaging:
Vasche (tanks): 1 carton containing 50 sachets, each sachet contains 1 tablet of 20 g each.
Fusti (barrels): 1 carton containing 40 sachets, each sachet contains 2 tablets of 7 g each.
Damigiane (carboys): 1 carton containing 50 sachets, each sachet contains 12 tablets of 1g each.

Not legal for US commercial wineries.

Microbiological control and heavy metals fining: Chitosan based products

Chitosan is a natural derivative of fungal origin, which is obtained starting from the partial deacetylation of chitin (a polysaccharide that AEB sources from *Aspergillus Niger*), in an alkaline environment. It's main activities in wine are:

Fining
- By reducing or eliminating heavy metal content, notably Calcium, Iron, lead and Copper.
- By reducing or eliminating possible contaminants, especially ochratoxin A.

Microbiological control
- By reducing or eliminating undesirable micro-organisms, notably Brettanomyces.

Its particular type of charged structure, makes Chitosan functional to the disintegration of the membranes of bacteria and yeasts. In fact, one of the mechanisms by which Chitosan acts results from the fact that the outside of the cell wall, bacteria are negatively charged and being Chitocel positively charged it will attach to them. On the other hand, yeasts do not have an obvious negative charge, but it is thought that they incorporate chitosan into their own wall during growth, thus leading to wall disintegration. An alternative mechanism in which Chitocel inhibits these microorganisms can be traced back to the binding of chitosan to microbial DNA, which would effectively block DNA transcription and replication.

AEB Chitosan based products

NAME	COMPOSIT.	APP.	BACTERIA		BRETT.	YEAST NS/ MOLDS	ACTIVITY DELAY ACTIVITY DELAY	EXTRA	SOST SO_2	DOSE/HL
			G+	G–						
CHITOCEL	Chitosan, yeast hulls	beginning AF /end AF	++	++	+++	++ NS	>8day	Adsorbent	+	3-30g/hL
CHITOCEL MUST	Chitosan, yeast hulls and autolysates, Gallic tannins and Acacia	beginning AF /FA	+	+	++	+NS +molds	>8day	Antiox	+++	15-40g/hL
CHITOCEL RED	Chitosan, yeast hulls and autolysates, Acacia and quebracho tannins	beginning AF /end AF	+	+	++	+NS +molds	>8day	Antiox	+++	15-60g/hL
ANTIBRETT 2.0	Yeast hulls , chitosan, ß-glucanase	beginning AF /end AF	++	++	++	++NS ++molds	>4–8day	ß-glucanase	+	5-25g/hL
CHITO–F	Chitosan, fumaric acid	End AF	+++	+	++	+NS	>2day	Antibacteric Acidyfier	++	30-75g/hL

Chitocel

Is a product based on Chitosan, a natural polysaccharide of fungal origin (derived from *Aspergillus niger*), biodegradable and non-allergenic, that allows to reduce and, in some cases, to eliminate, the unwanted microbial population in wine. Chitocel is active against acetic and lactic bacteria, yeasts in general and specifically on *Brettanomyces bruxellensis*. Its action is mostly "physical" as there seems to be an electrostatic interaction between the membranes of the microorganisms and Chitocel, that would induce a strong disturbance in the permeability of the membrane of the *Brettanomyces*. This ultimately ends up forming a large floccule and can be eliminated by racking or filtration. It's still possible to detect live cells of Brettanomyces after the treatment with Chitocel, but these cells are for the most part critically damaged and incapable of reproducing or to form volatile phenols (false positives). Thanks to the synergy with yeast hulls (deodorizing media), Chitocel reduces the content of 4-ethylguaiacol, 4-ethylphenol and contaminants such as ochratoxin A. Also, the use of Chitocel allows to reduce the content of heavy metals such as iron, lead, calcium, copper, thus preventing the Iron and the Copper casse and alleviate Calcium instability.

Utilization: dilute 1:10 in must or wine and add to mass making sure to homogenize well. Leave it in the media for at least 10 days before filtering or racking.

Dosage: 120-180 ppm (1-1.5 lbs./1,000 gallons)

TTB 27 CFR § 24.246
Packaging: 250 grams

Chitocel Red

Is a product based on chitosan, proanthocyanidin tannins and yeast hulls. It helps to reduce the content of heavy metals such as Calcium, Iron and Copper, and additionally reduces potential contaminants such as ochratoxin due to its synergy with yeast hulls and tannins. During the early stages of fermentation, it helps to stabilize the color, protects from oxidation and controls spoilage microorganisms. During fermentation it creates a shield against bacteria or other contaminations. At the end of the fermentation process it will protect the wine during aging.

Chitosan is a valuable support to facilitate the racking and clarification of musts, it also has an important antiseptic action by inhibiting microbiological activity making it an excellent alternative to SO_2.

Dosage: In musts, mainly in maceration. 1-5 lbs/1,000 gallons as appropriate.

Utilization: dissolve the dose in the must and add it to the mass during pump-over.

Storage: store in a cool, dry place away from direct light and heat.

TTB 27 CFR § 24.246
Packaging: 1 kg net packets

Chitocel Must

Is a preparation of chitosan, gallic and proanthocyanidin tannins, yeast hulls and autolysates with naturally occurring glutathione for white wine. Due to its antimicrobial action, it is an excellent alternative to SO_2, while the glutathione assists in antioxidant protection.

It is very useful at the early stages of fermentation however, thanks to the antioxidants components, it is a safe adjunct also at the end.

Dosage: in musts, mainly in the early stages of fermentation 1-3 lbs/1,000 gallons as appropriate.

Utilization: dissolve the dose in the must and add it to the mass.

Storage: store in a cool, dry place away from direct light and heat.

TTB 27 CFR § 24.246
Packaging: 1 kg net packets.

Lysocid W

Lysozyme enzyme naturally obtained from selected egg albumin, which has the capacity to breakdown the cell walls of gram-positive bacteria such as *Oenococcus*, *Pediococcus* and *LactobacillIus*. It is not effective against gram-negative bacteria like *Acetobacter* and has no effect on yeast.

Utilization: dissolve Lysocid W 1:10 ratio in water, juice or wine and add uniformly to musts or wines. Do not treat with bentonite or other fining agents for 24 hours after addition to avoid inactivation of the enzyme.

Dosage: to prevent Lactobacillus in grapes: 10-25g/hL (1-2 lbs./1000 Gal). To stabilize Lactobacillus during slow or stuck fermentation: 25-40 g/hL (2-3 lbs./1000 Gal).

Shelf life and storage: 2 years stored in cold temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 1kg packs

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117 (Lysozyme).

Microcid F

Due to its potassium sorbate content, it helps preventing re-fermentation of wines containing residual sugars. Thanks to the presence of Fumaric acid, Microcid-F helps controlling the lactic acid bacteria species that convert sorbic acid into 2-ethoxyhexa-3,5- diene, a molecule that can be traced back to the geranium aroma.

Utilization: dissolve in about 10 parts of warm water and add uniformly to the clarified and filtered mass.

Dosage: 25-60 g/hL (2-5 lbs./1000 Gal)

Shelf life and storage: 2 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 1 kg packets

Product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117 (Potassium sorbate, Fumaric acid, Potassium Metabisulphate, Ascorbic Acid).

Fining agents summary chart

FINING AGENTS				
PRODUCT	COMPOSITION	ACTIVITY	VEGAN	EU LABELING REQUIREMENT
BENTOGRAN	Na-Bentonite	Eliminates unstable proteins	Yes	No
CATALASI	Bentonite, Calcium Caseinate, gelatin, ascorbic acid, KMS	Reduces oxidized phenolics	No	Yes
CATALASI AF PLUS	Bentonite, isinglass, pork gelatine, PVPP, silica gel	Absorbs oxydized and astringent tannins, removes excessive proteins, compacts lees, adsorbs odors	No	No
CARBOSIL	Liquid solution of decolorizing carbon and silica	Removes color and helps settling during must fining or fermentation	Yes	No
CATALASI VEGA	Bentonite, pea proteins, PVPP, Silica gel	Prevents pinking, oxidation and protein haze	Yes	No
DECORAN GRAN	Pelletized carbon	Removes color	Yes	No
GELSOL	Hydrolized liquid gelatin	Removes solids in must fining	No	No
MICROCEL	Bentonite, potassium caseinate, cellulose	Absorbs oxydized and astringent tannins, removes excessive proteins, compacts lees	No	No
MICROCEL AF	Bentonite, PVPP, cellulose	Absorbs oxydized and astringent tannins, removes excessive proteins, compacts lees	Yes	No
QUICKGEL AF	Pork gelatin and yeast derived proteins	Smooths edged in finished red wines	No	No
SPINDASOL	30% Silica solution	Mostly used to compact lees especially during must fining.	Yes	No
VEGA GEL	Pea proteins	Mostly used in must fining to substitute pork gelatin	Yes	No

Proteins and phenolics stabilization

Bentogran

VEGAN FRIENDLY

A pharmaceutical grade Na-bentonite for protein removal with low impact on the wine aromatics. The active surface of Bentogran will be 3-4 times larger if compared to a regular bentonite. This characteristic will yield larger sized floccules with a higher clarifying power. Ultimately, by using less Bentonite-slurry in the fining process, less water will be added to the wine. Bentogran is granulated and doesn't contain fine powder which are hazardous to the respiratory system. Bentogran is soluble-calcium free, soluble-sodium free, soluble-phosphates free, soluble-metals free, and arsenate-free. Free from dust, sand, and organic matters.

Utilization: rehydrate Bentogran for 20 minutes in 15-20 parts of cold or warm water (warm being more effective and faster than cold) before usage. Because of its high swelling power, Bentogran will increase its size 20 folds. To match this potential, it needs to be re-hydrated in a larger volume of water compared to other bentonites. When re-hydrating Bentogran, try not to use wine or hard water unless you don't want to use too much water. In any case try to use water/wine for 20 times the volume of Bentogran to maximize the swelling.

Dosage: 12-50 g/hL (1-4 lbs./1000 Gal).

Shelf life and storage: 4 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246

Packaging: 1kg packs & 25 kg bags

Carbosil

VEGAN FRIENDLY

A liquid clarifier based on silica and decolorizing carbon. It allows a quick andefficient color removal in both musts and wines. Carbon is hydrated and in liquid form, so the product is safe and practical to use. It is highly recommended on musts of Pinot Grigio or those obtained from over-ripe grapes. It will yield a clear must/wine, with no trace of carbon and with a compact sediment.

Utilization: It may be used in cold settling along with Gelsol for must clarification or added during fermentation to reduce color. Mix Carbosil in must/wine using a Venturi or by pumping over. Dose the product either diluted 1:1 with water or full strength.

For solids and color fining: in musts, add Carbosil before adding gelatin. In wines, do the opposite, wait at least 1/2 hour after the clarifier (albumin, gelatin, casein) is fully homogenized and then add Carbosil and mix.

Dosage: It always depends on the wine or must to be treated, and trials are recommended.

As a rule of thumb, if used in combination with gelatin, Carbosil needs to be added at 5 to 10 times the amount of Gelsol used. When used as color remover during fermentation, rates of addition are between 250-600 ppm equal to 25-60 grams/hl or 2-5 lb./1,000 gallons. In liquid unit of measures, it would be 790-1,900 ml of Carbosil per 1,000 gallons.

Shelf life and storage: sealed containers will last for 2 years stored at room temperature in a non-humid environment. Do not store below 5 degrees Celsius.

TTB 27 CFR § 24.246
Packaging: 25 kg pails

Catalasi

Blended products to cure oxidized wines or to add “freshness” to fermenting musts. Used in fermentation it also helps preventing “pinking”. It contains a balanced amount of Bentonite, caseinate, gelatin, L-ascorbic acid and potassium metabisulfite. It partially cures or prevents darkening of white wines, the occurrence of “brick” hues in rosé, and yellow hues in red wines. The potassium caseinate present in Catalasi highlights the original aromas and color, reducing the level of polyphenols and oxidized polymerized components. It also contains a strong antioxidant (vitamin C) and a calibrated dose of SO_2 important to neutralize eventual peroxides produced by the oxidation of vitamin C.

Utilization: Dissolve the dose of Catalasi in about 5 parts of cold water. Wait 15 minutes before use. Add quickly to mass with maximum turbulence in order to disperse before flocculation of the bentonite with the caseinate occurs.

Dosage: 200/500 ppm (20-50g/hL or 1.5-4 lbs./1000 Gal). 100 ppm or 0.8 lb./1,000 gallons of Catalasi, yield 5ppm of SO_2

Shelf life and storage: 2 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 1kg pack and 20 kg bags

Contains Potassium Metabisulphite and Ascorbic acid, if used for fining before bottling this is a product that will need to be listed on the QR code of the wines sold in the EU in accordance with Regulation (EU) 2021/2117.

Catalasi AF Plus

A mix of clarifiers (Bentonite, isinglass, pork/fish gelatin, PVPP and silica gel) that selectively removes green and bitter catechins from red, rosé and white wines and cures light off-flavors. The variety of agents that formulates Catalasi AF Plus, will give a balanced fining process, without the classic albumin and caseinate allergenic agents. It can be used in reds and whites for removal of bitterness and odd flavors deriving from reductive phenolics. Ideal also to ferment on for Pinot Grigio or in general for white and rosé wines with high phenolics.

Utilization: Dissolve Catalasi AF Plus in about 5 parts of cold water. Wait 10 minutes, mix and quickly add suspension to mass with turbulence (Venturi or pump).

Dosage: 200/500 ppm (20-50 g/hL or 1.5-4 lbs./1000 Gal).

Shelf life and Storage: 2 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 1kg packet and 20 kg bags

Catalasi Vega

VEGAN FRIENDLY

Is a vegan complex clarifier for the cleaning and stabilization of musts and wines. The presence of vegetable proteins, PVPP, silica and activated Bentonite, guarantees the cleaning and stabilization of the treated products with just one operation.

Catalasi Vega is active towards the oxidized phenolic substances giving the wine brown colors and bitter taste scents. It also improves protein stabilization and brightness thanks to the perfect removal of the finest turbidity particles. The treated wines are therefore fresher and franker; they fully express the varietal character and are stable over time.

Dosage: musts, from 50 to 100 g/hL (4-8 lbs/1,000 gallons). White, red and rosé wines: from 20 to 60 g/hL (1.5-4.5 lbs/1,000 gallons).

Utilization: dissolve the dose of Catalasi Vega in cold water at the ratio 1:15, vigorously mix the solution and then add slowly to the wine.

Shelf life and Storage: 2 years stored at room temperature in a non-humid environment.

Packaging: 10 kg net bags

Gelsol

A liquid pork gelatin produced by a process of irreversible hydrolyzation, that helps to maintain a constantly stable liquid product. The clarifying effect achieved through instantaneous flocculation results in the formation of large, heavy macro-coagula. Sediments are compact and easily filtered out. It is used alone or in conjunction with Spindasol in order to clarify white musts both in cold settling and flotation.

In reds it helps the wines to be softer and less susceptible to oxidation, Gelsol in facts removes small, condensed tannins, which give most of the bitterness-astringency to wines. Gelsol has little affinity with anthocyanins; therefore, it is ideal for red wines because it does not cause any loss of color intensity.

Is a liquid gelatin, prepared enzymatically, without the use of heat. This difference makes Gelsol more active if compared with dry products where the use of high temperatures, partially denatures proteins making them less efficient.

Gelsol never sees the solid phase, and not only does this make it more efficient, but it also prevents re-condensation and the formation of "footballs" or "pyramids" inside the tank.

Utilization: Dilute in 1 to 3 parts of water before adding it to the wine, must or flotation equipment. In musts, add Spindasol or Carbosil before adding Gelsol. In wines, wait at least one hour after Gelsol is fully homogenized, and then add Carbosil or Spindasol and mix.

Dosage: It always depends on the wine or must to be treated, and trials are recommended.

Consider a specific weight of 1.2. For must clarification in combination with Spindasol, do trials starting from 60 ppm or 6 g/hL (1/2 pound/1,000 Gal) of Gelsol and compact with 5 to 10 parts of Spindasol or Carbosil (specific weight of 1.15).

For both rosè and red wines fining trials, start from 30 ppm of Gelsol. Dosages of Spindasol in these cases are only 3-4 times the amount of Gelsol used.

For must clarification (with Spindasol): begin trials at 5 ml/hL of Gelsol and settle with Spindasol at 5-10 X the weight of Gelsol.

Shelf life and storage: sealed containers will last for 2 years stored at room temperature in a non-humid environment. Do not store below 5 degrees Celsius.

TTB 27 CFR § 24.246
Packaging: 25 kg pails, 250 kg drums, and 1200 kg totes

Microcel

A complex clarifier to be added to white musts when they start fermenting, it diminishes the concentration of phenolics and proteins in the finished wines. It is also ideal to minimize the damage in wines derived from botrytized or moldy grape musts.

The main philosophy of the Microcel product is that modern winemaking usually prefers a preventive approach instead of a curative one. Using Microcel in fermentation of white and rosé wines, winemakers stop phenolics oxidation at its onset. Also, a significative amount of proteins is taken out early on, before the risk of affecting the "finished" bouquet with heavy bentonite treatments.

Microcel is composed of Potassium Caseinate, active cellulose fibers, and micronized pharmaceutical Bentonite. During fermentation, Microcel absorbs the proanthocyanidins and monomeric catechins, which cause oxidation in wines. The color of treated wines becomes more appealing, with greenish hues in white wines or more defined pink hues in the case of rosé wines. Musts treated with Microcel produce more complex wines, which retain their individual characteristics longer.

Potassium Caseinate also fines for copper as well as iron (up to 50% of the initial content).

Utilization: Dissolve the dose of Microcel in about 5-10 parts of cold water, wait approximately 15 minutes, add to mass quickly and with turbulence.

Dosage: 200/500 ppm (20-50g/hL or 1.5-4 lbs./1000 Gal).

Shelf life and storage: 3 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 10 and 25 kg bags

Microcel AF

VEGAN
FRIENDLY

Is the allergenic free version of the Microcel described above. The Potassium Caseinate is replaced by pure PVPP. The mix also includes bentonite and activated celluloses with a high adsorbing power. Thanks to the activity of PVPP, Microcel AF adsorbs catechins, preserving the product from oxidation risks and thus eliminating those yellow or orange and reductive smells.

Utilization: dissolve the dose of Microcel AF in about 5-10 parts of cold water, wait approximately 15 minutes and add to mass quickly and with turbulence.

Dosage: 200/500 ppm
(20-50g/hL or 1.5-4 lbs./1000 Gal).

Shelf life and storage: 3 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 25 kg bags

Quickgel AF

Allergenic free clarifier for red musts and wines based on pork gelatin and activated bentonite, with no significant impact on color. Extremely effective and quick, it's the best choice when winemakers need to clarify cloudy juices or wines in a very short time. It enables to obtain bright and softer wines with extremely compact lees. Thanks to the presence of specific quantities of bentonite, pork and fish gelatin, Quickgel AF helps to make sure that wines and juices are fined even with a high level of turbidity and polysaccharides.

Quickgel AF forms a very compact "net" of flocculants, which gives the wines brightness and makes it easier to filter them. The sediment left at the bottom of the tank will be very compact making it for an easy and clean raking. Filtration can be carried out 48 hours after addition without any problems in filtration flow rates.

Utilization: Dissolve Quickgel AF in ten parts of cold water and let it rehydrate for 20-30 minutes. Add the slurry to the tank with a pump over. Wait 48 hours before racking and filtering.

Dosage: 300-900 ppm (30-90 g/hl or 2.5-6 pounds/1000 gallons).

Shelf life and Storage: 2 years stored at room temperature in a non-humid environment.

TTB 27 CFR § 24.246
Packaging: 500 grams packets and 10 kg bags

Spindasol W

VEGAN FRIENDLY

Liquid Silica for extra compaction of settling agents or carbon fining.

When used in must, lees are heavier than when using just Bentonite and the settling is much faster and compact. Also, Silica does not adsorb aromatic molecules nor color. Because of its negative charge, it can be used in conjunction with gelatin, Casein and Albumin in order to achieve a more compact sediment, minimizing the lees. Using Spindasol to help settle the fining agents always improves the yield and reduces work.

Utilization: Mix Spindasol in must/wine using a Venturi or by pumping over. Dose the product either diluted 1:1 with water or at full strength. In musts, add Spindasol before adding Gelsol. This way gelatin will be neutralized on the silica and will interfere much less with the phenolics. To smooth out phenolics in finished wines, wait at least ½ hour after the protein clarifier (albumin, gelatin, casein) has reacted in the media, and then add Spindasol to settle.

Dosage: it always depends on the wine or must to be treated, and trials are recommended.

Generally, Spindasol needs to be added at 5 to 10 times the amount of the protein-based clarifier used. As a generic settling agent use 500 to 1000 ppm (1 liter is about 1.15 kg).

Shelf life and storage: Sealed containers will last for 2 years stored at room temperature in a non-humid environment. Do not store below 5 degrees Celsius.

TTB 27 CFR § 24.246
Packaging: 25 kg pails

Ve-Gel

VEGAN FRIENDLY

Clarification product based on pea derived proteins. Its high reactivity towards Bentonite and silica enables to obtain a quick clarification with compact deposits. In must cold settling, Ve-gel enables to obtain not only a better technological result, but also more favorable parameters. The clarification achieved has lower NTU's than the ones obtained with common vegetable proteins, the deposit is more compact, and the clarification is carried out significantly faster. Thanks to its reactivity, Ve-Gel can be successfully utilized during flotation, alone or in association with bentonite. Ve-Gel has a low reactivity towards the coloring matter and can be used in red wines with virtually no color loss.

Usage: dissolve Ve-Gel in water at a ratio 1:15 and add it in-line.

Dosage: 100-500 ppm (10 to 50 g/hL or 0.8-4 lb./1,000 gallons)

Shelf life and storage: store in a cool dry place, away from direct sunlight and heat.

Packaging: 1 kg packs and 20 kg bags

FILTRATION

07

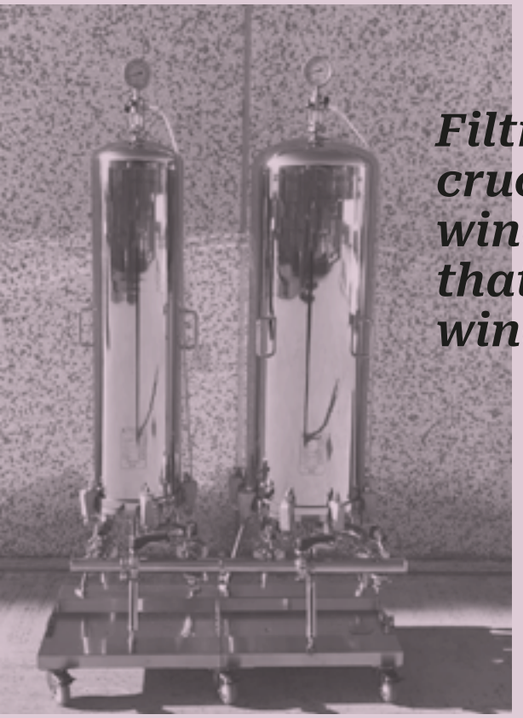
Preparing the wine for final filtration

Filtration is a crucial step in winemaking, one that protects the wine from spoilage but that if overdone can diminish wine quality. It is important to size well the flow allowed through each cartridge and to pick the right material and porosity for each step.

The market demands alternatives to traditional filtration methods, such as sheet and earths, during wine preparation. Medium and small wineries are always seeking more flexible and high-quality prefiltration systems. Moreover, crossflow filtration works uniformly across all wines but does not allow for porosity selection. The M3 High Performance high-capacity cartridge is such alternative, distinguished by its radial pleating and high filter surface area. Its special features ensure numerous advantages:

- Depth filtration with high filtering surface area
- High retention capacity of suspended solids, ensuring high performance, durability and lower costs.
- Faster replacement of filter elements
- Fewer o-rings and reduced risk of by-pass
- Significantly lower disposal costs compared to cartridges considering the same filter surface area.
- Broad chemical compatibility for filter element regeneration
- FDA-compliant polypropylene construction
- High retention efficiency for quality filtration.
- Choice of different micrometers

Each cartridge can guarantee a prefiltration with a flow of 45 Hl or 1,200 gallons/hr, normally with three steps 5-2-1 Micron. The flow can be accelerated by using multiple housings per step



Filtration is a crucial step in winemaking, one that protects the wine from spoilage

Regeneration and sanitation

M3 High Performance filter elements can be repeatedly regenerated also in backflush, with hot water (max 80°C-176°F), sterilized with steam up to 121°C-250°F. They can also be used in hot caustic cycle, even with peroxide.

- Filtration surface: 18 m² (194 sqf)
- Washable in counterflow
- Maximum Delta P: 3.4 bar (50 PSI)
- Maximum operating temperature: 80°C (176°F)

Prefiltration with PP cartridges

In order to protect the final PES membrane is very important to utilize a less sophisticated cartridge made of polypropylene which will retain most of the colloids and particles, keeping those from plugging the more expensive final membranes. It's important not to go too fast on the flow in order not to push colloids through these pre-filters. Ideal flow through each 30 inches cartridge is about 1,000 liters–265 gallons/hr. Keeping the flow at this rate will guarantee a life of 150,000 liters or 40,000 gallons of wine filtered through each final membrane.

Absolute PP Membrane Protect

When filtering wines through a 0.45-micron final membrane it could be a good idea to put an even tighter pre-filter before, this way we're sure that most particles will not get to the final membrane. Installing a pre filter as tight as an AEB Absolute PP Membrane Protect is recommended especially in a particular circumstance: when measuring NTU's before and after the prefilter normally used, we don't see any changes in turbidity. This is a simple test that would prove that the prefilter isn't performing and we should install a tighter one.

Absolute PP Membrane Protect is an absolute pre-filter composed of six layers made in polypropylene and with a porosity equal to 0.4 micron. Its configuration is suitable for frequent chemical regenerations.

Absolute PP

AEB recommends using 0.4-micron prefilters especially when coming out of a crossflow, when NTU's should be as low as 0.2 and going into a 0.45 membrane. For all the other situations, AEB-Danmil also produces a wide range of pre-filters in polypropylene consisting of 4 layers and with different porosities.

Different porosities for Danmil pre-filters
ABSOLUTE PP MEMBRANE PROTECT 0.40
ABSOLUTE PP 0.6um
ABSOLUTE PP 1um
ABSOLUTE PP 3.0um
ABSOLUTE PP 5.0um
ABSOLUTE PP 10um

Absolute PES Final Membrane

PES (Polyethersulfone) membranes are a type of filtration membrane commonly used in various industries, including biopharmaceuticals, food and beverage, water treatment, and more. PES membranes feature some key characteristics:

- Chemical Resistance: PES membranes are resistant to a wide range of chemicals, including acids, bases, and organic solvents. This property makes them suitable for regeneration even with alkaline detergents. Also, they can be stored with 0.2% peracetic acid.
- Thermal Stability: PES membranes can withstand relatively high temperatures compared to other membrane materials. Danmil Absolute PES membranes can be repeatedly regenerated with hot water at 80 °C-176 °F, sterilized with steam up to 121°C-250 °F. They can also be used in hot caustic cycle, even with peroxide.
- Hydrophilicity: Danmil Absolute PES membranes exhibit hydrophilic properties, which enhance their wetting ability, crucial when performing an integrity test.

Overall, AEB-Danmil PES membranes offer a versatile and reliable solution for a wide range of filtration applications, particularly those requiring chemical resistance, thermal stability, and precise particle or solute separation. If well protected with the adequate pre-filter, AEB final PES membranes can live through 150,000 liters or 40,000 gallons of wine filtered.

Different porosities for Danmil final membranes

ABSOLUTE PES 0.2um
ABSOLUTE PES 0.45um
ABSOLUTE PES 0.65um
ABSOLUTE PES 1,2um

Filtering Pads

Danmil pads and modules are designed for the filtration of liquids such as wine, oil, beer and juices.

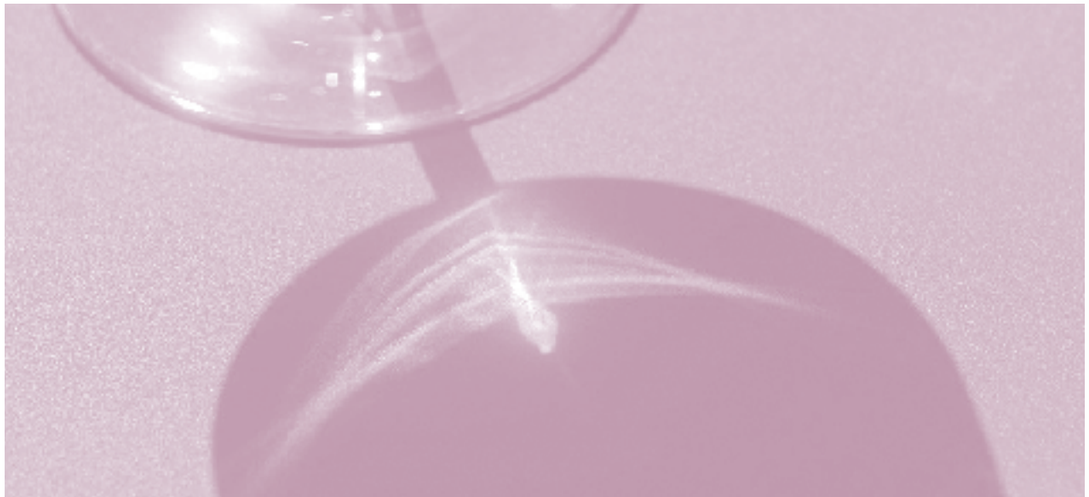
Danmil depth filter sheets are made of natural, first choice and particularly pure materials, carrying a cationic charge. They are made of cellulose finely shined broadleaf and conifer fibers, kieselguhr and perlite at different concentrations.

Danmil pads porosity, thickness, resistance and permeability

SHEET	POROSITY	THICKNESS (MM)	TEAR RESISTANCE IN WET STATE (PSI)	WATER FLOW RATE DELTA P AT 14.5 PSI (L/M²/MIN)
DA30 (MATCHES STERIL 300 XL)	5-12 micron	3.8	>7.2	350-400
DA50 (MATCHES STERIL 500 L)	3-6 micron	3.8	>7.2	200-240
DA70 (MATCHES STERIL 700 L)	1.5-3 micron	3.8	>7.2	160-200
DA110 (MATCHES STERIL 1100)	0.5-0.8 micron	3.8	>11.6	68-80
DA130(MATCHES STERIL 1400)	0.4-0.6 micron	3.9	>7.2	42

Danmil pads applications for different Danmil pads

DANMIL 110 / 130 STERILIZING FILTRATION WITH REDUCTION OF MICROORGANISMS	
CHARACTERISTICS	APPLICATIONS
Narrow-pored structure of the filter media, combined with an electrokinetic potential with adsorption action (charged) to yield a high rate of microbiological retention	In sterile cold bottling, in order to improve the shelf life of wines, beer and juices.
	As pre-filters upstream of membrane filtration, thanks to the high retention capacity of colloidal components.
DANMIL 50 / 70 FILTRATION WITH REDUCTION OF MICROORGANISMS AND MICROFILTRATION ABSOLUTE PES 1,2UM	
CHARACTERISTICS	APPLICATIONS
They allow to reach high levels of clarification for their effective retention capacity of the finest particles and microorganisms.	Storage and bottling of microbiologically stable wines.
DANMIL 30 ROUGH, POLISHING FILTRATION	
CHARACTERISTICS	APPLICATIONS
They have a high-volume hollow structure and a high turbidity absorption capacity.	Polishing of the product, be it wine, beer, oil or juices.



Pads sterilization (optional)

Danmil pads can be sterilized with hot water or saturated steam at a maximum temperature of 134°C-273°F, during this phase it is necessary to loosen the compressed filter pack slightly and make sure that the complete sterilization of the entire filter system is carried out. Final compression should only be performed after the cooling of the filter pack.

PADS STERILIZATION WITH HOT WATER	
Flow rate must be similar to the one used in operations The water must be demineralized and free from impurities	
TEMPERATURE	80°C 176°F
DURATION	Half hour after temperature has been reached
PRESSURE	At least 0.5 bar or 7.2 psi at the outlet

STEAM STERILIZATION OF PADS	
The steam must be free from impurities	
TEMPERATURE	134°C 273°F
DURATION	20 minutes starting from when all the valves are steaming
WASH	50 liters/m2 at 1.5 x the filtration flow rate

Direction of use: each Danmil sheet consists of:

- A rough side, representing the entrance of the filtered product.

- A smooth side, representing the exit of the filtered product.

Pressure difference: according to the standard operating mode, filtration must be halted when the maximum permissible pressure difference of 300 kPa (3 bar) is reached. To work under maximum safety conditions, a pressure difference of 150 kPa (1,5 bar) must not be exceeded during filtration for retention of microorganisms.

Disposal, handling and storage: thanks to their composition, Danmil depth filter sheets are biodegradable. However, the requirements of the local authority must be observed depending on the filtered product.

Carbon Pads

Powdered activated carbon is widely used in the food and beverage industry for absorption applications, but it has significant drawbacks relating to the handling of bulk carbon powder, cleaning of the process equipment, as well as time and costs associated with carbon removal from the process. Danmil Carbon pads alleviates these concerns by incorporating activated carbon within a matrix of cellulosic fibers.

Danmil Carbon pads are available in the format of 400 mm x 400 mm and they are made of cellulose, powdered activated carbon and diatomaceous earth (DE, Kieselguhr). They have many applications:

- De-chlorination of water
- Correction of color, flavor and odors in distilled spirits
- Decolorization of sweetener and sugar syrups
- Color correction in juice and beer applications
- Gelatin decolorization and deodorization

Advantages of carbon pads:

- Adsorption efficiency is greater than an equivalent amount of bulk powdered activated carbon
- Reduction of the overall process time and increase of product yield
- Better color removal: an internal comparative study using the same carbon grade showed up to 150% better color removal efficiency when compared to bulk PAC (Powdered Activated Carbon)
- Absence of carbon dust and ease of use thanks to the Carbon-impregnated media
- Good permeability with excellent filtrate quality
- High economic efficiency due to a long service life

Perlite filtration earths, pre-coat and body feed

Fibroxcel 10

- Pre-coat with 10% fibers for gross filtration
- Permeability = 120 l (30 gallons)/m2/minute
- ***Dosage:*** 0.5-1 kg (1-2.2lb)/m2 of filtering area for the formation of the pre-coat or in variable doses between 50 to 500 g/hl (4-40 lb/1,000 gallons) for the body feed filtration
  Packaging: 16 kg bags

Fibroxcel 30

- Pre-coat with 30% fibers for polishing filtration
- Permeability = 50 l (13 gallons)/m2/minute
- ***Dosage:*** Should be used in a variable dose between 0.8 and 1kg (1.7-2.2lb)/m2 of filtering surface for building up the pre-coat, 20 and 80 g/hl (1.5-6 lb/1,000 gallons) for the body feed filtration
  Packaging: 16 kg bags

Fibroxcel VAC

Vacuum filters tend to have an extremely compact layer of earths that eventually breaks or plugs, Fibroxcel VAC mixed at 10% with the DE used for the filtration guarantees a smooth cut of the top layer and, thanks to its softening action, delays plugging of the cake and prevents cracks. The drum cut is linear and micrometric, with a noticeable increase in the total filtration capacity, with the result of a more satisfactory yield.

The addition of Fibroxcel Vac makes it possible to treat very quickly suspensions loaded with hazy matter, which would require a great work to discharge coats, with the assurance of an excellent result. Fibroxcel Vac can also be used in conjunction with the body feed in pressure filters for particularly hazy musts and concentrates.
Packaging: 16 kg bags

Silite Mini Speed

- A very fine perlite, with low flow-speed, used for tight filtrations, especially the polishing ones
- Permeability l/m2/minute: 68-77, specific weight when wet: 0,21-0,23
- ***Applications:*** final filtrations of wines, vinegars, dry spirits, beer, oils, juices, distillates
  Packaging: 16 kg bags

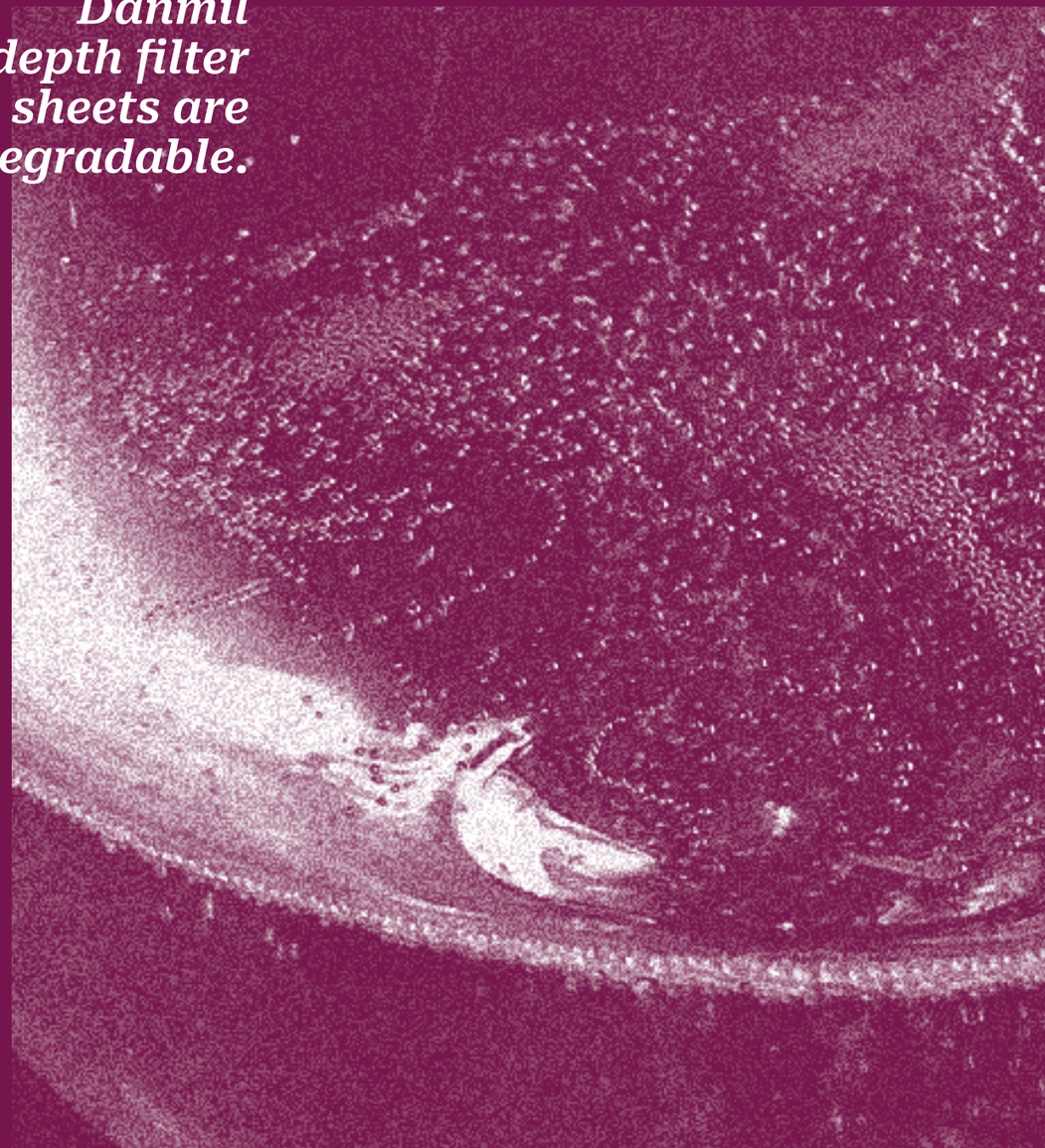
Silite Normal Speed

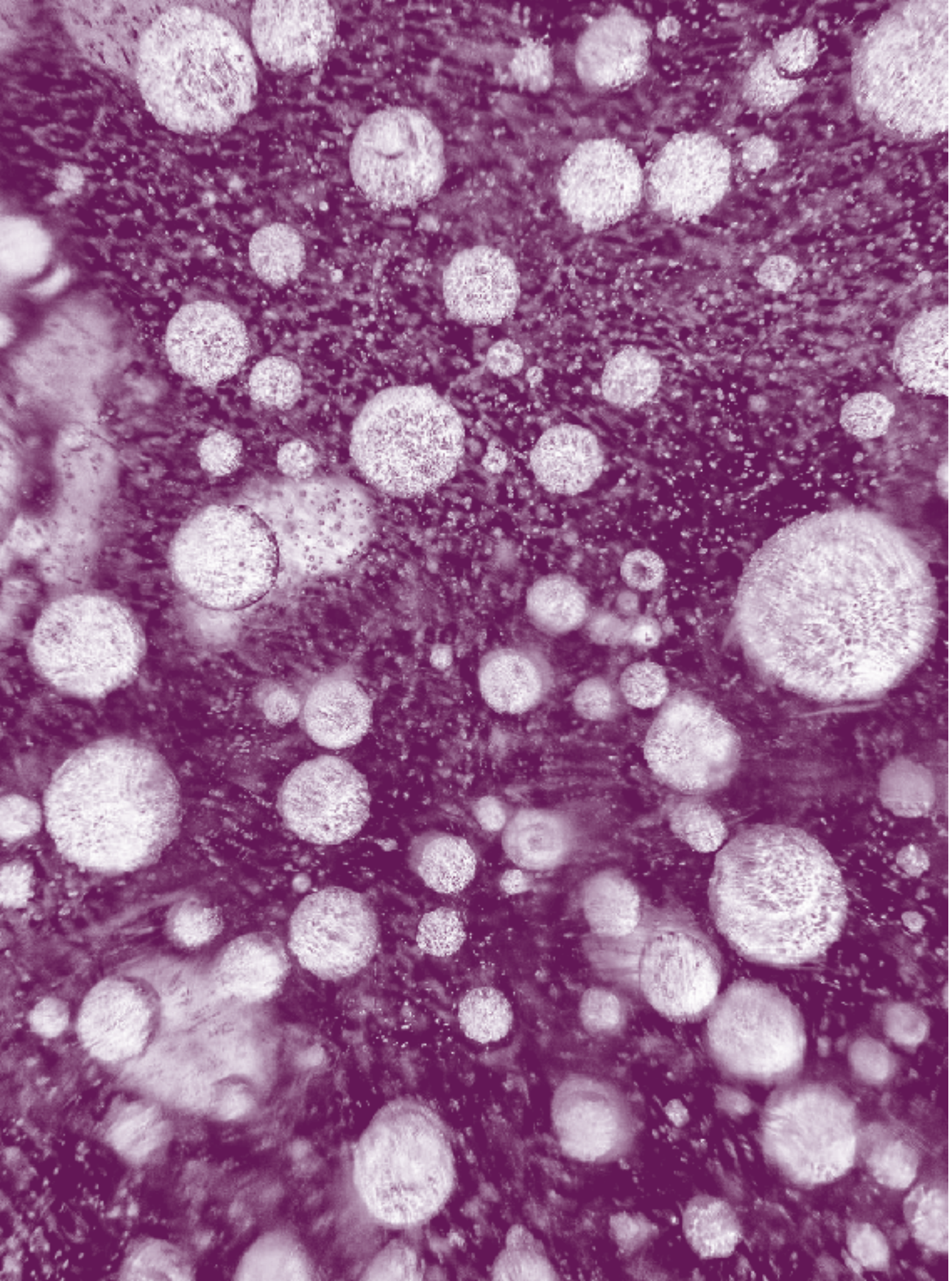
- Perlite with medium permeability and is recommended for all uncomplicated filtrations. It is used for normal filtrations.
- Permeability l/m2/minute: 127-147, specific weight when wet: 0,20-0,22
- ***Applications:*** filtrations of wines, sweet spirits, distillates, fruit juices, syrups, beer, industrial drains, etc.
  Packaging: 16 kg bags

Silite High Speed

- The high permeability of this perlite makes it ideal for filtering very hazy liquids with a high content of suspended solids. It is classified as a perlite for coarse filtrations.
- Permeability l/m2/minute: 200-240, specific weight when wet: 0,16-0,18
- ***Applications:*** coarse filtrations of musts, worts, cloudy wines, thick spirits or syrups
  Packaging: 16 kg bags

Disposal, handling and storage: thanks to their composition, Danmil depth filter sheets are biodegradable.





DETERGENTS

08

REMOVIL

A powder alkaline detergent with a superior blend of builders, water conditioning and wetting agents that can remove the toughest organic matter including tartrates. This detergent is specifically designed for cleaning tanks, CIP systems, equipment and more.

Packaging: 50 lb Pail and 480 lb Drum

REMOVIL K

A complex detergent that is potassium based. It's blend of builders, water conditioning and wetting agents can remove the toughest organic matter including tartrates. This detergent is specifically designed for cleaning tanks, CIP systems, equipment and more.

Packaging: 50 lb Pail and 480 lb Drum

REMOXAN

A highly concentrated hydrogen peroxide-based formulation for use in the food & beverage industries. It's used in combination with Removil or Removil K provides superior cleaning of all tanks, lines and equipment in processing facilities. Remoxan is readily biodegradable and chlorine free.

Packaging: 5 Gal Pail and 55 Gal Drum

MEMBRAN UF

Is a medium alkalinity and high sequestering liquid detergent, to be used for the cleaning of ultra and micro filtration Membranes present in all sectors of food industries, beverage bottling and pharmaceutical sector. Membran UF can easily remove organic and inorganic residues from Membranes, restoring the normal flow levels. Suitable also for hard waters.

Packaging: 5 Gal Pail and 30 Gal Drum

LIQUID CAUSTIC SODA CIP

It is a liquid caustic detergent specifically formulated to be used in clean in place circulation systems. Used at high dilution rates for greater economy. Can be used in meat, beverage, fruit and vegetable processing CIP applications.

Packaging: 5 Gal Pail and 55 Gal Drum

X-WASH A

It is a highly concentrated foaming detergent used in combination with X-Wash B to clean exterior tank surfaces. It's proprietary blend of builders, surfactants and other ingredients provide superior cleaning and economy. Removes common soil that builds up on tanks. No harsh chlorine.

Packaging: 55 Gal Drum

X-WASH B

It is a highly concentrated additive used in combination with X-Wash A to clean exterior tank surfaces. It's unique formulation blended with X-Wash A has a greater cleaning power, efficiency and soil removal. Removes common soil that can build up on tanks. No harsh chlorine.

Packaging: 30 Gal Drum

SULFURIC ACID 20%

Used to recharge resin in a AEB ionic exchange machine.

Packaging: 55 Gal Drum

PBC

Is an alkaline CIP and general purpose cleaner that is an effective alternative to caustic soda. Specifically designed to remove any organic soil, proteins and stains commonly found in breweries. Designed to be safe for use on stainless steel, soft metals, rubber and more.

Packaging: 50 lb Pail and 480 lb Drum

PERASAN "A"

Is a food grade sanitizer used in the dairy, food and beverage processing industry for CIP pipeline cleaning, sanitizing, bottle and filler sanitizing, and disinfection. It is also used in the treatment of cooling water, process and wastewater.

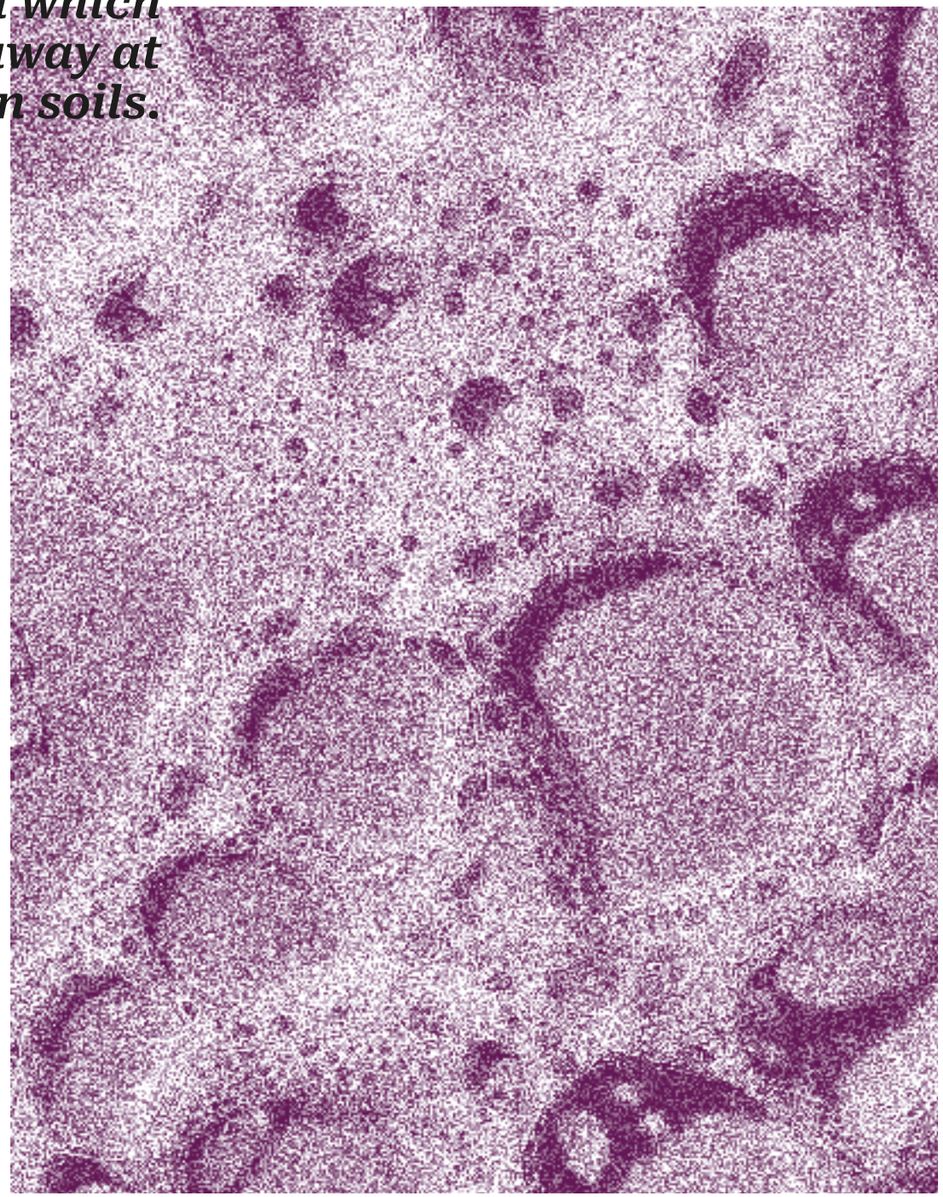
Packaging: 5 Gal Pail and 53.5 Gal Drum

QUAT SANITIZER II

Is designed for use in hotels, schools, food processing plants, food service establishments, restaurants and bars where disinfection, sanitization and deodorization is of prime importance.

Packaging: 5 Gal Pail and 55 Gal Drum

The system applies a thick, soaking chemical foam which works away at stubborn soils.



Equipment for Detergents

AEB's portable foamer

It allows for easy mobility and storage for industrial foam cleaning. From heavy dirt and grime to tartrates the AEB chemical cleaning system will breakdown residues, so they easily rinse away.

The system applies a thick, soaking chemical foam which works away at stubborn soils. Foam adheres well to both vertical and horizontal surfaces, activating soil for easy removal. Simply rinse to finish the job.

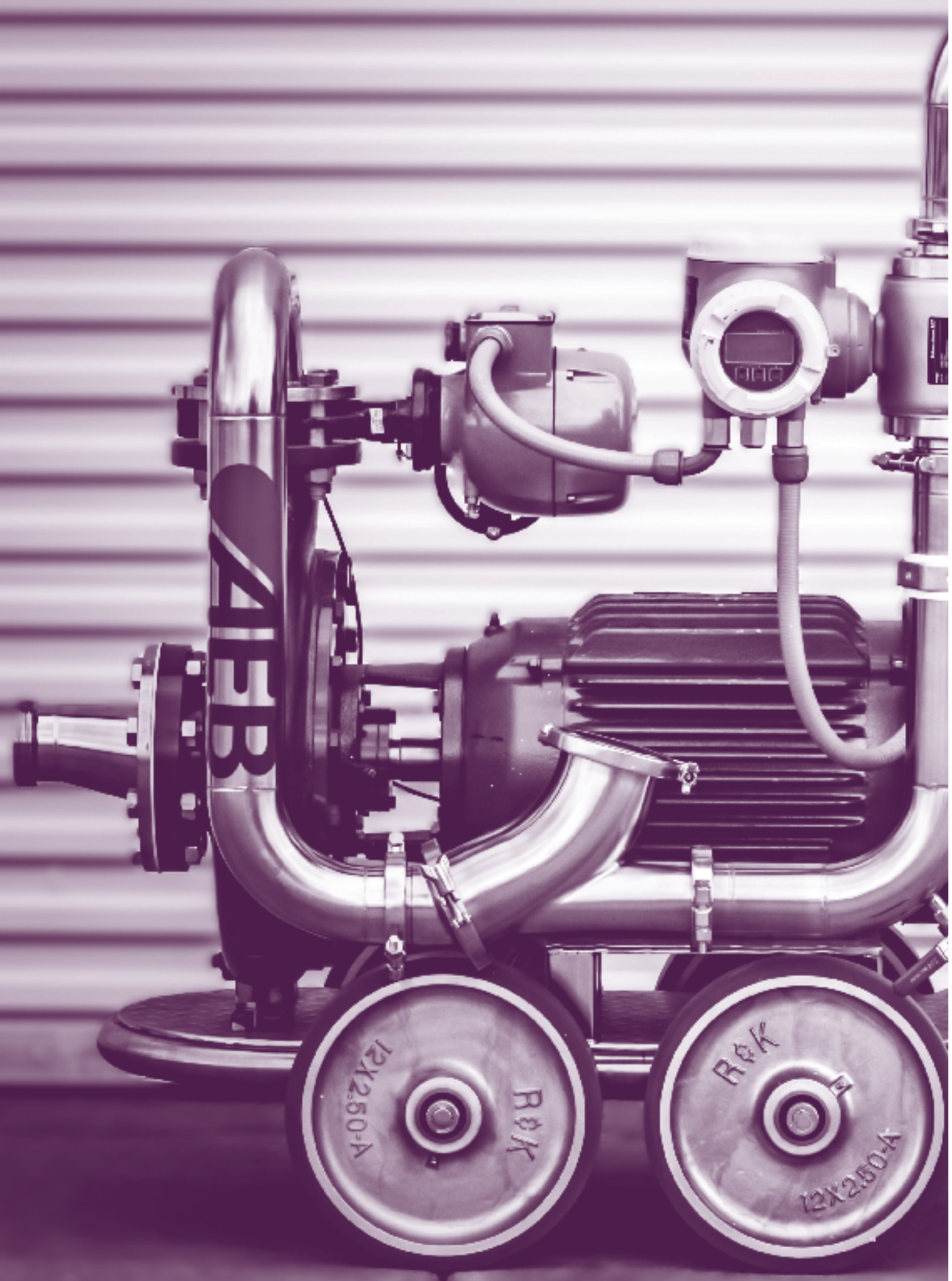
Draws from pre-mixed solution and powered by compressed air.

- Natural color tank for easy visibility of product levels
- Color coding options to assist with chemical identi cation or other color code programs utilized in your facility
- Lid-7 colors (BK, BL, GN, YL, RD, PL, OR)
- Discharge hose-4 colors (BL, GN, YL, RD)

MIXING STATION

The Gemini™ Model 150 Mixing Station is a unique, 7 GPM @ 40 PSI high-volume chemical proportioner that will simultaneously dilute and blend two chemical concentrates into one accurately diluted solution and quickly dispense it into larger containers and equipment.

- Eliminates manual mixing and optimizes chemical utilization, employee safety and labor e ciency
- Dilution ratios are controlled independently for each chemical using precision metering tips
- Industrial-strength design holds up in tough environments



EQUIPMENT

09

ISIOX®—Advanced Gas Management for Wine Preservation and enhancement through modulation of O_2 and CO_2

It ensures precise gas management, safeguarding wine quality from oxidation and improving its overall stability during critical winemaking phases.

Oxygen is a crucial molecule in the life of wine—when properly managed in micro-doses (micro-oxygenation), it supports microbial activity and tannin polymerization.

However, once wine is bottled, oxygen could be its greatest enemy, affecting its freshness and longevity. Every 1 mg of dissolved oxygen can oxidize 4 mg of SO_2, reducing its protective effect. Wines with low SO_2 levels are more susceptible to undesirable oxidation, which can spoil aromas and color, making wines less appealing.

This also aligns with the growing need to reduce or eliminate SO_2 additions, improving wine health and consumer preference.

ISIOX® is a simple yet powerful system designed to optimize dissolved low-molecular-weight gases in wine, allowing for:

- Controlled O_2 and CO_2 modification, featuring a continuous measurement with optional O_2 and/or CO_2 sensors for inlet and outlet analysis
- Hydrogen sulfide (H_2S) removal
- Continuous gas concentration regulation during bottling, preserving wine structure and aroma

It can reduce oxygen levels by up to 97%, depending on flow-rate and operating mode.

The calibrated dosage of inert gases differentiates this tool from stripping, saving processing gas and preserving the aromatic compounds.

ISIOX		
MODEL	HL/HR	GALLON/HR
ISOX 2 Logic	100	2600
ISOX 4 Logic	200	5200
ISOX 500 Logic	500	13000

Isiox speed

Stabymatic speed

Ion Exchange: Stabymatic

Stabymatic is a revolutionary system for tartaric stabilization and pH reduction. Its operation is based on the use of pH-Stab 2.0, which allows for the reduction of K+ and Ca++ salts in wine, making it stable.

The decrease in electropositive ions helps lower the pH of the treated musts or wines.

Tartaric stabilization using resins is achieved by removing positively charged metal ions, exchanging them with H+ ions. The liquid passes through columns containing pH-Stab 2.0, which exchanges ions and reduces conductivity, leading to a consequent drop in pH. Regeneration is carried out using Acid+, an activator based on Sulfuric Acid, which restores the resin to its acidic form.

Stabymatic can operate in 3 modes:

- **automatic**, working automatically in both exchange and regeneration. The machine alternates between regeneration and exchange cycles until it has reached the defined settings.
- **semi-automatic**, simply by selecting the desired function.
- **manual**, through the selection of the single user on the touch screen.

STABYMATIC		
MODEL	HL/HR	GALLON/HR
500 (continuous)	30	800
500 single column (batch)	60	1600
1000 Stainless steel (continuous)	60	1600
1000 Auto Glass Fiber (continuous)	60	1600
2000 (continuous)	120	3200
STABYMATIC ECO (SEMI-AUTOMATIC AND MANUAL MODELS		
MODEL	HL/HR	GALLON/HR
30 Eco	3	80
50+50 Eco C	6	160
200 Eco C	25	660
500 Eco C	60	1600

Automatic yeast rehydration and acclimation: Reactivateur

When rehydrating ADY (active dry yeast), a few simple things can make a huge difference in the quality of the biomass that ultimately is going to ferment the must. Temperatures, timings, aeration, and acclimation are all variables that can influence the success of yeast rehydration. The yeast Reactivateur engineered by AEB has the capability to optimize this delicate process, guaranteeing the best out of the inoculum used.

After the operator sets the amount of yeast to rehydrate, the machine starts by intaking a proportional amount of water. Then the water is brought to the programmed temperature and maintained, waiting for the operator to add the yeast. Water and yeast are constantly homogenized and saturated with oxygen through continuous mixing. Acclimation is then achieved by introducing must at small increments, with intervals programmed in the settings. After the acclimation is finished the machine can pump the active inoculum into the must tank.

The main advantages are measured on a shorter lag-phase (faster turnover of the tanks) and a smaller yeast dose needed. Also, stuck fermentations less frequent.

Reactivateur sizes

REACTIVATEUR		
MODEL (YEAST TO BE REHYDRATED)	TANK VOLUME	COUNTRY OF ORIGIN
60/300-UP TO 5KG (No min. addition)	300L / 80GAL	Italy Made
60/1500 – 10 – 30KG	1500L / 396 GAL	Italy Made
60/3000 – 25 – 50KG	300L / 792 GAL	Italy Made
600 – 100KG	975 Gallons	USA Made / Custom

Automatic yeast rehydration and propagation: Bioreactor X10

Yeast inoculation represents the first technological step in producing quality wines, this is true provided that the selected yeast can take over and complete the fermentation, with adequate and rational nutrition.

Yeast, as a microorganism, is very rapid in multiplying and propagating its biomass, however, if conditions are not optimized (ideal aerobic environment and a proper carbon and micro elements supply) the yeast could lack the strength to complete fermentation, and in worse cases create unwanted metabolites in the wine that could compromise its quality. This is true whether we just do 2/4 generations or take this technique to the extreme.

AEB engineering's team of experts has been able to well interpret the needs in this field by designing the Bioreactor X10 1.5, which, guarantees rehydration of yeast and the subsequent propagation of biomass without having stressed cells.

Practically speaking, with a 12 hours cycle and 5 kg of yeast (normally good for 200 Hl or 5,300 Gallons) the winery will obtain the equivalent of about 50 kg (good for 2,000 Hl or 50,000 Gallons).

The Bioreactor also comes with its own cleaning CIP that washes the system automatically in about 10 minutes (3 steps: prewash, cleaning and rinse).

Must flotation: E-Flot

Flotation is an alternative, intelligent method for achieving must clarity, by pushing solids against gravity and collecting them in a "cake" at the top of the tank. The clear juice is then racked and separated from the racking valve.

AEB has been manufacturing batch-flotation units (E-flots) since the early 2000's. The clarification of must using the E-Flot is achieved through the incorporation of an inert gas (Nitrogen) into the solids that make up the turbidity of the liquid. Gelatin products like Gelsol or vegetable derived proteins like Ve-gel, may also be incorporated by the machine to optimize the process and get floccules that flot and compact faster and better. The gas combines particles in suspension and makes them float towards the surface of the tank leaving a clear must to be racked, at the bottom.

It is important to first make sure that the must is thoroughly depectinized. AEB recommends the use of pectinase enzymes such as Endozym E-Flot, Ice, Micro or Endozym ICS 10 Eclair to help achieve depectinization. In order to have optimal results and better must clarity, it is recommended to use a specific gelatin, like Gelsol or Ve-Gel, that allows the formation of a good-sized flocculate, absorbing solids.

Other than achieving a good clarification, the benefits of the E-Flot are numerous:

- Saving on power and eliminating the refrigeration and subsequent warm-up time, when switching from traditional processing by cold settling.
- Time and tank saving: 50 tons of fruit at 9 am can, in theory, be inoculated by 4 pm on the same day using floatation clarification. This compares to a minimum 24 hrs settling time plus racking, warming, and RDV filtration time.
- The capital cost of a floatation machine is less than one tenth of a similar rated centrifuge.
- E-Flot is a versatile machine that allows operation at a higher flow rate for gross fining or slower rate for a brighter must.

E-Flot speed

E-FLOT	
MODEL	GALLON/HR
10	3170
25	6600
50	13200
80	21133
130	34300

Proportional dosing: Dosaprop

Dosaprop ensures the in-line addition of liquid processing aids in proportion to the flow, guaranteeing perfect homogenization.

Its operation is based on a sensor that detects the quantity of liquid flowing through the pipeline and sends an impulse to the dosing system for the addition.

The dosing of processing aids can be carried out by up to 3 pumps and can be adjusted from 1 to 730 L/hour.

The stainless steel AISI 316 pumping head ensures perfect cleaning and sanitization and, unlike diaphragm pumps, guarantees a continuous flow.

Operation via a piston pump allows for precise dosage control by adjusting the piston's movement speed. The regulation of the piston's bore enables micro-adjustments.

The motor is managed via an inverter to control the piston's speed, which determines the amount of product to be dosed.

Wood "Tea" brewer: Boisélevage Extractor

Boisélevage Extractor is a fast and efficient extraction system that integrates advanced technical solutions to achieve a rapid yet delicate extraction of desired compounds from wood derivatives. It minimizes undesirable effects on wine, preserving its integrity.

The key strength of this machine lies in its ability to ensure homogeneous extraction through a high, evenly distributed flow. This process distills the wood essences without stressing the wine, thereby preventing an uncontrolled increase in astringency.

Boisélevage Extractor efficiently extracts essences from all types of wood derivatives using a uniform, perpendicular flow through a specially designed mesh. While flow alone does not always guarantee rapid extraction, the system is equipped with two thermostat-controlled heating elements that reduce surface tension and improve the wettability of the wood, enhancing the extraction process.

BOISÉLEVAGE EXTRACTOR	
MODEL	CAPACITY
Boisélevage Extractor 100	100 kg of oak
Boisélevage Extractor 300	300 kg of oak

Additional Features:

- Porous stone for introducing oxygen or inert gas, depending on the winemaker's needs.
- Large hatch for easy removal of depleted oak fragments and quick cleaning, facilitated by a dual Spray-Ball washing system located at the top of the container.
- Wide opening for effortless insertion of new oak material.
- Automated safety mechanisms, including electronic and mechanical sensors, ensure secure operation.

The system is operated via a user-friendly control panel, and both inlet and outlet connections are DIN 80.

Red Fast: Efficient and Rapid Color Extraction System

Red Fast is a simple and fast color extraction system designed for use in tanks of up to 300 hL/8,000 Gallons capacity, utilizing the effect of air or CO_2 injection. This method preserves the integrity of grape skins while preventing the extraction of green tannins, which can introduce bitter or vegetal flavors.

Red Fast is equipped with two pipes, one for intake and one for injection. When the suction tube is placed at the top of the tank (during alcoholic fermentation), the process occurs in an inert environment. If fermentation is not occurring or the tube is positioned outside the tank, the process is carried out with air. A bubble is created by submerging the special nozzle, approximately 30-50 cm below the cap of grape skins, ensuring they are fully immersed in the must/wine for optimal extraction.

Red Fast is ready to use with no installation required, simply connect it to a power source, and it's ready for operation.

MicroOx: Microsafe O_2

From an oxidation-reduction perspective, wine is an unstable beverage that tends to undergo reduction, which can mask the pleasant aromas of its varietal characteristics and sometimes produce unpleasant odors. This phenomenon is caused by the proanthocyanidin tannins in grapes, which have the ability to bind together, depleting oxygen from other compounds in the wine especially aromas. As a result, the bouquet become diminished or "reduced."

To counteract this phenomenon, micro-oxygenation is a great option to dose a precise and consistent amount of oxygen equal to what the proanthocyanidins in the wine require.

This technique helps to stabilize color and soften tannins, reducing their astringency. Additionally, research on wine aging in barrels has shown that the presence of ellagic tannins during oxygenation allows for better control of the maturation process, preventing oxygen from damaging the wine.

Oxygen Dosing Modes can be easily selected via a dedicated button on the control panel, allowing smooth navigation through the menu. Microsafe O_2 offers three dosing options:

- Micro-oxygenation: Measured in mg/L/month, ideal for controlled and gradual oxygen integration.
- Macro-oxygenation: Measured in mg/L/day, used for more intensive oxygen addition.
- Single-dose injection: A set amount of oxygen delivered within a specified time frame.

Studies have shown that the ideal temperature range for micro-oxygenation is between 14°C and 24°C. To ensure optimal conditions, Microsafe O_2 is equipped with a continuous temperature monitoring system, ensuring precise control throughout the process.

The micro-oxygenation process is automatically suspended when the temperature exceeds 22°C or drops below 14°C, ensuring optimal conditions for wine stabilization and maturation.

Different types of candles and diffusers will require specific minimum wine heights to function effectively:

- Stainless steel candles: 180 cm
- Ceramic candles:140 cm
- Flat ceramic candle & flat barrique candle: 60 cm

Microsafe O_2 range:

- MICROSAFE O_2 SINGLE UNIT: single-unit dosing system for controlling one tank, featuring a fully digital management interface for precise and secure oxygen dosage adjustments. It includes all the alarm systems: (e.g., temperature monitoring, clogged cartridge detection, etc.) ensuring safe and efficient operation.
- MICROSAFE O_2 5X5: designed to manage up to 5 tanks from a central unit, this compact and easy-to-install system allows for quick connection of diffusers to the oxygen supply. All alarms and monitoring systems are integrated into the unit, with individual displays providing real-time updates on the micro-oxygenation process for each active tank.
- MICROSAFE O_2 15X15: a high-capacity micro-oxygenation system capable of managing up to 15 tanks. It features a central processor that not only controls all oxygen dosing satellites but can also integrate with refrigeration systems and their thermal control units, fermentation kinetics monitoring for the tanks Pump-overs, punch-downs, and spray systems for enhanced winemaking control.

This advanced system ensures precise oxygenation while providing full management of critical winemaking processes.

Transfer-Pumps:

AEB offers a wide selection of transfer pumps. We specialize in manufacturing custom units to customers specifications. We also offer standard units that are available with Stainless Steel centrifugal closed impeller heads and open heads ranging in HP from 5.5 up to 30HP. These pumps have the capability to transfer all sorts of liquids with a high flow rate.

Blend-Pumps:

The Blend pump is an accurate liquid transfer portable cart. With programmed schedule, network ready, precise speed control, redundant safety, manual or Auto mode and many custom options. The user inputs gallons required, speed of transfer and presses Start.

Pump will stop automatically at the correct setting. Data is saved on power loss and allows the pump to re-start where you left off.

Characteristics:

- IP66 rated, Class 1 Div 2 controls cUL/UL Approved
- Up to 500v 50/60HZ single or three Phase
- Stainless Steel construction
- Welded Stainless Steel cart
- Dry pump/ No flow safety check
- Electronic operated valve w/manual over-ride
- Positive Stop, remove & clean check valve
- Electronic Mag meter
- High-Low pressure safety switch
- External E-Stop
- Downloadable historical error/login/alarms
- Units are available is many sizes and options

Oxygen is a crucial molecule in the life of wine—when properly managed in micro-doses (micro-oxygenation), it supports microbial activity and tannin polymerization.

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