

ENARTIS NEWS

GOOD REASONS FOR USING ACTIVATED CHITOSAN AFTER HARVEST

Now that harvest is over, it is time to protect your wine from the risk of spoilage caused by unwanted microorganisms. An activated chitosan-based product like EnartisStab MICRO M is a powerful antimicrobial agent and offers interesting side benefits for wine shelf life that can be very helpful in this period when labour shortage and precariousness for the future requires an even stricter control during wine storage.

EnartisStab MICRO M

EnartisStab MICRO M is an allergen free and vegan friendly bioregulator containing activated chitosan and yeast hulls rich in chitin-glucan. It was specifically developed for the treatment of turbid musts and wines in the early stages of wine production.

During wine storage, Enartis Stab MICRO M can be used to control the development of spoilage microorganisms and limit the production of undesirable metabolites such as volatile acidity, sulphur compounds, volatile phenols and biogenic amines.

Beside the antimicrobial activity, EnartisStab MICRO M has very interesting side effects that help to increase wine resistance to oxidation and ageing.

EnartisStab Micro M antimicrobial activity

- **Lactic bacteria** (*Oenococcus*, *Pediococcus* and *Lactobacillus*)

Growth conditions: low SO₂, high pH, presence of residual sugar.

Potential damages: volatile acidity, decrease of total acidity, off-flavours, production of biogenic amines, bitterness, ropiness, overproduction of diacetyl.

Recommended EnartisStab MICRO M dosage: 10-20 g/hL.

- **Acetobacter**

Growth conditions: temperature higher than 18°C, low acidity, low SO₂, alcohol <13%, prolonged contact of wine with air (not fully topped containers).

Potential damages: volatile acidity.

Recommended EnartisStab MICRO M dosage: 20 g/hL. Acetic bacteria are among the least susceptible microorganisms to chitosan. Nevertheless, activated chitosan is the only oenological tool alternative to SO₂ that is significantly effective in reducing acetic bacteria population.

	Control	EnartisStab MICRO M 10 g/hL	EnartisStab MICRO M 20 g/hL
	FCU/mL of <i>Acetobacter acetii</i>		
Wine 1	9E+06	n/a	2E+03
Wine 2	TNTC*	n/a	725
Wine 3	200	25	75
Wine 4	605	330	280

*TNTC: too numerous to count.

EnartisStab MICRO M is effective in controlling acetic bacteria. Analysis made by plating 7 days after EnartisStab MICRO M addition.

- **Brettanomyces/Dekkera**

Growth conditions: resistant to high alcohol content, SO₂, antimicrobial agents like sorbic and benzoic acid and low pH. Due to its osmotolerance, it prevails in conditions of high sugar concentration (grape juice concentrates).

Potential damages: volatile phenols (Brett character), volatile acidity, biogenic amines, loss of colour in red wines.

Recommended EnartisStab MICRO M dosage: 3-5 g/hL (preventative treatment); 5-10 g/hL (curative treatment).

- **Zygosaccharomyces**

Growth conditions: resistant to high alcohol content, SO₂, antimicrobial agents like sorbic and benzoic acid and low pH. Due to its osmotolerance, it prevails in conditions of high sugar concentration (grape juice concentrates).

Potential damages: unwanted refermentation, volatile acidity, reduction of total acidity.

Recommended EnartisStab MICRO M dosage: 10-20 g/hL.

EnartisStab Micro M side effects

• Removal of off-flavors

EnartisStab MICRO M can reduce volatile phenols and sulfur compounds. After treatment with EnartisStab MICRO M, wines usually appear cleaner, fresher and often fruitier at the nose.

	Control	EnartisStab MICRO 10 g/hL	Perception threshold (µg/L)
Hydrogen sulphide (µg/L)	9.65	9.32	1.1
Methyl Mercaptan (µg/L)	2.28	1.17	1.8
Ethyl Mercaptan (µg/L)	1.7	N.D.	1
Dimethyl Sulfide (µg/L)	N.D.	N.D.	2.5
Diethyl Sulfide (µg/L)	1.1	0.86	0.9
Other sulphur compounds (µg/L)	4.31	2.26	-

EnartisStab MICRO M increases wine aroma cleanliness by removing volatile phenols and sulfur compounds.

• Prolong wine shelf life

Activated chitosan has the ability of removing catechins and chelating copper and iron, metals that activate the oxidation process. This minimizes wine sensitiveness to oxidation and preserves fresher aroma and colour for longer time.



	Control	5 g/hL EnartisStab MICRO M	10 g/hL EnartisStab MICRO M
Catechins (mg/L)	16.17	10.15	9.58
Abs 420 nm	0.209	0.155	0.132
Abs 520 nm	0.061	0.039	0.030

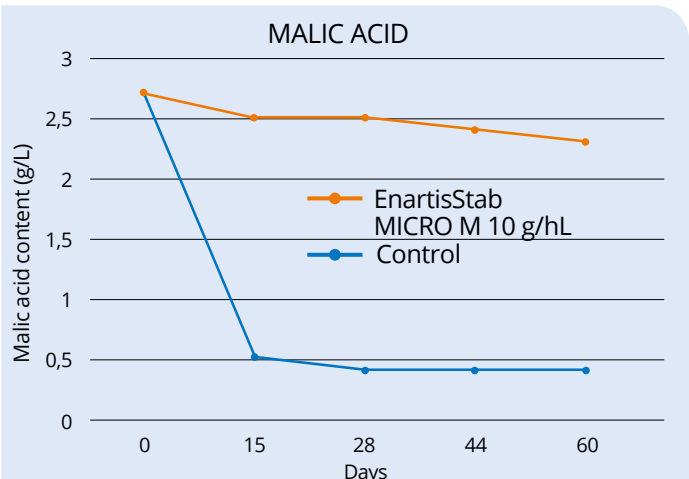
EnartisStab MICRO M increases wine resistance to oxidation by removing catechins, copper and iron. Analysis done 48 hours after EnartisStab MICRO M addition.

EnartisStab MICRO M APPLICATIONS DURING WINE STORAGE

Prevention of malolactic fermentation

For many wines, malolactic fermentation is not desired. Lactic bacteria activity is generally controlled by using SO₂. In the case of SO₂-free or low-SO₂ wines, like base wines for sparkling for example, wine is exposed to the risk of an unwanted malolactic fermentation onset. Also "regular" wines can undergo undesirable malolactic fermentation with increased of temperatures at springtime.

Depending on the initial population, the addition of 10-20 g/hL of EnartisStab MICRO M reduces the number of bacteria below the risk threshold and allows the preservation of wine acidity. EnartisStab MICRO M proved to be as effective as lysozyme with the additional advantages of being non-allergenic, vegan friendly and respectful of wine colour.

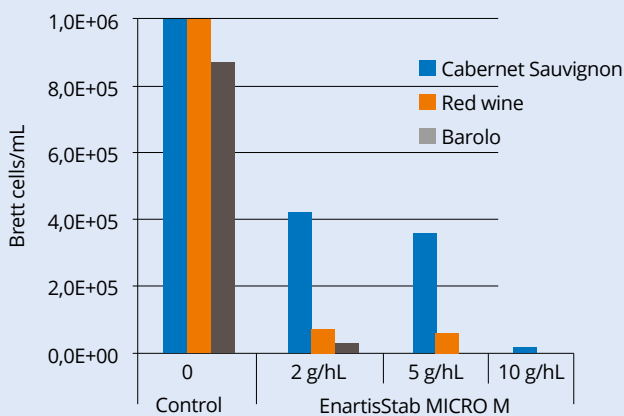


EnartisStab MICRO M can prevent or delay the malolactic fermentation. Initial lactic bacteria population: too numerous to count (TNTC).

Wine parameters: pH 3.4, alcohol 13.4%, 0 mg/L free SO₂, 8 mg/L total SO₂.

Wine ageing in barrel and concrete tanks

Brettanomyces are a potential contaminant for all wines present in the winery but mainly for those aged in oak and concrete tanks. These two materials have a porous structure that offers a wonderful shelter for Brett and that makes full sanitization rather complicated. That is why it is essential to avoid new barrel and new concrete tank contamination by only transferring wines that are microbiologically “clean”. A preventative treatment with 3-5g/hL of EnartisStab MICRO M added to the wine during the transfer to barrels, concrete tanks or amphoras is a recommended practice.



Examples of EnartisStab MICRO M effectiveness in controlling *Brettanomyces*. Analysis made by plating 10 days after EnartisStab MICRO M addition.

Prevention of spoilage microorganism during maturation on lees

Benefits from wine maturation on lees are well-known: more aromatic complexity, bigger volume on the palate, improved chemical-physical stability, better antioxidant protection and longer shelf life. However, maturation on lees is not a risk-free practice. Substances released from yeast cells as a result of lysis can be used as nutrients by bacteria and non-*Saccharomyces* yeast.

Addition of 15-20 g/hL of EnartisStab MICRO M can help prevent the development of most of these contaminants.

Production low SO₂ or SO₂-free wines

Activated chitosan is the only enological tool that, like SO₂, has both antimicrobial and antioxidant activity. The application of 8-10 g/hL of EnartisStab MICRO M at the beginning of maturation phase in combination with storage at low temperature and regular microbial analysis helps to reduce or to replace SO₂ addition without sacrificing adequate wine protection.

Protection of base wines for sparkling

Base wines used to produce sparkling wine, must have a low quantity of SO₂. This exposes them to high risk of contamination. The addition of 5 g/hL of EnartisStab MICRO M and regular microbial analysis ensures the desired quality is maintained.

Protection of sweet wines

Wines that are sweetened with concentrated must can be contaminated by *Zygosaccharomyces*. This yeast is difficult to control with the usual treatments. EnartisStab MICRO M is quite effective in reducing *Zygosaccharomyces* population. A fining with 8-15 g/hL prior to bottling helps to reduce the risk of fermentation in bottle.

Treatment of bulk wines

Bulk wines that are transferred from a winery to another can be a source of contaminants. Addition of 5-10 g/hL of EnartisStab MICRO M is a kind of insurance to prevent any kind of microbiological issue.

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