



**RED WINE**

# Compromised Fruit: Powdery Mildew

VARIETY	TYPE OF WINE
Red Varieties	Incidence of 9% or more of powdery mildew and associated secondary infections.
CHALLENGES	OBJECTIVE
<ul style="list-style-type: none"> <li>Oxidation</li> <li>Off-aromas and flavors</li> <li>Stuck fermentation</li> <li>High protein instability</li> <li>High pH and potassium</li> <li>High phenolic content</li> <li>Microbial instabilities</li> </ul>	Mitigate the detrimental wine matrix alterations from fruit compromised by powdery mildew.

**KEY WINEMAKING STEPS WHEN DEALING WITH POWDERY MILDEW AFFECTED GRAPES:**

1. Hand harvest and sort contaminated grapes in the vineyard
2. Use adequate antioxidant protection to limit browning, color loss and aroma oxidation
3. Reduce skin contact to limit extraction of off-flavors, avoid extended maceration, separate press fractions (first ten gallons is full of detrimental metabolites)
4. Control any spoilage microbes as early as possible
5. Supplement must with amino acids and ammonia to ensure complete healthy fermentation
6. Select robust, low nutrient requiring yeast with fast, complete fermentation kinetics
7. Improve color intensity and stability by promoting condensation and co-pigmentation reactions
8. If there is visual browning, use **Enartis Claril SP** to remove browning products
9. Balance wine mouthfeel with mannoproteins and fermentation tannins
10. Late application of certain fungicides can increase elemental sulfur and metal content (Cu), analyze for metals and use **Stabyl Met** (PVI/PVP) to fine out heavy metals

**RECOMMENDED VINQUIRY ANALYSIS**

STAGE	ANALYSIS	INTERPERTATION
<b>Juice</b>	Core Juice Panel Potassium Metals: Cu & Fe Ammonia and Amino Nitrogen	Analyze nutrient status and potential risk of reduction with application of late sulfur sprays in the vineyard.
<b>After MLF</b>	Glucans	Presence of glucans effect wine filterability and viscosity. Recommend using <b>EnartisZym Elevage</b> to improve filterability if results are positive. (Related with associated secondary infections)
	Volatile Acidity	Acetic Acid <ul style="list-style-type: none"> <li>Normal range in dry table wine: 400 mg/L</li> <li>Higher is indicative of spoilage from secondary infections</li> </ul>

The above is achieved to the best of our knowledge and experience.  
The industrial application of the advice provided does not imply any responsibility on the part of our company.

**Revision:** August 2019

## PROTOCOL

WINEMAKING STAGE	OBJECTIVE	ENARTIS RECOMMENDATIONS	DOSAGE
Harvest	Antioxidant	<b>Effergran:</b> Effervescent, granulated potassium metabisulfite. Direct addition into gondolas if machine harvested. 1g of Effergran = 0.40 g of SO <sub>2</sub>	125 g/gondolas (5 tons)
		<b>and</b> <b>AST:</b> Potassium metabisulfite 50% L-ascorbic acid 30% Gallic tannin 20%. 10 g/hL (0.8 lb/1000 gal) of AST provides around 28 mg/L of SO <sub>2</sub> and 30 mg/L of ascorbic acid. (At reception)	100-200 g/ton
Processing and Maceration	Antioxidant	<b>EnartisTan Antibotrytis:</b> Gallic, di-gallic, ellagic and condensed tannins.	50-200 g/ton
	Enzyme	<b>EnartisZym Color Plus:</b> Pectolytic enzyme preparation rich in cellulosic and hemicellulosic side activities.	20-40 g/ton
	Antimicrobial	<b>EnartisStab Micro M:</b> Pre-activated chitosan from <i>Aspergillus niger</i> with purified yeast hulls.	80 g/ton
Inoculation	Organic Nitrogen, Yeast Survival Factors	<b>Nutriform Energy:</b> Contains amino acids, organic nitrogen, micronutrients, vitamins, mineral salts and survival factors which are immediately available to meet these requirements. <i>Add at inoculum rehydration.</i>	20 g/hL
	Yeast (select one)	<b>EnartisFerm ES488</b> <b>EnartisFerm WS</b> <b>EnartisFerm Top 15</b>	20 g/hL
Fermentation	Yeast Derivatives	<b>EnartisPro Tinto:</b> Yeast cell walls, grape seed tannins and ellagic tannins. Improves mouthfeel, promotes color stability.	20-40 g/hL
1/3 Fermentation	Inorganic Nitrogen	<b>Nutriform Advance:</b> DAP, inactivated yeast and cellulose.	20-40 g/hL
Pressing	Color Stabilization Antioxidant	<b>EnartisTan E:</b> High concentration of mono-catechins and low molecular weight condensed tannins.	10 g/hL
Malolactic Fermentation	Malolactic Bacteria	<b>EnartisML Silver:</b> <i>Oenococcus oeni</i> that ensures ML fermentation under difficult conditions due to high alcohol and polyphenol content.	Volume dependent
	Nutrients	<b>Nutriform ML:</b> Amino acids, vitamins, polysaccharides, cellulose and co-factors.	20-30 g/hL
	Yeast Derivatives	<b>Surli One:</b> Inactivated yeast that contributes to protein, tartrate and polyphenol stability. Enhances volume and aromatic complexity	10-20 g/hL

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WINEMAKING STAGE	OBJECTIVE	ENARTIS RECOMMENDATIONS	DOSAGE
Maturation	Antioxidant Antimicrobial	<b>Winy:</b> Potassium metabisulfite.	0.5 ppm Molecular SO <sub>2</sub>
	Antimicrobial	<b>EnartisStab Micro:</b> Pre-activated chitosan from <i>Aspergillus niger</i> .	10 g/hL
	Oak Color Stability	<b>Incanto Range:</b> Select French and American oak, aged 18-36 months. Bench trials are recommended to find the best oak profile.	3-5 g/hL
	Filterability	<b>EnartisZym Elevage:</b> Pectolytic enzyme preparation with significant β-glucanase activity.	5 g/hL
Finishing	Mouthfeel Structure	Enartis maturation and finishing tannins, <b>Surli Velvet</b> (soluble yeast mannoproteins)	Trial Dependent

For more information about how to treat powdery mildew infected grapes and wine, please contact Enartis Wine Services at (707) 838-6312 ext. 4.

#### CITATIONS:

Lopez Pinar, A., Rauhut, D., Ruehl, E., & Buettner, A. (2017). Effects of bunch rot (*Botrytis cinerea*) and powdery mildew (*Erysiphe necator*) fungal diseases on wine aroma. *Frontiers in chemistry*, 5, 20.

Steel, C. C., Blackman, J. W., & Schmidtke, L. M. (2013). Grapevine bunch rots: impacts on wine composition, quality, and potential procedures for the removal of wine faults. *Journal of agricultural and food chemistry*, 61(22), 5189-5206.