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PROTOCOL

THERMOVINIFICATION

VARIETY	TYPE OF WINE
Cabernet Sauvignon, Merlot, Pinot noir	Red Varieties
CHALLENGE(S)	**OBJECTIVE**
• Color Extraction • Color Stability • Off Aroma	• Protect color and natural tannin • Increase filterability, yield, and clarification of must • Stabilize color and improve structure • Encourage co-pigmentation and bank unstable color compounds

BACKGROUND

Thermovinification treatment temperatures range from 104-158^{0}F (40-70^{0}C) with duration of heat application spanning from 15 minutes to more than one hour (Morata et al, 2019). The musts exposure to heat denatures detrimental oxidative enzymes, and destroys microorganisms, making this treatment ideal for compromised fruit infected with *Botrytis cinerea* (Wang et al., 2016). Thermal treatment can degrade some desirable and undesirable compounds, highlighting the importance of time and temperature in its application. Pomace treated with thermovinification techniques are extremely viscous and exogenous enzymes should be applied to facilitate efficient pressing. The high degree of extracted coloring compounds should be stabilized with the use of exogenous tannins. Sacrificial, condensed and co-pigmentation tannins for color stabilization and protection should be utilized to maintain a good ratio of anthocyanins to tannins (1:4) limiting the precipitation of coloring material.

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WINEMAKING STAGE	OBJECTIVE	ENARTIS RECOMMENDATIONS	DOSAGE
GRAPE RECEPTION	*Sacrificial antioxidant, color stabilization*	ENARTISTAN FERMCOLOR Blend of condensed and hydrolyzable tannins from exotic wood species and ellagic tannins from chestnut.	120-200 g/ton
THERMAL TREATMENT	*Improved filterability and clarification*	ENARTISZYM T-RED Liquid pectolytic enzymatic with hemicellulosic activity preparation developed for use at high temperatures. Helps reducing juice viscosity and improving wine filterability. * Add when must is below 158°F (70°C), optimum activity at 131°F (55°C).	18 mL/ton
Apply enzyme to grapes after crush or after thermal treatment dependning equipment as well as the maximum tempertature and treatment time. Allow clarifyification for up to 10 hours before fermentation			
INOCULATION	*Fermentation*	ENARTISFERM VINTAGE RED Medium nutrient requirements. Wide fermentation temperature range (18-35°C) with high production of glycerol and mannoproteins.	20 g/hL
	Color stability Improved mouthfeel and structure	ENARTISPRO TINTO Condensed grape seed tannin, ellagic tannin, and yeast hulls rich in mannoproteins. Dramatically increase color stability and mouthfeel. *homogenize with a pump-over at inoculation.	45 g/hL
AFTER ALCOHOLIC FERMENTATION BEFORE MLF	*Color stability Condensation*	ENARTISTAN FRUITAN Blend of condensed tannins, mainly extracted from fresh, physiologically ripe, white grape seeds. The use of EnartisTan Fruitan during fermentation on skins, or immediately after alcoholic fermentation allows for better color retention and improved color stability.	10 g/hL

For more information call our Technical Winemaking Specialist at (707) 838-6312.

CITATIONS

Morata, A., González, C., Tesfaye, W., Loira, I., & Suárez-Lepe, J. A. (2019). Maceration and Fermentation: New Technologies to Increase Extraction. In *Red Wine Technology*(pp. 35-49). Academic Press.

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Wang, J., Huo, S., Zhang, Y., Liu, Y., & Fan, W. (2016). Effect of different pre-fermentation treatments on polyphenols, color, and volatile compounds of three wine varieties. *Food science and biotechnology*, *25*(3), 735-743.

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