Inspiring innovation.

PROTOCOL

WINEMAKING GUIDELINES

SMOKE TAINT – RED WINES

How are grapes and vines affected by bushfire smoke?
Numerous volatile phenols are present in bushfire smoke and can be absorbed by grape berries and vine leaves during a smoke event. Vineyard and grape exposure to smoke may result in wines with undesirable aromatic characteristics such as smoky, burnt, bacon, medicinal or ash, as well as distinct bitterness and drying sensation in the throat.

What compounds are responsible for smoke taint?
The known compounds which contribute to smoke taint are free forms volatile phenols (guaiacol, 4-methylguaiacol, o-cresol, p-cresol, m-cresol, etc) which are produced when lignin in wood is burnt. These compounds are absorbed by the vine and which then glycosylates, or adds one or more sugars to the compounds. These sugar bound compounds are released in the mouth by enzymes in saliva, which leads to an ashy aftertaste.

How can I assess the level of smoke taint risk?
In grapes, we recommend measuring the **Total Smoke Taint Markers** as the "free" (volatile) fraction is almost non-existent with grapes and not representative of the smoke taint risk. Testing grapes two weeks prior to harvest is recommended.

Which factors affect smoke uptake by vines?
To assess the risk of smoke taint in wine, we recommend testing for Free and Total Smoke Taint Markers as this gives a more complete picture for the status of free and bound fractions within the wine. For red wines, samples can be tested just after pressing a red must and at any point during the ageing process. Constant, regular sensory monitoring recommended especially when close to bottling time – release of bound compounds rather unpredcitable and does not follow a trend/pattern.

Key winemaking steps when dealing with smoke tainted grapes:

1. **Heavily sort the fruit.** Removal of leaves and plant material will reduce smoky characteristics.
2. **Do not attempt to press off early to avoid extraction of smoke compounds.** Research has shown that most of the extraction of smoke compounds occurs within the first couple days of fermentation. For this reason avoiding extraction is not an option for reds affected by smoke. Instead make a wine which has more body, because the wine will likely have to be fined or undergo reverse osmosis, which will strip out some of the wine. For this reason, it is better to have a wine which has more body to begin with.
3. **Separate press fractions,** when pressing the skins, some extra volatile phenols may be extracted from heavy press fractions.
4. **Select a yeast which produces high levels of red fruit characteristics**. This is one of the best tools a winemaker has for masking smoke aromas.

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5. Rack off lees early: some off-aromas bound to lees and can be eliminated by racking early. Replace with clean lees
6. Balance wine mouthfeel with mannoproteins and fermentation tannins. Precursors from fermentation tannins may aid in red fruit characteristics as well as improve the body of the wine.
7. Market for early release: smoke-related characteristics can evolve in bottle as wine ages.

WINEMAKING STAGE	OBJECTIVE	ENARTIS RECOMMENDATIONS	DOSAGE
Harvest/ Vineyard	Antioxidant	**Effergran**: Effervescent, granulated potassium metabisulfite. 1g of Effergran = 0.40 g of SO_2.	
On Grapes	Enzyme	**Enartis Zym Color Plus**: Cellulase, hemicellulase, pectinase and protease activities. Improves polyphenol extraction and helps with color stability.	20-40 g/ton
Inoculation	Yeast Nutrients	**Nutriferm Arom Plus** provides essential nutrients for proper yeast development: amino acids, vitamins and mineral salts and aromatic precursors to enhance fermentation aromas.	40 g/hL
	Yeast (select one)	**EnartisFerm Red Fruit:** One of the most aromatic red fruit producing strains of *Saccharomyces Cerevisae*. It can utilize aromatic precursors from Tan Red Fruit to aid in masking smoke aromas. **EnartisFerm Q5**: Used for full bodied red wines. This strain of *Saccharomyces Cerevisae* produces intense red fruit aromas which complement structured red wines.	20 g/hL
	Polysaccharides	**Enartis Pro Tinto** is a blend of yeast cell wall polysaccharides, grape seed tannins and ellagic tannins. Improves mouthfeel, promotes color stability and intensity.	20-40 g/hL
	Oak Chips	**Incanto Chips Natural**: Untoasted French oak chips, aged 18-36 months.	3- 5 g/L
1/3 Fermentation	Yeast Nutrients	**Nutriferm Advance**: Inorganic nitrogen, cellulose and yeast cell walls rich in sterols and fatty acids. Helps yeast with stress resistance, detoxifies wine, ensures complete fermentation and reduces production of H_2S.	30-50 g/hL
	Tannin	**EnartisTan Red Fruit**: A blend of condensed tannins extracted from red fruit trees. Provides precursors for red fruit aromas and nor-isoprenoids to mask smoke aromas.	5-15 g/hL
1/2 Fermentation	Yeast Nutrient	**Nutriferm No Stop**: Yeast cell walls rich in fatty acids and sterols to improve yeast cell membrane fluidity, yeast resistance and fermentation activity.	20-30 g/hL
Recommended analysis: Alcohol, Residual Sugar, pH, TA, Malic Acid, Microscan, Smoke Taint Markers Rack wine from heavy fermentation lees toward end of fermentation.			
Press Fractions	Fining	**Fenol Free**: Activated carbon fining agent with high affinity for volatile phenols responsible for smoke taint.	20-40 g/hL
Free Fraction	Fining	if wine is heavily smoke taint affected, **Fenol Free**: Activated carbon fining agent with high affinity for volatile phenols responsible for smoke taint.	20-40 g/hL
Malolactic Fermentation	ML Bacteria	**Enartis ML Silver**: *Oenococcus oeni* that insures ML fermentation under difficult conditions such as high alcohol and polyphenol	

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		content. This ML strain also increases fruity aromas and characteristics	
	ML Nutrient	**Nutriferm ML**: Nutrient specific for ML bacteria: amino acids, vitamins, polysaccharides, cellulose and co-factors. Stimulates bacterial growth and activity.	10-20 g/hL

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