# 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 sensory characteristics such as smoky, burnt, bacon, medicinal or ash, usually described as 'smoke tainted'.

**What compounds are responsible of smoke taint?**

The primary compounds in smoke responsible for taint are free volatile phenols (guaiacol, 4-methylguaiacol, o-cresol, p-cresol, m-cresol, etc) which are produced and released into the atmosphere when lignin in wood is burnt.

**How can I assess the level of smoke taint risk?**

Vinquiry Laboratories by Enartis USA has developed a robust method for the quantification of smoke taint markers (free and bound) in grapes, juice and wine. Vinquiry Laboratories offers analysis for total guaiacol and 4-methylguaiacol (free and bound), which have been identified as smoke taint markers. A representative grape, juice or wine sample is required.

Sample volume: grapes = 5 clusters or 200 berries; juice or wine = 50 mL.

**Which factors affect smoke uptake by vines?**

The risk of smoke exposure causing a perceptible taint in wine is a function of the stage of grapevine growth and development, the grapevine variety, smoke concentration, duration of exposure and the volatile phenol concentration and composition of the actual smoke.

**Key winemaking steps when dealing with smoke tainted grapes:**

1. **Hand harvest** and sort out **leaf material** that can release smoke-related compounds
2. **Limit skin contact** to reduce extraction of off-aromas: avoid destemming, crushing, cold soak, extended maceration, whole bunch press and press early
3. Process fruit **cold** to limit extraction
4. **Separate press fractions** and clean hard presses with **carbon fining**
5. Select an aromatic, fast fermenter yeast strain with good phenolic extraction ability
6. Rack off lees early: some off-aromas bound to lees and can be eliminated by racking early
7. **Mask** smoke related off-aromas with untoasted oak chips or tannins with aromatic precursors. Oak chips can reduce intensity of smoke characteristics through increased wine complexity
8. Balance wine mouthfeel with mannoproteins and fermentation tannins
9. Market for early release: smoke-related characteristics can evolve in bottle as wine ages

**How to compensate for short skin contact?**

1. Use adequate **antioxidant** protection and **sacrificial tannins** to limit color loss
2. Promote **fast extraction of polyphenols** and maximize press yield by using maceration enzymes
3. Use a yeast with good extraction ability
4. Improve color intensity and stability by promoting condensation and co-pigmentation reactions

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| WINEMAKING STAGE | OBJECTIVE | ENARTIS RECOMMENDATION | 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 |
| *Limit skin contact: no cold soak, no extended maceration, no crushing, no destemming.* *Recommended analysis: Juice Panel, Smoke Taint Markers* | | | |
| **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) | **Enartis Ferm MB15:** Pinot noir isolate from California with high polyphenol extraction capacity. It respects varietal character and terroir, ferments fast with a short lag phase. **Enartis Ferm WS**: Resistant to stress conditions, dominant *S.cerevisiae* strain that requires low nutrients. Produces clean, fruity and elegant wines. | 20 g/hL |
| | Polysaccha-rides | **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 |
| *Fermentation temperature < 25°C (77°F)* | | | |
| **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 |
| | Oxygen | Via **Enartis MicroOx** or pump-over to improve yeast membrane health. | 10 mg/L |
| | Grape Tannin | **Enartis Tan V**: Mono catechins and low molecular weight condensed tannins from grape seeds. Highly reactive, it condenses with free anthocyanins to promote long lasting color stability. | 5-10 g/L |
| **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* *Press early and rack from heavy fermentation lees toward end of fermentation.* *Gentle press cycle – Limit rotation – Separate press fractions* | | | |
| **Press Fractions** | Fining | **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 content. | |
| | 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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