



WHAT TO DO WITH GRAPES EXPOSED TO SMOKE?

SCOTT LABS' BEST PRACTICES GUIDE TO OPTIMIZING WHITE & ROSÉ GRAPES EXPOSED TO SMOKE

THIS GUIDE IS FOR WINEMAKERS WHO ARE MAKING WINE FROM GRAPES EXPOSED TO SMOKE AND ARE LOOKING FOR STRATEGIES TO MINIMIZE THE DAMAGING EFFECTS OF SMOKE COMPOUNDS ON WINE QUALITY AND STYLE.

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BACKGROUND

Smoke is an aerosol of small solid particles and/or liquid droplets generated from burning material. Smoke composition varies depending on type of material that has burned, extent to which material has burned, and intensity of heat.

Smoke contains many undesirable compounds for winemakers including small volatile phenols that may smell and taste smoky, spicy, plastic-like, fecal and are sometimes likened to cigarette smoke and dirty ashtrays. Once these compounds permeate the grape they can bind with sugars and other compounds found in the grape skins. When smoke compounds are bound to grape components they are often

odorless and tasteless. However, during fermentation and aging, smoke compounds can be released from their bound form resulting in unwanted smoke odors and flavors. This means that grapes and juice may smell clean but the resulting wine could have unwanted smoke aromas and flavors!



Research into the effects of smoke on grapes and wine quality is ongoing and we are not able to answer even some of the most basic questions. The information and best winemaking practices presented here are based on information publicly available from research groups working on smoke exposed fruit within the United States and Australia coupled with Scott Labs' long experience with winemaking processes, products, and know-how. Despite publicly available research and our know-how, there are no guarantees that any particular strategy will reduce, prevent, or ameliorate the impact of smoke on wine quality and style.

HOW TO USE THIS GUIDE

This guide is **organized by winemaking stage** starting with grape harvest and transport and ending with filtration and finishing. For each winemaking stage we have proposed one or more

Best Practices and an explanation for how that practice could positively **effect smoke exposed grapes**. Our Best Practices can be categorized into **four types of strategies**:

Minimize	Remove/Reduce	Counterbalance	Quality Preservation
Practice may minimize smoke compounds from entering the system.	Practice may remove or reduce smoke compounds from the wine system.	Practice may push wine style in a direction to counterbalance the effect of smoke compounds.	Practice prevents microbial spoilage or other flaws which could exacerbate impact of smoke compounds.

TIPS

Run smoke taint marker compound analysis on the fruit and wine ([etslabs.com](https://www.etslabs.com)).

Conduct a micro-fermentation pre-harvest to determine risk (<https://www.etslabs.com>).

Do not cross-contaminate wines in the cellar by blending prematurely.

Assess risk from anhydrous cellar chemicals (bentonite, cleaners, acids, etc.) so that you don't taint clean wines.

Link to other resources: [cawg.org/Shared_Content/Resources/Wildfire_Smoke/Wildfire_and_Smoke_Exposure.aspx](https://www.cawg.org/Shared_Content/Resources/Wildfire_Smoke/Wildfire_and_Smoke_Exposure.aspx).



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Winemaking Stage	Best Practice	Explanation for Best Practice	Scott Labs' Recommendation (product, dosage, notes)
Harvest and transport	Minimize berry damage, keep fruit cool, and sort to remove all leaves.	<p align="center">- Minimize -</p> Minimizes risk of smoke compounds on leaves and grape skins from migrating into juice. Keeping fruit cool keeps grapes turgid and minimizes skin rupture.	In addition to traditional vineyard analysis run a smoke taint panel. For further information on smoke taint analysis see the following link: etslabs.com
	Add SO ₂ to picking bins.	<p align="center">- Quality Preservation -</p> Minimizes microbial spoilage.	Standard SO ₂ addition to picking bins. <ul style="list-style-type: none"> • Inodose granules • Potassium metabisulfite (KMBS)
Grape reception and fruit processing	Keep fruit cool, perform secondary sorting, and process quickly.	<p align="center">- Minimize -</p> Minimizes risk of smoke compounds from grape skins and leaves migrating into juice. <p align="center">Quality Preservation -</p> Minimizes microbial spoilage.	Begin pressing then clarify as soon as possible to eliminate vineyard residues like dirt, dust and ash. For Rosé winemaking, no skin contact (direct to press).
Pressing	Obtain high quality free run juice and protect from oxidative damage.	<p align="center">- Minimize -</p> Minimizes risk of smoke compounds from grape skins migrating into juice. <p align="center">- Counterbalance -</p> Protects aromatic compounds and color from oxidative damage. Increased fruit and varietal aromas can help counterbalance smoke compounds.	<p align="center">Recommended Product:</p> <ul style="list-style-type: none"> • Glutastar™ at 30g/hL to the press pan to scavenge quinones Consider removing first 5-10 gallons/ton if juice contains excessive amounts of vineyard dust, dirt and smoky aromas. Taste press cuts and separate harsh fractions. Process and treat fractions separately based on sensory evaluation.
Juice clarification/ Static settling	Fast clarification.	<p align="center">- Minimize -</p> Minimizes risk of smoke compounds from pressed juice solids from migrating into juice. <p align="center">- Quality Preservation -</p> Protects aromatic compounds and color. Removes pectin, proteins, harsh, bitter or oxidized compounds.	<p align="center">Recommended Clarification Enzymes:</p> <ul style="list-style-type: none"> • Scott'zyme® Pec5L • Scott'zyme® Cinn-Free <p align="center">Recommended fining agents:</p> <ul style="list-style-type: none"> • GranuBent PORE-TEC (Bentonite) at 35-75 g/hL • Bentolact S (Bentonite-Casein blend) at 20-100 g/hL • Freshprotect (PVPP and Bentonite blend) at 20-100 g/hL • Colle Perle (Gelatin) with Gelocolle (Silica Gel) each at 80-150 ml/hL • Polycel (PVPP) at 40-80 g/hL • Caséinate de potassium (Casein) with Gelocolle (Silica Gel) each at 50-100 g/hL • Granuacol GE (Carbon) at 10-100 g/hL <p>Bench trials must be conducted to determine dose. The dosage for smoke compound minimization will be much higher than traditional dosage recommendations.</p>



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Winemaking Stage	Best Practice	Explanation for Best Practice	Scott Labs' Recommendation (product, dosage, notes)
Pre-fermentation racking	Eliminate gross lees.	<p align="center">- Counterbalance -</p> <p>Encourages production of esters and fruity notes by yeast due to lower solids (lower NTUs) which can help counterbalance smoke compounds.</p>	Clarify to ~100 NTUs.
Alcoholic fermentation	Use a yeast strain that will start quickly, promote good fruit character and texture while minimizing off flavors .	<p align="center">- Quality Preservation -</p> <p>Starting alcoholic fermentation as soon as possible minimizes opportunity for microbial spoilage.</p> <p>Choosing yeast strains compatible with the wine matrix minimizes risk of stuck and sluggish fermentation and/or production of off-odors (i.e. volatile acidity, sulfur-containing off odors)</p> <p align="center">- Counterbalance -</p> <p>Choosing yeast strains that increase fruit aromas and mouthfeel can potentially counterbalance the effect of smoke compounds.</p>	<p align="center">Recommended Yeast Strains:</p> <ul style="list-style-type: none"> • Cross Evolution™ • CVW5™ • ICV Opale 2.0™ • QA23™ • VIN 13 <p>Dosage at 25-35 g/hL. For high brix fruit increase yeast dose.</p> <p>Begin alcoholic fermentation as soon as possible.</p> <p>Ferment between 60-72°F to promote good fruit flavors, secure your fermentation and minimize yeast stress.</p>
	Add yeast nutrients.	<p align="center">- Quality Preservation -</p> <p>A complete nutrition strategy minimizes risk of microbial spoilage due to a stuck or sluggish fermentation and minimizes risk of yeast-derived off-odors and flavors.</p> <p align="center">- Counterbalance -</p> <p>Strategic use of nutrients can maximize fruity aromas which can potentially counterbalance the effect of smoke compounds.</p>	<p align="center">Recommended Yeast Nutrients:</p> <ul style="list-style-type: none"> • Go-Ferm Protect Evolution™ at 30-45 g/hL • Fermaid O™ at 20-40g/hL • Stimula Sauvignon Blanc or Stimula Chardonnay™ at 40 g/hL to reveal thiols or produce esters respectively
	Add Reskue™ , an inactivated yeast with high bio-sorptive capacity.	<p align="center">- Minimize -</p> <p>Inactivated yeast with high bio-sorptive capacity can sometimes bind smoke compounds.</p>	<p align="center">Recommended Inactive Yeast:</p> <ul style="list-style-type: none"> • Reskue™ at 40 g/hL. Add anytime from mid-fermentation to end of fermentation.
	Add aromatic tannins or oak chips at the onset of fermentation to help elevate fruity and floral aromas.	<p align="center">- Counterbalance -</p> <p>- Counterbalance -</p> <p>Adding aromatic tannins or oak chips during fermentation can add sweetness, enhance fruit, boost mid-palate and length which may counterbalance effects of smoke compounds.</p>	<p align="center">Recommended Oak Chips:</p> <ul style="list-style-type: none"> • Feelwood! SWEET & FRESH at 50-100 g/hL
Post-fermentation racking	Let gross lees settle for 24-48 hours and then rack.	<p align="center">- Minimize -</p> <p>Removes protein, pectin, tartrates and dead cells that may be bound with smoky characters.</p>	<p align="center">Recommended product:</p> <ul style="list-style-type: none"> • Noblesse at 10 g/hL if smoky compounds persist.



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Malolactic fermentation	Conduct a rapid malolactic fermentation .	<p align="center">- Quality Preservation -</p> <p>A rapid malolactic fermentation allows wines to be stabilized sooner, thus minimizing risk of microbial spoilage.</p>	<p>Recommended sequential inoculation bacteria strains:</p> <ul style="list-style-type: none"> • O-MEGA at 1 g/hL • Lalvin VP41™ at 1 g/hL <p>Recommended co-inoculation* bacteria strain:</p> <ul style="list-style-type: none"> • Enoferm Beta Co-inoc™ at 1 g/hL <p>Recommended nutrient for bacteria:</p> <ul style="list-style-type: none"> • Opti'Malo Blanc™ at 20 g/hL <p>*If a rapid sequential malolactic fermentation is difficult to achieve (lack of temperature control, difficult wine conditions, etc.) then a co-inoculation strategy is advised.</p>
	Ensure microbial stability .	<p align="center">- Quality Preservation –</p> <p>Post fermentation microbial control allows wines to be stabilized sooner, thus minimizing risk of volatile phenol production from <i>Brettanomyces</i> or <i>volatile acidity</i> from wine bacteria.</p>	<p>Recommended microbial control agents:</p> <ul style="list-style-type: none"> • No Brett Inside™ at 4-8 g/hL • Bactiless™ at 20-50 g/hL • Inodose tablets to maintain MSO₂ according to pH
Post fermentation management	Trial fining agents and tannins to reduce smoky compounds and build structure .	<p align="center">- Remove/Reduce -</p> <p>Fining agents may be able to remove some of the smoke compounds.</p> <p align="center">- Counterbalance -</p> <p>Tannins and fining agents can add structure, mid-palate, and impact aromas and flavors which may counterbalance effects of smoke compounds.</p>	<p>Recommended removal agents:</p> <ul style="list-style-type: none"> • Granucol GE (carbon) • Polycacel (PVPP-Casein blend) • Colle Perle (Gelatin) • Bentolact S (Bentonite-Casein blend) • Redules (Bentonite-Inactivated yeast blend) • GranuBent PORE-TEC (bentonite) <p>Bench trials must be conducted to determine dose. The dosage for smoke compound removal/reduction will be much higher than traditional dosage recommendations.</p> <p>Recommended tannins and counterbalancing agents:</p> <p>Tannins:</p> <ul style="list-style-type: none"> • Scott'Tan™ FT Blanc Citrus • Scott'Tan™ FT Blanc Soft • Scott'Tan™ Onyx • Scott'Tan™ Royal • Scott'Tan™ Riche • Scott'Tan™ Riche Extra <p>The Oak Lab™ Thermic oak infusion products</p> <ul style="list-style-type: none"> • Profiles 1-3 <p>Inactivated yeast blends</p> <ul style="list-style-type: none"> • Noblesse™ (may need TTB approval for post-fermentation use) • Redules™



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Filtration	Release bound up smoke compounds and remove .	<p align="center">- Remove/Reduce -</p> <p>Beta-glycosidase enzymes can cleave the bound non-odiferous aroma compounds increasing the level of free smoke compounds allowing higher levels to be removed via reverse osmosis. If not treating wines with reverse osmosis DO NOT use these enzymes. Allow minimum of 2 weeks contact time with enzyme before R.O. and deactivate enzyme with 3g/hL bentonite.</p> <p>Filtration through carbon filters may remove some of the smoke compounds.</p> <p>*If not treating wines with reverse osmosis or carbon DO NOT use these enzymes.</p>	<p align="center">Recommended enzymes:</p> <ul style="list-style-type: none"> • Rapidase® Revelation Aroma at 2-4 g/hL • Scott'zyme® BG at 3-6 g/hL <p>Bench trials must be conducted using enzymes to determine dose and contact time. The dosage for smoke compound cleavage may be much higher than traditional dosage recommendations.</p> <p align="center">Recommended carbon filters:</p> <ul style="list-style-type: none"> • Sheet filters- Seitz AKS4 • Lenticular modules- SDI AKS4 • Cartridges-ScottCART Carbon <p>For reverse osmosis providers see links here: wineindustrynetwork.com/suppliersearch.php?</p>
Finishing	Conduct trials to optimize structure, body and aromas	<p align="center">- Counterbalance –</p> <p>Can produce a more structured, aromatically pleasing and fuller wine to potentially counterbalance smoke compounds.</p>	<p align="center">Recommended finishing products*:</p> <p>Fining agents:</p> <ul style="list-style-type: none"> • Flashgum R Liquide at 40-120 ml/hL • UltiMA Soft at 15-30 g/hL <p>Tannins:</p> <ul style="list-style-type: none"> • Scott'Tan™ Royal • Scott'Tan™ Radiance • Scott'Tan™ Onyx • Scott'Tan™ Riche • Scott'Tan™ Riche Extra <p>Bench trials must be conducted to determine dose. The dosage for counterbalancing may be much higher than traditional dosage recommendations.</p> <p>*Consider using Scott Labs' Finishing Kit for Bench Trials.</p>