

# ROT MANAGEMENT IN REDS

## RECOMMENDATIONS

### ROT MANAGEMENT STRATEGY

Rot management is a part of your integrated pest management (IPM) strategy. However, despite your best control strategies you may still have to harvest fruit compromised by *Botrytis cinerea* or other microorganisms. *Botrytis* grows intracellularly and infects fruit primarily under the grape skin, secreting a damaging and stable enzyme called laccase. In extreme cases *Botrytis* can cause “slip-skin”, making the fruit very difficult to handle.

When *Botrytis* or other rots are present on red grapes, the resulting wine quality can be negatively impacted. Depending on the mold and bacteria present, there are serious enological concerns, such as oxidative browning, degradation of color and aromatic compounds, as well as clarification and possibly filtration challenges.

The first step in dealing with compromised fruit is to evaluate the mold level (both on the cluster, within the cluster and inside the berries) and to sort the grapes, separating the fruit so that you are dealing with the cleanest fruit available. Afterward, don't forget to clean your picking bins as well as your winery equipment to minimize cross-contamination.

### TIPS FOR DEALING WITH INFECTED GRAPES

- Analysis is key!
  - Pre-fermentation analysis (chemical and microbiological) allows you to make good winemaking decisions.
  - Post-fermentation analysis allows you to move forward while determining risk.
- Must is very sensitive to damage from laccase.
- Increase your initial SO<sub>2</sub> addition, and consider using Lysozyme if secondary lactic infections are evident.
- Minimize time between picking and inoculation (no- cold soak).
- Choose a yeast with a short lag phase, low VA production and good mouthfeel. Increase your yeast dose to insure a fast start to fermentation.
- If a late Sulfur spray was done in the vineyard, you may wish to consider using a non-SO<sub>2</sub>/ H<sub>2</sub>S producing wine strain.
- Consider co-inoculation with ML to get your wine protected earlier.
- Keep free run and press fractions separate until you have determined risk.
- Separate heavy fermentation lees ASAP, as the lees contain most of the laccase.
- Keep tanks/barrels topped and treated.
- Minimize oxygen exposure, consider the use of gas, dry ice or a sparging stone.
- Do not blend laccase positive and laccase negative wines.
- If heat treatment is available, that is a very good tool to deactivate the laccase.



### ROT ASSESSMENT

#### Visual Test

- Count number of infected clusters per vine and determine the % of the fruit infected
  - <1% proceed as normal
  - >1 - <5% further sorting
  - 5-20% - treat with care as fruit needs special consideration
  - >20% extreme measures to save fruit

#### Sensory Evaluation

- Make notes on the taste and smell of the fruit so that you can determine the impact on wine quality.

## QUALITATIVE & QUANTITATIVE TESTING

Qualitative and Quantitative tests are available and should be used to determine risk. Adapt an appropriate winemaking strategy to optimize wine quality.

### Qualitative Test for Laccase Activity:

- Place three samples (~50ml) of must in clean glasses and cover.
  - Glass one – Control
  - Glass two – Add 60ppm SO<sub>2</sub> and leave at cellar temperature
  - Glass three – Add 60 ppm SO<sub>2</sub> and place in the refrigerator
- After 24 hours assess for changes in color or quality. If laccase is present then the control and the glass held at cellar temperature will be browner than the refrigerated sample. You may also have an oily film on the surface.

### Quantitative (Laccase Unit) Test Interpretation for RED Wines:

- 1 laccase unit – Exercise caution (Increase SO<sub>2</sub> dose)
- 2-15 laccase units – Pro-active (Increase SO<sub>2</sub>, use enological enzymes and tannins- medium dose)
- >15 laccase units – Aggressive intervention (Increase SO<sub>2</sub>, use enological enzymes and tannins higher end of dose recommendations)

## MANAGING ROT BY STAGE

WINEMAKING STAGE	GOAL	ADDITION	ADDITION RATE	NOTES
<b>Harvest and Transport</b>	Sort in the vineyard to remove as much of the compromised fruit as feasible. Start to protect from oxygen damage and microbial activity.	SO <sub>2</sub> addition. Consider the use of <a href="#">Inodose Granules</a> in the picking bins.	This is depending on pH and % of compromised fruit. But should be adapted accordingly.	In addition to your vineyard analysis, conduct a qualitative and quantitative laccase activity test, as well as a visual rot assessment.
<b>Fruit Reception and Grape Processing</b>	Sorting and fast processing is key, as juice/must is very sensitive to the damaging effects of laccase (oxidative browning), and moldy flavors.  If Lactic acid bacteria are present consider the use of <a href="#">Lysozyme</a> .	<a href="#">Inodose Granules</a>	As appropriate for the pH and laccase level.	Appropriate SO <sub>2</sub> management offers some protection from oxidative browning.
	Tannin additions are highly beneficial at this time as they act as an antioxidant and help minimize the damage from laccase.	<a href="#">Lysovin</a> or <a href="#">Lyso-Easy</a>	20g/hL	In color sensitive cultivars, then the addition of proteins ( <a href="#">Lysozyme</a> ) at this stage can cause color-loss.
	Enological enzymes help to liberate the laccase from under the grape skins. They also assist with the extraction of positive compounds so that you can treat the fruit gently throughout the early stages of the process. Begin the alcoholic fermentation as soon as possible (No pre-fermentation cold soak).	<a href="#">FT Rouge™</a> , <a href="#">FT Rouge Soft™</a> or <a href="#">FT Rouge Berry™</a>	30-60g/hL (dosage depending on required treatment/laccase activity)	Add half of the dosage at the crusher, and the balance at the start of fermentation.
		<a href="#">Lallzyme EX™</a> , <a href="#">Lallzyme EX-V™</a> or <a href="#">Scottzyme ColorPro®</a>	20-30g/ton, 15- 20g/ ton, and 80-100ml/ton respectively (dosage depending on required treatment/laccase activity)	Respect a 6-8 hour time interval between enzyme and tannin addition.

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Alcoholic Fermentation	You want a secure alcoholic fermentation. Use a yeast strain that will start quickly, promote good fruit character and texture while minimizing off flavors (VA, sulfides, and SO <sub>2</sub> ). If MLF is desired you can consider a co-inoculation 24 hours post inoculation.	<a href="#">Lalvin T73™</a> , <a href="#">ICV D21®</a> , <a href="#">Rhône 2056™</a> , <a href="#">GRE™</a> , or <a href="#">Enoferm CSM™</a> . If VA is not elevated in the fruit then <a href="#">D254®</a> , or <a href="#">CVRP</a> are good choices. If elevated SO <sub>2</sub> is a concern then use <a href="#">ICV Okay™</a> .	25-35g/hL	Increase the inoculum to have a good start to fermentation, and enter into the alcoholic phase as soon as possible.  Ferment no hotter than 80°F, this to promote good fruit flavors and minimize yeast stress.
	Ferment on bentonite	<a href="#">Bentostab</a>	10-20g/hL	Potential to bind laccase.
Fermentation Nutrition & Yeast Derivative Nutrients	Ensure that the yeast has the nutrients (macro and micro) available to conduct a rapid and clean fermentation.	<a href="#">GoFerm Protect Evolution™</a> during rehydration	30-45g/hL	<a href="#">GoFerm Protect Evolution™</a> protects and stimulates the cells, minimizes lag phase, and compensates for nutrient deficiencies caused by molds. It replaces the thiamin has been deactivated if you used >50ppm SO <sub>2</sub> .
	To bind any potential pesticides, or moldy aromas.	<a href="#">Nutrient VitEnd™</a>	30g/hL	
	To stabilize color and build a balanced palate. Balance (potential) high alcohol.	<a href="#">OptiMUM Red™</a>	20g/hL	
		<a href="#">Booster Rouge™</a>	20g/hL	
	<a href="#">Fermaid O™</a> at 2-3 brix sugar drop	10-40g/hL	This is to nourish the cells minimizing heat spikes, yeast stress while promoting good aromatics.	
	<a href="#">Fermaid K™</a> or <a href="#">Fermaid O™</a> at 1/3 sugar depletion	10-40g/hL	This replaces nitrogen used during the yeast growth phase.	
Pressing and Racking	Taste throughout the fermentation process to determine skin contact length. In the most challenging situations you may have to shorten your time on skins. Run a quick laccase activity test to determine browning risk. Drain free run to a tank, and taste press fractions and isolate, keeping fractions separate if necessary. Let gross lees settle for 24-48 hours and then rack to a clean tank. Keep fractions separate for as long as necessary. Rack under a CO <sub>2</sub> blanket if needed.			
Malolactic Fermentation	Make sure you conduct post fermentation analysis so that you use a compatible MLF strain. If you added higher than normal amounts of SO <sub>2</sub> , your strain must be able to withstand this higher total SO <sub>2</sub> level. Inoculate as soon as possible, even if wine is slightly sweet, but looks like it is going to complete alcoholic fermentation.	<a href="#">VP41™</a> or <a href="#">PN4™</a>	1g/hL	Use strains that conduct a fast MLF, and produce texture-building polysaccharides.
		<a href="#">ML Red Boost™</a>	20g/hL	This will provide the bacteria with essential nutrients so that the ML can be conducted in a timely manner.

WINEMAKING STAGE	GOAL	ADDITION	ADDITION RATE	NOTES
<b>Post Fermentation Management, Aging and Fining</b>	Keep running the qualitative laccase assessment. A quantitative analysis may be conducted to determine risk. Protect wine from O <sub>2</sub> until the risk is low. Manage your topping and SO <sub>2</sub> regime. Conduct trials with cellaring tannins due to their structure building and anti-oxidant qualities. If wine is slightly moldy in the nose or mouth, then gelatin trials can be run, and if oxidative browning is causing challenges, then casein or PVPP can be trialed.	<a href="#">Scott'Tan Tannin Complex™</a> , <a href="#">Estate™</a> , <a href="#">Refresh™</a> .  <b>Gelatins:</b> <a href="#">Colle Perle</a> and <a href="#">Inocolle</a>  <b>Caseins:</b> <a href="#">Caseinate de potassium</a> , <a href="#">Polycacel</a> , and <a href="#">Polycel</a>	Bench trials can be conducted to determine dose based on wine style and desired outcome.	Protein fining may destabilize color.
<b>Filtration</b>	The wine may have filtration issues if complex polysaccharides are present (glucans, pectins, etc). It may be useful to conduct a filterability test. If the filterability test fails and the wine is clean, you may wish to conduct trials with <a href="#">Scottzyme KS®</a> , or <a href="#">Lallzyme MMX™</a> . <a href="#">Lallzyme MMX™</a> may take up to 6 weeks to break down the glucans. For a guide to managing filtration please see <a href="#">Filter Grade Selection by Measuring Turbidity</a> .			
<b>Packaging</b>	Trial tannins under our Luxe range. <a href="#">Scott'Tan Royal</a> , <a href="#">Scott'Tan Radiance</a> and <a href="#">Scott'Tan Onyx</a> are designed to bring out elegance, complexity and balance. Due to their production process, they can be used up to 48 hours before bottling. Protect your aromas from oxidation throughout the packaging process.			