

Dear WA Winemakers,

Please find below some notes on what to watch out for when dealing with frost damaged grapes. I realize this note comes a bit late but thought it might still be helpful.

Ripe fruit caught in the freeze

The fruit should be harvested as soon as possible, best harvested by hand. There is a possibility that the dead leaves entering the grape bins with mechanically harvested fruit can give an off flavor to the wine. If fruit is machine harvested it is therefore best to try to blow off the leaves on the vines before the harvester runs through. Again, hand harvest would be the best to avoid a potential taint from leaves.

The partial freezing of the berries causes some structural damage inside, also in the berry skin and at the attachment point (pedicel) to the stem (racchis). This damage opens up the berry to infection and rapid growth of spoilage yeast and bacteria. The freeze-damaged berries will have significantly higher microbial loads than healthy, intact berries (up to several million microorganisms per mL rather than a few hundred). These unwanted microorganisms must be controlled in the winery. One way is to pasteurize the must. Very few wineries are equipped to do this and many winemakers think this is a bad technique, but it is very effective. The use of short periods of heat, 60°C (20 minutes) to 80-90°C (2 minutes) (140 to 180°F) can also reduce vegetative flavors in the resulting wine.

Other ways to eliminate the unwanted and to limit their activity are:

For white wines

- Add 50 to 80 mg/L (ppm) of SO₂ to the must at pressing
- Use rapid and strong clarification at cold temperatures. This will remove a large part of the microorganisms attached to the pulp and berry skin. Strong clarification also helps avoid excessive extraction of phenolic compounds. Bentonite is a good clarifying agent as it will help with protein instabilities as well. A guide to fining agents is available here (<http://cru.cahe.wsu.edu/CEPublications/em016/em016.pdf>).
- Quickly warm the grape must to 60–65°F (15-18°C) and use a large dose of starter culture yeast 2.5 lbs/1000 gal (0.3 g/L). This will help your inoculum establish a very large population and overwhelm unwanted apiculate yeast and bacteria that can spoil your wine. Maintaining a moderately warm fermentation temperature is also helpful as well as trying to avoid a slow, lengthy fermentation under cool conditions (temperatures of 60F and below favor the growth of apiculate yeast (non-saccharomyces)). With this fruit it is best to avoid fermentations with native yeast because the risk of spoilage is higher than with healthy, intact berries.

For red wines

- Add 100 mg/L of SO₂ to crushed fruit.
- Avoid cold soaks. Quickly warm the grape must to 60–65°F (15-18°C) and use a large dose of starter culture yeast 2.5 lbs/1000 gal (0.3 g/L). As discussed earlier this will provide your yeast a larger population size to dominate the fermentation. In these types of situations it is better to maintain a warm fermentation temperature so as to avoid long drawn out fermentations.
- Avoid extended skin maceration after completion of alcoholic fermentation. You might consider pressing off just before dryness.

Under-ripe fruit

Some of the fruit that was caught in this unseasonably early freeze was not fully ripe and of course ripening stopped when the leaves were destroyed. Heat treatment of must and wine can help reduce unripe, green flavors. Also additions of oak preparations and some wine fining materials can help remove or mask these unripe flavors. Making rosé is a good option for slightly under-ripe reds.

Adjusting sugar and acidity

Chaptalization is legal in Washington so take full advantage of the rules so optimize the final alcohol content in your wine. It may also be necessary to remove excess acids if your titratable acidity is above 10 g/L. Both calcium carbonate and potassium carbonate are effective at removing excess acids with calcium being more effective. Typically the amount of carbonate needed to reduce your juice to a predetermined acidity is added to a small portion of the juice (25%) and then blended back after the acid has all precipitated. Calcium carbonate will make the treated juice less acid stable so it is better to only treat a portion of the juice or stick to potassium carbonate. If you have to deacidify must of TA higher than about 12 g/L, consider double salt deacidification. The amount of tartaric acid in the must determines how much acidity can be removed with simple potassium or calcium carbonate deacidification because only tartaric acid is removed in this way. If a larger deacidification is needed then the double salt method must be employed in which some malic acid is also removed.

Adjust pH

In fruit that carries a large microbial load it is VERY important to keep the pH as low as possible. Low pH is a very strong selective factor which favors beneficial yeast and bacteria. Try to have a must be pH before start of fermentation at 3.4 and lower. For white wines a must pH as low of 3.0 is good. In fact, outstanding Rieslings and Sauvignon Blancs are produced from fruit with pH as low as 3.0 to 3.2. For Chardonnay intended for premium sparkling wine the pH again is very close to 3. For still wines made from Chardonnay the pH will be a bit higher – still try to keep it below 3.5 (this is a good practice also with healthy, intact fruit). For red wines try to get the must to 3.4-3.5. This will help limit the growth of many unwanted yeast and bacteria and will lead to less off flavors being reduced in these wines.

Check YAN

As always, please remember to check the yeast available nitrogen! Aim to have a least 250 mg/L of YAN. Fruit that carries a higher microbial load is likely to contain less nutrients for the wine yeast. Best to use a combination of complex yeast nutrients and simple diammonium hydrogen phosphate (DAP).

Use of MLF

Also, remember, malolactic fermentation (MLF) lowers the wine's acidity. MLF also removes unripe, green flavors – in white and in red wines! MLF can be used to make fruity whites. If you have questions, please ask us.

Yeast Lees Aging

Extended aging of wines on yeast lees also helps reduced unripe flavors and bring our more ripe flavors. It also improves the body of wines. This works in white and in red wines. In case of the freeze damaged grapes it is probably best to remove the lees after primary fermentation because it will contain more pulp and more unwanted microorganisms. You can add back fresh, healthy yeast by simply rehydrating some more starter culture yeast and adding it to the wine. Use the same care in rehydrating this as when you prepare the yeast for inoculation of must. Again, use a large inoculum to give you lots of fresh, healthy yeast for the lees aging time.

Thomas Henick-Kling
Jim Harbertson

WSU Viticulture & Enology Program
<http://www.wine.wsu.edu/>

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