Post Fermentation - Guiding Our White and Rosé Wines Toward Bottling

By Clem Joyce, 2021

Imagine, picking fruit off the vine, crushing it and it ferments, the wine squeezed out, settles and clears brilliantly. It tastes great, so you bottle it. That is called magic. SNAP, SNAP, back to reality. Only in our dreams. If only it was that simple. There is a reason the last word in the English dictionary is zymurgy. We need to use every available tool that comes before it, to perfect the process.

It's now early in the month of March; our wines from the fall may be clearing a little. What is the process for getting our white and rosé wines ready for bottling? What is your desired timeline? Mid to late spring is my goal for fruity aromatic whites. With the exception of the odd rosé, white wines in my experience rarely ever settle clear enough to think about bottling without the aid of fining and filtering.

Our wines have probably been finished the alcoholic ferment AF since at least early November. Let's look at what we should have done from November through February.

Early Settling

Some of us use the 3-3-3 rule for racking. After our fermentations have stopped and hopefully, they are where we want them, the wine is racked off the main fermentation gross lees. Serious H2S problems can arise if the wine is left too long on the gross lees. Red wines should be racked 3 days after pressing, again in 3 weeks and then in 3 months. Whites should be stirred daily nearing the end of fermentation to keep the yeast in suspension and then racked off the gross lees after the ferment has stopped, then again in a week and then in 3 months. This gets the wine away from heavy solids and dead yeast deposits and any potential problems of H2S. Light lees after the first racking onward is usually not a problem, **if** you intend to continue stirring weekly. Wines like Chardonnay and possibly Sauvignon Blanc, and Pinot Blanc where the winemaker wants a rounder wine with lees character will benefit from this process. Stirring with lees can continue for several months. These wines must be stirred on a regular basis or H2S can develop. Read a very good article by Ben Rotter on our Vawa Website on Lees stirring or batonnage. http://www.brsquared.org/wine/Articles/surlie/surlie.htm

Other wines with fruity aromatic character will benefit from getting the wine off the yeast lees sooner. Sulphiting the wine to .8 molecular is recommended and testing to confirm. It is commonly believed that about half of the first dose of metabisulphite after AF will bind and a further dose may be needed to maintain the .8 molecular level. We must test.

An enzyme I have used to help wine settle is ScottLab's Scottzyme KS. Used at the high end of the recommended dose of 5 – 8 mls per 100 L, I had great clarification by spring and by late summer probably didn't need filtering. KS can be added soon after AF or early spring.

We should be doing full specs testing after AF; SG to confirm dryness or desired sugar level if you wanted an off-dry wine, pH, TA, Alcohol, and Free SO2. This should give you a good picture of where you are and may need to go if adjustments are needed, not just by taste alone. A hydrometer will not give an accurate residual sugar level but 0.990 or .991 is considered dry for a wine with an alcohol 12 – 14%. Every .004 on hydrometer is 1% residual sugar or 10 gr sucrose per litre. So, a wine with a finished SG of .993 is likely to have a residual sugar level of about .5 -.75%. You may taste a very slight sweetness. Most of us don't perceive .5% RS or less as sugar. It will be perceived as fruit or roundness. Unfortunately,

with Clinitest not being available any longer, and the replacement not cost effective, it's hard to get an accurate RS level. We can use our hydrometer and a refractometer to determine the finished alcohol. Our club has both for sharing. And a quick check with our pH meter will tell us if we will need some adjustments for acidity. Adjustments can be made gradually over the coming weeks to guide our wines to our intended goal rather than making larger adjustments nearing bottling.

After fermentation, the main tasks of getting our wines ready for bottling are degassing, stabilizing/clarifying and balancing.

Our VAWA website has several good articles on fining.
http://www.brsquared.org/wine/Articles/fining.htm

Degassing

Wines immediately after AF contain a lot of CO2 and will struggle to clarify. Wines that are kept cool or cold will naturally retain CO2, so keeping in a warm space, approx. 15 – 20°C after AF will help release CO2 from the wine. Agitation, stirring and racking with some splashing also helps to release CO2. Some winemakers may choose to use an inert gas like nitrogen or argon to avoid excessive oxidation while racking. Degassing is gradual and will take time. Be careful with the first stirrings of the wines as there may be a significant amount of CO2 released. Stirring wine in carboys with a stirring rod on a drill are more effective than hand stirring. You may need to remove some wine from carboys to give some headspace for the foaming. As wines lose their CO2, they will taste rounder and wines with some residual sugar will gradually taste sweeter. A common fault of bottling wines like Social wines that have some residual sugar and still have a little retained CO2 when young; they can fool the palate. As the CO2 dissipates over time, they can tend to taste sweeter than intended. The retained CO2 in the wine initially gives a false impression of acidity. Such wines then tend to taste flabby over time. If wines, even with noticeable CO2 need to be cold stabilized, one should not hesitate to take advantage of our cold winter temperatures and then put back into a warmer environment. This process will take some time and may be ready for bottling in late spring but there are many who still wait till the fall to bottle their wine. Excessive aeration should be avoided as significant character can be lost. The final step of filtering in late spring will usually remove any residual CO2, if not excessive.

Protein Stability

Most white wines will have some dissolved proteins that can show themselves over time or if the wine warms up. They appear as a haze in the wine or settle as a light whitish deposit in the bottle even in filtered wines. As all proteins have a positive charge, they are attracted to compounds like tannins, having a negative charge. Rosé wines usually have enough tannins to balance any proteins and will naturally fall fairly clear in a few months. Whites usually require fining with an agent. Bentonite has been the go-to agent for its effectiveness and low cost, but can be troublesome settling. Winemakers should fine with bentonite shortly after AF, as it usually takes some time to remove these proteins in the wine and settle. One should do a stability test before any addition to determine the amount of bentonite to add, because adding too much can strip flavour. Bench tests I have conducted had results requiring from .3g/L to 1.3g/L of bentonite, so it's hard to just pick a number. The average was in the .7 -

.8g/L range. I know of wineries that just add a standard dose of .5g/L and they hope that the wine is consumed by the time anything shows up. Most wine kits also just give a set dose. Over fining strips character. So, bentonite bench tests should be conducted. They are involved and time consuming, so I understand why winemakers with a small amount of wine are reluctant to do them. There are alternatives.

Kieselsol which does not strip character is another fining agent that can be effective to remove proteins, followed by an addition of Chitosan or Gelatin. A little less invasive than bentonite. Fining for protein removal shortly after AF, is highly recommended to be able to take advantage of any cold stabilizing that compacts the bentonite or other finings with tartrates that precipitate.

Wines that have some tannins like rosés rarely need fining for protein. White wines that have had fermentation tannins added also may not need protein stabilizing. In the last few years, I have added to all my whites and rosés, Scott Lab fermentation tannins, FT Blanc Soft and FT Blanc Citrus during ferment to a total additional of 15g/100L. I have found that doing so, I haven't had a protein problem in my whites and haven't needed to use bentonite. Fermentation tannins also seem to provide a fuller, rounded mouthfeel and possibly better settling.

We can do a stability test of our wine by heating a sample (100mls) in a small bottle to about 80°C in a water bath for a couple of hours and let cool. Any proteins will show as a cloudiness. The test to determine how much bentonite to add requires making a 5% bentonite solution, letting it hydrate for a day, then adding measured amounts to samples ranging from .1 – 1.0 or more g/L dose. These samples are chilled in a fridge for a day to settle, then the clear wine carefully taken off the settled bentonite. These marked samples are then heated for a couple of hours, then cooled. The samples are then checked for clarity to determine the appropriate dose of bentonite to use. There is also a product called Bentotest, available from Bosa, that can be used that takes the place of heating the samples, reacting in a few minutes. The Bentotest is added to a range of samples as above. If proteins are present, the sample will turn cloudy. You choose the bentonite dose needed. It is quite costly for home winemakers to use as one would only use about 10mls per wine and Bentotest is $75 for 250 mls with a limited shelf life.

Wines that have had some oak aging or oak additions like Chardonnay don't seem to need protein fining. It would appear the tannins from the oak react to take out the proteins.

There is plenty to read on-line about protein stability testing. Read an in-depth article on Protein Stability in wine by Dr. Bruce Zoecklein here,

CHAPTER 19 PHYSICAL INSTABILITY (vt.edu)

Cold Stabilizing

In our west coast environment, we can sometimes get sub-zero temperatures of -3°C to -5°C in December through February, ideal temperatures for dropping tartrates in the wine. The advantage of having tartrates precipitate out, helps to compact the lees or bentonite fining if used. Even if you do not use bentonite early, cold stabilizing is still highly recommended to preventing tartrates forming in our bottled wine when chilled in the fridge. One, cannot always count on the weather but I have found that we usually get suitable temperatures sometime through our winter. This year we had some nice sub-zero temperatures in December and in February that helped me drop tartrates and compact the lees.

The wine should be racked off the tartrates while still very cold so as not to be reabsorbed. One should also watch temperatures very carefully so as not to allow your carboy to freeze and break. Alcohol levels will determine actual freezing temperature point. I have seen this tragic loss. If one is lucky enough to have a fridge or controlled cold space to cold stabilize, that is a nice advantage.

Cold stabilizing usually results in a slightly lower TA due to the tartrates dropping slightly. Experts suggest TA can drop as much as 1 gr/L and the result is a softer taste. Taste testing is needed to assess balance. Only potassium bitartrate drops out resulting in lower tartaric acid, not malic acid.

Balancing

This can be a good time to taste our wines, preferably with a friend for input, assessing for balance. We can assess for acidity, alcohol, sugar, mouthfeel and tannins. Setting up a series of glasses with graduations of minor adjustments is a very good way to evaluate the wine and can make a significant difference.

Acidity can be increased by small additions of tartaric or citric acid. Citric has the advantage of not precipitating over time. Reduction of acidity can be made with the addition of potassium carbonate. This only reduces tartaric acid and could cause tartrates to drop out in time. Tartaric adjustments should be done before cold stabilizing. The last adjustments should be done with citric acid which will not precipitate.

If back sweetening is planned, sample ranges should be tasted. Also consider the addition of potassium sorbate to stabilize and avoid re-fermenting in bottle. Never add a wine that has had a malo-lactic ferment with any wine intended to have sorbate added. Never add sorbate to any wine that has gone through a malolactic fermentation. Lysozyme can be added to any wine after ferment to avoid a lactic bacteria fermentation. This avoids the dreaded geranium characteristic that can arise.

Alcohol can be reduced slightly with the addition of water. See our VAWA website for a Reduction Chart. Taste trials are needed to determine if necessary.

White and rosé wines can have an excess of tannins and need fining to reduce. Gelatin or egg white works well for this. Back sweetening can also balance out tannins. High acid will also bring out tannins, so wine style will play a part in determining if any reduction is needed.

Aromatic whites like Gewurztraminer, Riesling, Ehrenfelzer or Viognier to name a couple, often have some residual sugars and higher acidity. These wines can taste a little out of balance when young. Testing for residual sugar has been made more difficult with the loss of use of the Clinitest. The replacement test kits from a local supplier; Aimtab of 36 tablet /$54; Accuvin 10Pk/ $55. With a shelf life of weeks when opened (from my personal experience) is not worth the effort. A hydrometer seems the only resource. Remembering about SG and residual sugar in the earlier section on **Early Settling**, can help us understand residual sugar levels. We also have our all-important taste buds to guide us.

I set up a range of glasses with slight adjustments and ask a friend or two to also help for feedback. When I get my balance adjustments set, I adjust the remainder of the batch. If I have more than one carboy, I may adjust one slightly differently if I want a slight variation. Keep track of each batch variation.

If back sweetening, I always add potassium sorbate to stabilize. Not all sorbate is created equal. Some sorbate seems to be very refined and leaves no after taste in the wine. Other sorbate can give the wine a bubble gum taste. I would ask for a sample to test and taste before buying a quantity. My last source was a Kg pack from Bosa which I shared with someone years ago and it is still very good.

Our VAWA website has a great chart on the amount of sorbate based on the wines' pH and alcohol level.

VAWA Winemaking Techniques, Potassium Sorbate Table

Clarifying

Now that we are into March, hopefully our wines have been stabilized and are clearing, we can continue with the degassing and balancing. If you are just catching up with fining and setting, you can still fine for clarity using the products previously mentioned. Review the great article about fining from our VAWA website by Ben Rotter.

Filtering

With our wine finally balanced to our palate, we can consider the addition of our desired aroma enhancing enzyme like Scottzyme BG or Trenolin Bouquet Plus, by Erbsloeh. These are designed to bring out more aroma character. Trenolin's action is not inhibited by residual sugar greater than .5% unlike the BG, which is. Selecting the right product is essential for the wine style. I would make all additions of aroma enhancing enzymes, oak tannins if used, before the final filtration.

Even if our wines may be clearing nicely, rarely can I avoid filtration. Buon Vino produces a variety of filtration systems. Two common systems for home winemakers are the smaller 3 pad Mini Jet and the slightly larger 3 pad Super Jet, but they also make a 6 and 10 pad system for larger capacity.

I generally use the #2 medium pad (about 1 micron) which many winemakers are happy with. For a very brilliant wine, when all additions are finalized and just before bottling, I then use the finest #3 pad, approx. .5 micron. This produces brilliantly clear wine but is not sterile filtration. These pads filter out approximately .5 micron nominal size particles whereas sterile filtration requires .45 micron absolute filtration which means nothing larger than .45 micron can get through the pad and you will need a sterile room.

Pad preparation is very important to condition the pads for insertion and avoid the cardboard off-taste that can sometimes come from pads. I would often see this fault while judging during competitions. A solution of a tablespoon of Citric or Tartartic acid and equal metabisulphite in about 8 - 10 litres of water should be prepared. The pads should be soaked in the solution for a moment while they hydrate and foam before setting one by one in the filter system. Pad direction is very important. Once pads are tightened in place, the same water is circulated through the pads for at least 5-10 minutes. This flushes any fibres and pad taint that come off the pads. Once this is done, you can start to pump the wine through. You can see the colour change as the wine starts coming through the pads. Discard the water. The pads will drip slightly. Don't save this wine; tasting will convince you why. Avoid high pressure during filtering as this can cause pads to crack and leak unfiltered wine through. Sulphite level should be checked before and after filtering, so you are aware of the free sulphite loss during filtering.

Bottling

The final filtration done; our wines' free sulphite tested !! not just guessing; we are ready. Bottles are clean, DRY, corks and caps on hand. Our bottle filler cleaned and sterile. (I regularly take apart and clean and sanitize my wine filter pump and my bottle filler. In the past, I had been shocked with what I have found).

One can use a simple hose and shut-off to fill bottles or something more sophisticated. There is a filler wand with shut-off on the lower end that attaches to your hose. This style fills from the bottom up. This requires good light and careful watching as dark bottles are hard to see the fill level. One can use an auto-shut-off filler that has an adjustable fill level. This one fills from the top and probably allows a little more aeration. All will give approximate fill levels and a slight adjustment may be needed. I use a 10ml syringe and a depth clamp to extract excess wine and adjust bottle fill level based on the cork length.

Buon Vino makes a pump driven bottle filler that also fills from the top, but it's fill level is better regulated. I usually leave about ½" airspace under cork. Wine temperature does make a difference and more headspace may be needed if the wine is quite cold, as it will expand in time. I leave all my bottles standing up in their cases. Very few ever get laid on their side. If you do lay your wine down, I would recommend keeping the wine vertical for a couple of months. This allows for the pressure inside the bottle to equalize rather than having the wine forced into the cork. If the wine doesn't touch the cork, there is little chance of cork taint.

Don't wash your corks before bottling as any chlorine can give the wine a cork taint. Fill dry bottles. Don't wash or boil corks. Insert them dry as most corks have a special lubricant finish on them to help insertion. I recommended a corker that compresses the cork sides before insertion. The actual insertion method makes a difference. Compress the cork, hold for a couple of seconds and then insert rapidly rather than slowly. Rapid insertion allows a great deal of air to be expelled, whereas slow insertion traps most of the air inside the bottle. A significant pressure can be trapped inside the bottle. There is an ideal diameter that the cork should be compressed to. It is usually about 15mm. Check your corker. Also check that the mechanism compresses the cork properly, centered and allows the cork to enter the bottle without being fouled by the corker housing, tearing or scaring the cork. I have serviced several of our members corkers that had worn badly. They all will need some maintenance over time.

I suggest a week or two after bottling that you open a bottle and measure the sulphite level in the wine, so you are aware of the loss during bottle.

Now on to the fun part. Chill before serving. Enjoy safely.

Clem Joyce

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