Making a Great White Wine

June 15, 2019

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Sources:

MoreWine, Guide to White Wine Making, https://morewinemaking.com/web_files/intranet.morebeer.com/files/wwhiw.pdf

From Vines to Wines (5th Edition): by Jeff Cox

Topics

- When to Pick
- Sanitization
- Fermentation Prep
- Yeast & Nutrients
- Fermentation
- Malolactic
- SO2
- Aging & Storage
- Bottling
- Must Knows

When to pick your Grapes

- Taste the grapes
- Look at the seeds (Green or Brown)
- Brix, PH, TA
  - Brix 19-24 (based on style)
  - PH 3.10-3.4
  - TA 5.5-8.0 g/L

- Cool Fruit - 50-55F pick early morning or night (consider dry ice)
- If transporting dry ice
- When you harvest test your PH - very important. Keep a book of notes, and record everything you do in the process.

Clean & Sanitization

- Keep it Clean
  - Legal/Regulatory
  - Quality outcome
- Use Proper Chemicals/Cleaners/Tools
  - P.W.B. – Tanks, lines, pumps (good for soaking),
  - Saniclean– Low Foam, but slower
  - Star San – High Foam
  - No Rinse or 1-Step
  - Bleach (before storing equipment, but rinse, rinse, rinse, rinse)
  - Brushes (carboy, bottle, lines brushes (small for airlocks & long for tubes))
- Sanitize (everything, especially your hands)
  - Sterile working surface – stainless, clean towels, paper towels
  - SO^2 or SO^2 & Critic Acid together
  - Star San (no fumes and safe to come in contact with)
  - Vodka (stray, wipe with paper towel, or swirl)
  - Sanitize anything that goes into the wine (thief, tube, pump, paddle, spoon, hand)
- Rinse, Rinse, Rinse

- https://www.extension.iastate.edu/wine/files/page/files/importanceofcleaningand.pdf

Fermentation Preparations

- Test and adjust the must before fermentation.
  - Test and adjust Brix, PH, TA. Testing Brix use a hydrometer make sure you strain the juice and adjust by temperature
- Crush & de-stem grapes or use whole clusters press adding SO2 while coming out of the Press/Crusher at 50ppm (1.6g per 5 gal) based on PH in the normal range
- CO2/dry ice during crush/press then fermentation
- Cold Soak: Crush then cold soak, soak at 50-55f - 4 hours then press and fermentation
- Free Run and Press Run. Press lightly or no more than 2 bars 29 PSI.
- Each press is different, taste taste. The end of pressing is a thin taste with astringent quality (tannins).

Fermentation Preparations (cont)

- Refining our pressed Juice: Settling out solids 50-55f or lower add Lallzyme-C Max quicker settling also a blanket of CO2 4-6 hours then rack and fermentation
- If not 55F or lower then fermentation immediately
  - Decide on Brix to match style of wine your want, add sugar if low, add water if high
- When testing TA also strain the juice if higher than 9g/L then MLF and/or cold stabilization or chemical adjustment. If lower than 6g/L you'll need to raise it to at least this level by adding tartaric acid.
- Test PH with a PH meter,
  - if your PH is high your TA is low inversely
  - if your PH is low your TA is high
  - Lowering the TA will raise your PH.

Yeast & Managing Nutrition/Nutrients

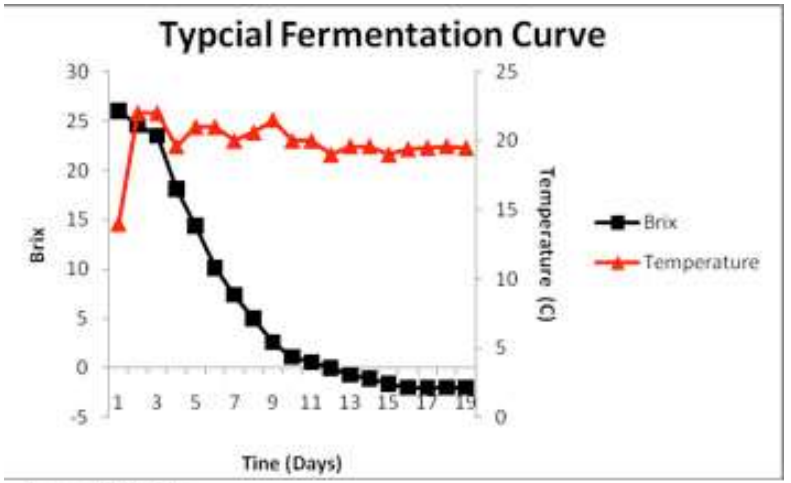
- Wild yeast is Russian Roulette. It is found everywhere, the vineyard, on fruit, floating in vineyard, everywhere imaginable
- Choose a yeast
  - Study different strains of known & dependable yeasts
  - Chose from past successful fermentation
  - Ask a friend or award wining winemaker what they have had success with on your varietal of grape
- Follow the instructions
- Hydrate with Go-Ferm or other yeast food (helps protect flavor and less apt to create Hydrogen Sulfide - 1 gram yeast 1.25 grams go-ferm into 25ml spring water

Yeast & Managing Nutrition/Nutrients (cont)

- Spring Water (NO CHLORINE)
- Let yeast must soak per package, at least 20 minutes
- Take temperature of must and yeast and keep them within 18F of each other
- Once hydrated and temperature measured add to must and thoroughly mix
- Congratulations you have inoculated your must
- Active fermentation within 1-3 days. Build a graph; date, starting specific gravity, temperature take a reading every day for the graph Recommended fermentation temperature 55-65F (12.7 - 18.33C)

Yeast & Managing Nutrition/Nutrients (cont)

- If more than 69F (20.5C) intervene to cool the must
- Controlling temperature, Ambient NV, Air conditioning/Swamp, refrigerator, Glycol cooling system



Sourse: US Davis
https://wineserver.ucdavis.edu/industry-info/enology/fermentation-management-guides/wine-fermentation/problem-fermentations

Fermentation Management, 2-3 weeks

- Stir lees daily during fermentation. Stirring allows fermenting wine to expel any negative odors
- Stir with a food grade plastic or metal. Sanitized easily. Sanitize every time including in between carboys
- Yeast nutrition during fermentation. Using nutrients is a cheap and easy insurance against Hydrogen sulfide, VA, stuck fermentation.
- Recommend adding Fermaid O (or other) at the beginning of fermentation and at 1/3 sugar depletion

Fermentation Management, 2-3 weeks (cont)

- Timing the end of fermentation. In about 2 weeks it will slow
- Graph the sugar levels as they give you a picture of the progress
- Measure your sugar levels with a hydrometer and because Alcohol is lighter than water you will read -1.5 to -2 for 0 Sugars
- Be sure to adjust hydrometer for temperature (see instructions)
- When is fermentation is over? Fermentation is considered done when you reach your desired sugar level.
  - Dry wine is typically 0.2% - 0.3% (two grams of sugar per liter)
  - Off dry wines 1.0% - 5.0% range and
  - Sweet 5.0% - 10%.

Fermentation Management, 2-3 weeks (cont)

- Depends on varietal. In the end there is no correct sugar level. It's personnel preference.
- Creating a dry wine. Fermenting to dryness let the yeast consume all the sugar.
  - If MLF - add no S02 and add MLF bacteria. If no MLF add desired S02 level stir well and proceed to aging.
- Creating a wine with residual sugar
  - Ferment to dry and sweeten at bottling
    - Create a sweet reserve by saving your original must before fermentation - zip lock, take all the air out and freeze. Add back the sweet reserve with bench trials to your taste filter and bottle.
  - Stopping fermentation before at desired sweetness before total dryness
    - Once the desired sugar level is reached add S02, stir well and immediately chill wine to 40F. Filter wine and bottle. Potassium Sorbate is used to stabilize wine with residual sugar (inhibits yeast reproduction and will stop renewed fermentation) Add at a rate of .5-.75 grams per gallon. Never use with MLF it will create rotting Geraniums in the wine
- Fermentation complete test/correct pH/TA and add SO2 if no MLF

MLF Malolactic Fermentation

Lactic acid bacteria (LAB)

- Delicious white wine can be none, partial or full ML impact - style and personal preference
- None MLF will focus on fruit such as Riesling, Gewurztraminer and new world Sauvignon Blancs
  - If none MLF add S02 immediately.
- ML bacteria metabolizes malic acid and turns it into lactic acid, like milk a much softer flavor. This process lowers acidity and creates a roundness and more approachable wine.
- Full MLF creates complexity and adds to mouthfeel, i.e., wines from Burgundy, Bordeaux & Loire
- Partial MLF best of both worlds fruit and complexity.
- Stop MLF when you feel you have complexity and proper fruit. SO2 or chill
- MLF and Lees. To do MLF you need some of the Lees for a source of food for ML bacteria.
  - Full lees– don't rack just add MLF
  - Partial lees: rack and add MLF.
- MLF creates CO2 so you need an airlock, at completion to switch to a solid stopper
- Remember if you want to MLF no S02 prior (except before fermentation)

MLF Malolactic Fermentation (cont.)

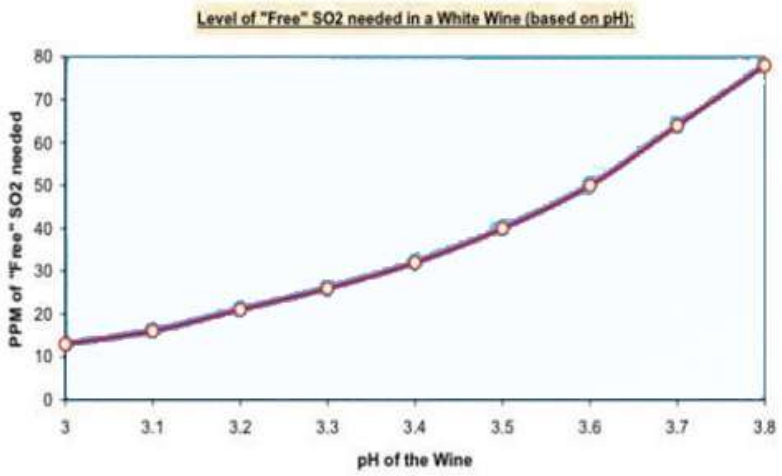
- Adding oak during MLF starts integration of the oak into the wine. The crevices of the wood excellent for microbial growth.
- ML in a liquid form read instructions add to wine.
- Dry ML process commonly comes in 2.5g add to a sanitized container dissolve 50g of Acti-Ml or other (nutrient for ML) into 250ml of distilled water at 77F. Stir and break up clumps wait 15 minutes add bacteria/nutrient solution into wine mix throughout.
- Managing MLF: Gently stir Lees twice a week. Keep temperature 65-70F. Keep oxygen off of wine best flush with CO_2 or Argon each time you stir.
- Listen or Chromatography. (Chromatography will show malic, lactic and tartaric acid)
- Normally complete in 10 Days. Look for activity if none test.
- When complete dose wine with correct SO_2 level then rack and begin aging process..
- These next few months will consist of tasting/monitoring the wine to be sure no problems develop, checking ph/TA and maintain SO_2 levels

SO2 Management

- To protect against oxidative browning and potential spoilage organisms you will add SO2 based on your pH.

pH Effect on Sulfite Additions White Wines			
pH of Must	Total SO2 Needs for Equal Sterilzation Power*	Campden Tablets to Add per Gallon of Must	Grams of Crystals
2.80	20	1/2	0.22
3.00	40	2/3	0.29
3.20	60	1 1/3	0.59
3.40	70	1 1/2	0.66
3.36	80	1 2/3	0.73
3.80	100	2 1/2	1.10
* In ppm potassiun metabisulfite. For those who can't measure pH, figure underripe and test tart grapes at pH 3.0, ripe grapes at pH 3.2-3.6 and overripe grapes at Ph. 3.8			
Source: From Vines to Wines, Jeff Cox, 1999			

***Note:** The precise amount of SO_2 needed is based on the wine's pH (see chart below). So, if you will be adjusting the TA /pH of the wine post MLF, keep this in mind when calculating your SO_2 addition. A good working method is to add the SO_2 addition into the wine, test and correct the TA/pH, then adjust the SO_2 as needed based on the new TA/pH value. For a complete explanation of SO_2 management, see section 9.4*



Source: MoreWines Guide to White Wines, Pg 38

SO2 Management (cont)

- At this point you need to keep your SO2 protection until bottling. If you've done MLF TA will drop and pH will rise.
- SO2 Management is one of the most difficult aspects of home wine-making to master but the most critical aspect of creating a high quality wine.
- SO2 Management simply comes down to understanding how to create & maintain a small stable reserve of free SO2
- SO2 is tied to pH. The simple formula used to make SO2 additions is a starting point but you cannot rely on calculations alone you must test to achieve your desired SO2 level.
- For example no two wines are the same, each one possesses a unique ratio of chemical compounds and solids. One wine could end up with 10ppm the other 25ppm of free SO2 because of a phenomenon know as "binding".
- SO2 becomes chemically bound to aldehydes, acids, furfural, sugars, solids, yeast/bacteria etc. This binding is a good thing it actually serves to protect the wine but as it binds free SO2 goes down thus the difference.

SO2 Management (cont)

- Free SO2 can be viewed as an insurance policy that the winemaker takes out in case the wine has problems
- Barrels, tanks and carboys with headspace lose their free SO2 more quickly than topped vessels.
- Free SO2 levels decrease over time check every 4-6 weeks
- One of the fine lines between artistry and science is to have a sufficient quantity of free SO2 to protect the wine but not to have levels so high that its noticeable when we drink the wine.
- Throughout, winemakers will need to properly maintain the SO2 levels, hold the temperature at a constant 55F and taste the wine every 4-6 weeks to monitor its evolution.

Aging/storage and Lees Management

- All future adjustments/transfers are consolidated into the same operation to limit oxygen & contaminants
- pH should be 3.2-3.55 but your taste will be your guide.
- Transferring your wine to aging container: If you still need oak add new or carry over your old oak. (rinse off your carried over oak, and put in hot water 140-170 to sanitize)
- Making additions at transfer is a good way to mix and stay sanitized
- The Lees: if you plan on aging on the lees you will need to study and understand that this is an advanced technique.
  - If all done correctly positive attributes such as complementary flavors and aromas of honey, hazelnut, toasted bread and spice to the wine.
  - The lees can create complexity and a creamy mouthfeel while better integrating oak, fruit, tannins, and acid into a unified whole.
  - This technique is not suited for every wine. Creating a delicate, light wine with plenty of fruit is not suited for lees contact.
  - Understanding working with the lees is just another tool and it can be modified to fit your needs.

Aging/storage and Lees Management (cont.)

- Aging/storage of white wine is made up of three parts,
  - letting the wine work on its own
  - monitoring its progress by tasting/smelling
  - testing and racking for clarification
- Throughout aging properly maintain the SO2 levels
- Hold at a constant cool temperature as possible (the closer to 55F the better)
- Taste the wine every 4-6 weeks to monitor its evolution
- Why you must stay vigilant “Polymerization”. Wine is never static. It is moving, shifting and alive. It is always developing throughout the aging/storage period whether were involved or not.
  - Polymerization essentially is the process of smaller molecules connecting to create larger ones. This creates complex flavors, aroma and structure. The ideal temp for white wines is 55F
  - This is cool enough to limit microbial growth and regulate extraction from the oak.

Aging/Storage and Lees Management (cont.)

- Tasting and adjusting during aging:
  - Taste and test every 4-6 weeks. Your looking for: Is everything all right. Is the wine fresh/fruity or are there any funky flavors or aromas. Any problems will need to be dealt with ASAP. NO signs of spoilage how is the wine developing?
  - Taste and test pH/TA check your taste against the pH/TA . Is the wine to flat add TA if it is to acidic you can cold stabilize or add Potassium Carbonate “Warning adding PC do not use PC unless you can chill the wine to at least 40F for two weeks. Otherwise the PC will never drop out and remain in solution thus ruining the wine. Then rack off the PC.
  - How is the mouthfeel/Structure. Is it full or thin?
  - Maybe you want a delicate Riesling or your looking for a wine that is more full then you could add small amounts of yeast derived additives such as Opti-White, Noblesse or enological tannins to help round out your wine.
  - If you are not working with the lees and you are careful during racking and don't stir-up a lot of the sediment when you rack your wine you will probably only need to transfer two to three times.
  - Check the amount of oak/tannin integration: oak compounds are continuously being released from the wood during the aging/storage process taste every 4-6 weeks to make sure you monitor the integration and don't accidentally over oak your wine. Recommended amount 1.5-2 oz. of oak cubes per 5 gallon carboy.
  - If your using barrels taste taste taste then rack to a neutral barrel

Fining/Filtering and Stabilization

- Hot and Cold Stabilization. A stable wine holds up better over time in the bottle.
  - Heat stability is done by fining the wine with bentonite, egg white, or other
  - heat stabilized the excess protein can flocculate (fluffy white clumps) and swirl back up into the wine each time the bottle is moved.
  - Bentonite has a negative charge and protein a positive charge when mixed the two opposites attract and stick to each other like magnets. When clear rack. Bentonite is a powerful tool.
  - Follow instructions.
    - Use least amount to achieve stability
    - Bench trials are important. Refer to page 59 MoreWine guide to white wine making
  - Cold stability is done by subjecting the wine to 40F or a little less for at least two weeks.
    - The reason for Cold stabilization. Potassium and tartaric acid combine to form crystals (tartrates) and change your pH and could change the taste/balance of your wine. You can cold stabilize at any time during the aging process. MoreWine suggest bentonite first then cold stabilize.
  - If In the next 6-12 months depending on the type of wine your making the wine will have come together enough to be considered finished.

Fining/Filtering and Stabilization

- Pre-bottling check list:
  - if the wine taste great, good clarity and your not worried about stability then test SO2 and correct. Then your ready to bottle but most likely there will be an element off, if so test pH/TA and correct.
  - If your making a sweet wine with Residual Sugar (RS) you will need to have proper SO2 levels and we suggest filtering to 0.45 microns absolute.
  - Filtration can make a wine more polished both in the glass and in the mouth, creating a rounding effect that softens the wines edges, also it helps with microbial stability.
  - If your wine is rounded with no flaws you can decide not to filter.
  - However if you have RS or problems with Acetobacter or Brettanomyces the filtration is needed.
    - Typical filters come in 5, 3, 2, 1, .45 micron and can be rated Nominal (most) or Absolute (all)
    - Filtration is based on two different forms, cartridges and pads. Only cartridges can provide .45 absolute
    - Filtration is a very effective wine-making tool that can be used to gently polish a wine or to make sure it is micro-biologically stable

Bottle Preparation/Bottling

- Once the pre-bottling check-list is complete and the wine has gone through all adjustments and treatments we are ready to bottle
- Bottles are cleaned, sanitized and your corks and corker are at hand then bottle the wines
- Limit air contact
- Using one of three techniques.
  - Gravity
  - Vacuum
  - Gas
  - Whatever method it is important to fill the bottles to ½ inch below the cork
  - If you have access to inert gas it is recommended to flush the bottles before you fill
  - Once bottled it takes about 2 months for the wine to get over the bottling process
  - Give the wine sometime it will get better with age.

Must have information

- MoreWine guide to white winemaking https://morewinemaking.com/web_files/intranet.morebeer.com/files/wwhiw.pdf
- Must adjustments page 63
- About Acidity and Adding Acid to Must/Wine page 64
- Complete Must Adjustment Example Brix, pH, TA page 66
- Testing SO2 page 68. Inert Gas and Winemaking page 72. Transferring/Racking page 75
- Bench Trials page 76
- Complete Yeast Hydration and Nutrients page 79
- Oak page 84
- Malolactic Fermentation page 90.
- Wineadds.com