I JUST STOMPED MY GRAPES – NOW WHAT?

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1. Goals - Personal preference in wine, what style do you want to make?:

Initial chemistry measuring sugar content (Brix), pH, and total acidity is important in crafting the final flavor and texture profile of the wine.

- Musts lower than pH 3.4, high in acid, brix around 22% sugar and lower: Higher acid wines produce leaner tasting wines with very bright fruit. White wines reflect apple (Malic acid) and citrus (citric acid) flavors, such as grapefruit. Red wines reflect bright, light fruit such as raspberries and bright cherries. These grapes could potentially not be ripe where flavors of green fruit such as green beans, asparagus, grass dominate. Champagne is a special case where additional sugar and yeast is inoculated back into finished wine which adds flavors produced from the yeasts.

- Musts between pH 3.4 and 3.7 brix around 25% sugar: Range where most grapes are considered as ripe. Wines are more balanced with potential for developing complex flavors, deeper color, and more mouth filling due to more developed tannin structure. White wines have deeper fruit flavors such as apricots. Red wines with more complex flavors of deeper fruits such as Bing cherry or plummy fruit flavors and with more developed spices such as licorice and mint flavors. These wines can also marry well with oak where flavors such as vanilla, spices add complexity.

- Must above pH 3.8 with low acid at 0.6% and lower, and with brix higher than 26% sugar: Grapes could be considered overripe. If the must is not adjusted the wines will be low in acidity, a condition some consider as flabby. Higher sugar content of finished wine has fruit flavors reminiscent of jams so non-descript. Many zinfandels are marketed with high alcohol and with descriptors as jammy flavors.

2. What to make??? What do you like????:

Our focus is on red wine. The goal for harvested grapes is 25 to 26 brix, which in most cases will provide musts with pH around 3.6 and total acidity around 0.7%. If harvested grapes do not meet these specifications then the must is adjusted.

- Current Wreckless Red Wine Goal: 25-26 Brix, pH 3.5-3.7, Total acidity 0.7%
- Goals could change if say a Pinot Noir would be made or a white wine

3. Measuring Brix, pH, and acidity in must:

- Brix: Hydrometer is used to measure the initial sugar content. Measurements made in a well-mixed solution of must.

- pH: pH meter is used. I use an inexpensive hand meter made by Hanna Instruments. Use two standards at pH 7 and pH 4 to assure that the meter is measuring in a correct range. The standards are kept in a refrigerator so pour some into a container and let it warm up as most chemical measurements are affected by temperature. Pipette 10 ml of juice into a small container and measure the pH.

- Acidity: Use 0.1 normal (N) sodium hydroxide (NaOH) added to the 10 ml juice sample. Count the amount of sodium hydroxide it takes to raise the pH, as being measured by the pH meter, to change upwards until pH 8.2 is measured. The amount of sodium hydroxide measured in milliliters is then multiplied by 0.075 to produce total acidity in percent tartaric acid.

  Example:

  1. pH of 10 ml sample of must at 3.7.
  2. 8.3 ml of 0.1 N NaOH added to the 10 ml juice samples raises pH to 8.2. – Don't get too specific about the end number because small addition of NaOH produces a large change in pH near pH 8.0.
  3. 8.3 ml x 0.075 = 0.62 % Total acidity expressed as tartaric acid.

<u>4. Corrections to Must:</u> Based on the goals set for the wine, corrections are made immediately to the must to adjust sugar and acid content.

- Sugar
  - Low sugar: Mostly reflective of unripe grapes except for champagne or some crisp white wine styles. Low Brix might be considered when measured at 22 or lower. Home winemakers can add sugar to bring up sugar content. Previously sugar needed to be inverted to split the 12 carbon sucrose into separate 6 carbon glucose and fructose sugar molecules. This was done because yeasts lacked an enzyme called invertase that split sucrose. Invert sugar by heating to 140 degrees Fahrenheit for 20 minutes with addition of lemon juice as suggested by Rex Johnson.

  - High sugar: In many cases unexpected rise in sugar is experienced near harvest when the grape crop is exposed to a heat spell at the end of the season. Musts above 26 Brix considered as contenders for correction. Rule of thumb is addition of 1 gallon of water to 100 gallons of must lowers Brix by 0.22. The amount of *purified* water to add (do not use tap water because it is chlorinated) is based on the amount of wine expected. One ton of grape yields between 120 and 150 gallons of finished wine. For lower volumes 250 lbs of grapes=15 gal of red or 12 gal white wine.

- Acidity:
  - Low acidity: Normally encountered with wines that are high in Brix. Tartaric acid is usually used to adjust acidity. The amount to add is based on the initial

measurement with the targeted amount based on the gallons of must that will be produced after the water I added to lower the percent sugar content into a desired range.

- High acidity: Acidity could be lowered prior to fermentation by addition of potassium carbonate. Or it could be adjusted in the finished wine.

5. Examples:

Example 1. Addition of only Water to lower Brix where grapes have a high acid content: 2015 Merlot

- Brix: 28.5
- pH: 3.22
- TA: 10.5 ml x 0.075 = 0.79 %
- Estimated 130 gal of finished wine from 1 ton of grapes.
  Note: 1 ton of grapes yields between 120 to 150 gallons of finished wine. Merlot grapes were smaller, well-formed so estimate was at 130 gallons.
- Water addition calculated as the volume of must that would be at the 28.5 Brix reading if it was actually at 26 brix:
  Formula: 28.5 Brix/X gal= 26 Brix/130 gal
  Solving for X gal rearranges the formula as:
  Estimated Must Volume = (Estimated gal x Measured Brix)/Target Brix
  X = (130gal*28.5 Brix)/26 Brix = 142.5 gal**:**
  142.5 gal -130 gal = 12.5 gallons of water to add
- After water addition Brix approximately 25; pH 3.47; TA took 9.1 ml x 0.075=0.68%

Example 2. Addition of only acid where Brix and pH reading are in range: 2014 Cab Franc

- Brix: 23.5-24
- pH: 3.65
- TA: 8 ml x 0.075 = 0.6
- Estimated 130 gal of finished wine based on 1 ton of grapes
- Tartaric to add is based on addition of 0.1 tartaric to raise from 0.6 to 0.7%
  Addition of 3.8 g of tartaric acid into 1 gallon of must equals a 0.1% rise in TA.
  3.8 g x 130 gal = 494 g Tartaric acid
  494 g/28 g per ounce = 17.64 ounces to add to must

Example 3. Addition of water to dilute Brix and addition of tartaric acid to raise TA: 2013 Cab Franc

- Brix: 30
- pH: 3.8

- TA: 8 ml x 0.075 = 0.6
- Goal is to bring Brix down to 26 and raise TA to 0.7%
- Estimated 60 gal of finished wine from ½ ton of grapes.
- Water addition:
  (60 Est Gal x 30 Brix)/26 Target Brix = 69 gal:
  69 gal – 60 gal = 9 gallons of water to add
- Tartaric acid addition based on amount present in wine compared to amount at 0.7% in 69 gal.
  Amount in 69 gal at 0.7% = 0.7 % x 3.8 g/gal x 69 gal= 183.54 g
  Amount in 60 gal at 0.6% = 0.6 x 3.8 x 60 = 136.8 g
  Amount to add: 183.54 g - 136.8 g = 46.74 g/28 g per ounce = 1.7 ounces

6. Fermentation notes – MY PROTOCOL!!

1. If grapes look good small addition or no addition of SO2. If acetic acid smell or see rotted grapes add 50 ppm SO2

2. Take out some juice. Hydrate yeast by adding dried yeast to 90 F water for 20 min. Inoculate hydrated yeast into juice taken from must. After 6 to 8 hours inoculate must.

3. Add yeast nutrient when inoculating must.
   Add ½ amount of FermaidK, a yeast nutrient, in beginning
   Example formula:
   FermaidK addition is 5 grams / 20 Liters which is close to 5 g/5 gal
   130 gal/5 gal x 5 g = 130 g FermaidK
   130/28 g per ounce = 4.6 ounces.
   Added 2.5 ounces at inoculation into must and then second half when Brix around 10.

4. Malo-lactic bacteria (ML) inoculation: Co-fermentation is recently the suggested method of inoculating with ML bacteria. This is the addition of the bacterial inoculum 24 hours after the addition of the yeast. We use a freeze-dried formulation that can be added directly to the fermentation.
   ML nutrient addition is 1g/5gal:
   130 gal / 5 gal = 26g
   26g ML nutrient / 28 g per ounce = close to 1 ounce for 1 ton of grapes

5. Importance of ML fermentation is to help stabilize wines. ML bacteria use nutrients in must that spoilage organisms could grow on, such as Brettanomyces, Dekkera, Lactobacillis and others. Authors of book referenced below state that ML fermentation is inhibited by high acid, high alcohol, high SO2 (additions at 50 PPM kill all bacteria), and high tannic musts. Musts in the range of pH 3.5-3.6 is an optimal condition:

Reference: Malolacic Fermentation – Importance of Wine Lactic Acid Bacteria in Winemaking. 2015. Numerous authors. Lallemand Inc, Montreal Canda. ISBN: 978-2-9815255-0-5. http://www.lallemandwine.com/wp-content/uploads/2015/10/Lallemand-Malolactic-Fermentation.pdf