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Adding Acidulated Water for Sugar Dilution

High brix levels can pose problems during primary fermentation and secondary fermentation. Stuck primary fermentations are common because many yeast strains are inhibited at high alcohol levels. These conditions can cause wines with residual sugars of between 1-4%. High alcohol (high sugar) levels do inhibit malolactic (secondary) fermentation.

It is a common practice in California wineries, and for the home winemaker, to add water to the high sugar grape must or juice prior to primary fermentation. The idea is to dilute the brix down to a more manageable level of about 24.5° brix.

If you simply add water to your must or juice, you will not only dilute your sugar concentration, you will also dilute your total acidity. For this reason, unless the must/juice already has excessive acid, it is important to use water that is acidulated with tartaric acid to perform your dilution. The acidulated water will not only dilute the sugar concentration, but it will keep your total acidity and pH constant.

The common practice is to add 7 grams (or 1/4 ounce) of tartaric acid to 1 liter of distilled water to make up your acidulated water dilution solution. (This solution is equivalent to a total acidity of 0.70 g/100 ml or 7 g/L.) This solution of tartaric acid will be used to dilute your high sugar must or juice. (Note: You may need more than 1 liter of acidulated water. See below on how to determine the amount of acidulated water you will need for your volume of wine.)

The most common mistake made is adding acidulated water based on the volume of your must – crushed grapes, not your final volume of the pressed, finished wine. You must first determine how much finished wine you will produce before you dilute your must or juice. The same principle holds when adding sugar to chapitalize must or juice.
For white grape juice, your yield is roughly the same as your starting volume. In general, for red grape musts, the yield is 3-1/3 gallons finished, pressed wine per 5 U.S. gallons of fermented must. This will vary based on the skin to juice ratio. Bordeaux varietals average a little over 3 U.S. gallons finished, pressed wine per 5 U.S gallons of fermented must. Rhone varietals average close to 3-1/2 U.S. gallons of finished, pressed wine per 5 U.S. gallons of fermented must.

Note: 3 U.S. gallons is equivalent to 11.4 liters. Since we are measuring total acidity in metric units, it is important to convert your volume units from the English system to the Metric system. (Note: 28 grams = 1 ounce).

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Example #1: We have 5 U.S. gallons of red must at a brix of 26.5°. How much acidulated water do you add to lower the brix to 24.5°?

In general, the formula is as follows:

Let:
O = Original Brix of must or Juice
L1 = volume (in liters) of finished wine from undiluted must/juice
B = Brix you want to dilute must/juice to
L2 = volume (in liters) of finished wine from diluted must/juice
Y = volume (in liters) of acidulated water to add to must or juice to dilute to desired level, B.

Equation 1: (L1) x (O) / (B) = (L2)
Equation 2: (L2) - (L1) = Y
From Example #1 above:
O = 26.5,
L1 = 11.4 liters (5 U.S. gallons of red must = 3 gallons finished wine)
B = 24.5
L2 = Do equation 1 to determine L2
Y = Do equation 2 to determine Y

(11.4 liters) x (26.5 brix) / (24.5 brix) = L2
L2 = 12.28 liters

(12.28 liters) - (11.4 liters) = Y
Y = 0.88 liters

Therefore, we must add 0.88 liters of acidulated water to our 5 U.S. gallons of red grape must to dilute the brix down to 24.5 brix.

Adding Tartaric Acid to Adjust Total Acidity

Adding tartaric acid to water for brix dilutions allows you to dilute the brix of juice or must without affecting the total acidity. When you have juice or must that is low in total acidity, you can add tartaric

acid directly to the must/juice or wine to raise the total acidity and therefore lower the pH.

In general: 1 gram of tartaric acid added to 1 liter of liquid (must/juice/wine) will raise the total acidity of that liquid by 0.10%. This is equivalent to 3.8 grams per U.S. gallon raises the TA by 0.10% in one U.S. gallon.

Example #1:

If you have 11.4 liters of juice/must/wine at 0.60 Total Acidity and you want to raise the Total Acidity by 0.10% to 0.70, how much tartaric acid will you need to add?

(11.4 liters) x (1 gram Tartaric Acid / liter) = 11.4 grams of tartaric acid to raise the TA of the wine by 0.10%. (Note: 28 grams = 1 ounce)

Example #2:
If you have 255 liters of juice/must/wine at 0.50 Total Acidity and you want to raise the Total Acidity by 0.20% to 0.70 you will need to add:

(255 liters) x (1 g Tartaric Acid / liter) = 255 grams of tartaric acid to raise the Total Acidity by 0.10%.

(255 grams) x 2 = 510 grams of tartaric acid to raise the Total Acidity by 0.20%

Note: When adding tartaric acid directly to young wine or fermenting juice, be aware that the acid granules will release dissolved CO2. If adding tartaric acid to a full carboy of wine, it is best to remove some of the wine before adding the tartaric acid. Dissolve your tartaric acid in either some of the juice you are fermenting or in some distilled water. Allow the bubbling to subside before adding the wine back to the carboy to top it up.
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