Acid Adjustments

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Many grapes and juice, particularly in climatically unfavorable years, may require acid reduction before fermentation. This can be achieved in several ways.

All of these procedures are useful and safe. It is unlikely that many commercial wineries make their wines without using one or another - or a combination – of these methods of dealing with acid imbalances.

Titratable Acidity is the measurement of hydrogen ions, neutralized by titration with a standard base - sodium hydroxide - to an end-point of pH 8.2 using a colour indicator - Phenolphthalein. Total acidity measures both the organic and volatile acid content of the juice, must or wine sample being analyzed.

The TA of grape juice is not the same as that of wine. Many winemakers think acid is only tartaric because we refer to TA in terms of tartaric. It would be nice if it were that simple. Amerine (1967), for example lists 22 organic acids, 32 amino acids and 18 minerals. We are concerned with only six organic acids and two minerals. Tartaric and malic acids represent 90% of the grape aid wine acidity. Citric is present in small quantities, while succinic, lactic and acetic acids are normal products of yeast and malolactic fermentation. Potassium and calcium cause crystalline and hazy deposits. Tartaric, malic and citric acids are termed fixed, while succinic, lactic and acetic are volatile acids. Sorbic acid, added for stability and ascorbic acid often added as a preservative round out the total acidity constituents.

Water Addition

As simple as it may sound, adding water, up to 15% of the volume, will help reduce acidity particularly with some of the more floral varieties. Take a 100 ml sample of juice and add 10 ml of water. Mix and test the acidity level. Take another sample and add 15 ml of water. Test again. Taste the resulting selection to see if you find the sample too diluted or just right. If it is too watery, use another method, described below.

Cold Stabilization

This procedure is usually performed after fermentation, when the weather is slightly below freezing. Some winemakers put the wine into a refrigerator for a few days. It also helps to "seed" the wine with cream of tartar crystals. Cold stabilization will not work if the pH is below 3.1. Cold stabilization may reduce the TA by 10%, depending on the pH of the wine.

ACIDEX

This is a so-called double salt of calcium carbonate which, in theory, reduces both tartaric and malic acids equally. A portion of the juice is treated (all the acid is removed) and added back to the rest of the must. Be careful not to add ACIDEX to the whole volume of must. This will cause all the acid to be eliminated and you will have to add more acid. It is best to deacidify a litre or a gallon (depending on the amount of wine you have) and to use tables to calculate the correct proportions. Any dealer selling ACIDEX should also provide the copies of the necessary tables. If they don't have the tables, don't use ACIDEX!

Calcium Carbonate (Chalk)

To reduce the high TA of a high pH wine, use CaCO3 at the: rate of .67 g/l to reduce TA by 1.0 g/l. Seeding with cream of tartar crystals and chilling aids the process. If the must pH is too low, calcium carbonate may not work. If you are to use CaCO3 on wine, do so at least six months before bottling or you may get a

chalk haze in the bottle.

Potassium Bicarbonate

Use at a rate of .9 g/l to reduce the TA by 1.0 g/l. The wine should be chilled.

Potassium Carbonate

To reduce the high acidity of a low pH wine, use at a rate of .62 g/l to reduce the TA by 1.0 g/l. The wine should be chilled.

The last three procedures are generally carried out on wine. It is always best (and safest) to work on a one liter test sample before treating the entire volume.

The two potassium reagents will increase the pH very quickly compared to calcium, so do not use either if the wine pH is already high (above 3.4). When using any of the last four procedures, put the additive into a small quantity of wine and mix well. Add this wine back to the larger volume and stir in. Always leave plenty of space in the larger container. Foaming often occurs and may be violent.

Malolactic Fermentation

Malolactic fermentation is another dimension of winemaking that many people don't want to step up to. The procedure is not all that complex but the untrained can cause more problems than they solve. The trained will give their wines more complexity.

Unlike the previous methods which remove tartrates, MLF removes malic acid by converting malic acid into lactic acid. Each one gram/litre of malic acid is converted into .5 g/l of lactic acid. The rest is given off as carbon dioxide.

This method is used for two reasons: it is a natural means of reducing acidity; and it is a stylistic tool (it changes the character of the wine by making it softer and giving it a slightly buttery mouthfeel).

One of the best MLF cultures to use was developed at

Oregon State University. It consists of two strains, Erla and Ey2d, now referred to as OSU1 and OSU2. These were developed to tolerate both low temperature fermentation and low pH.

When you buy any MLF culture, make a starter. The above mentioned culture is in liquid form and is good for five gallons. Some cultures are sold for up to $20.00 a sample and this is very expensive. Therefore, buy some pasteurized apple juice, with a pH of 4.0 (apple juice has a lot of malic acid) and get the culture started in this medium. Gradually add white grape juice to sensitize the bacteria to the lower pH of the must and add this to the ferment. This starter may be used for both red and white wines.

MLF is often carried out on red musts and a few white musts. When conducting MLF you must keep sulphite levels dangerously low (10-15 ppm). ML bacteria arc very sensitive to sulfite which stuns them (not kill). If the MLF is not completed before bottling, the bacteria will reactivate after the sulfite degrades. You don't want this to happen in the bottle.

Since home winemakers do not often test for either tartaric or malic acid levels, you don't really know how much TA drop to expect. The only way to find out if the MLF is complete is to conduct a colour chromatography test.

Blending

Blending high and wines with low acid wines is a method of balancing acidity that most people understand and prefer. This method does not require sophisticated testing procedures outside using simple acidity kits or a pH meter. It is safe requires no chemicals in the execution and the results are readily apparent. It can also be fun and entertaining as well as educational when the experiment is conducted with a group.

References

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