



Acid Trial Protocol

There is a complex relationship between the concentration of acids in grape juice and wine and their effect on the pH of the solution. Grape juice and wine are buffered solutions, meaning there are a number of components in the juice that will resist changes in pH when acid is added (known as the buffering capacity)¹. Two juices with the same pH or the same TA may have very different chemicals that give them those properties and may react very differently to added acids. Also, the buffering capacity will change based on the pH. For example, one gram of added tartaric may cause a pH change of 0.11 units at pH of 3.5 while it may cause 0.18 unit change at a pH of 4.0¹. The best way to determine how a juice or wine will respond to addition of acid is to measure it yourself on the lab bench. This process is very simple as long as you have a well calibrated pH meter, and a micropipette.

Following is a protocol to set up acid trials of your own. Generally, juice additions can be determined based on the results of the acid trial together with total acidity considerations. The same protocol can be used to make additions to wine. Taste trials are recommended for wine additions.

To make a stock solution of 50% Tartaric Acid:

1. Measure 50 g of Tartaric acid. Add Tartaric acid to a small beaker.
2. Add distilled water up to 80mL.
3. Stir until the acid is fully dissolved.
4. Pour the contents of the beaker into a 100mL volumetric flask or graduated cylinder.
5. Bring the volume up to 100mL with distilled water.
6. Transfer to a labeled plastic bottle with a cap and store in the refrigerator. This stock solution can be kept at least a year.

To do the acid trial:

1. Measure 50 mL of wine with a graduated cylinder and pour it into a beaker.
2. Add a stir bar and put it on the stir plate with gentle stirring.
3. Measure and record the pH.
4. Using a micropipette, add 25uL of 50% the stock Tartaric Acid and record the pH. (This is the equivalent of adding 0.25g/L tartaric to the wine.)
5. Continue adding 50% Tartaric Acid stock solution 25 uL at a time and recording the resulting pH until you reach the target pH. (ex: 3.25 for white wine, 3.50 for red)

To set up a taste trial:

1. Measure 50 mL of wine into each glass.
2. Add the 50% Tartaric acid stock solution at the concentrations around your target pH.
3. Mix, then taste.



4. Remember that 25 uL = 0.25 g/L so to taste the effect of adding 1.25 g/L you would add 125 uL of tartaric acid stock solution. For example, for a taste trial for a white wine you may want to taste three wines, with target pH of 3.30, 3.25, and 3.20.

Sample score sheet for acid trials.

WINE _____
DATE _____
TA (g/L) _____

uL = g/L	pH
0.00	
0.25	
0.50	
0.75	
1.00	
1.25	
1.50	
1.75	
2.00	

Reference

- (1) Boulton, R.; Singleton, V. L.; Bisson, L. F.; Kunkee, R. E. *Principles and Practices in Winemaking*; Chapman and Hall, Inc: New York, 1996.