



## Acid Education Series: Bench Trials & Taste Trials for Acid Additions

### **Materials/Equipment**

#### Acid Trials:

- Calibrated pH meter & probe
- Stir bar(s) and stir plate
- Micropipette that measures 25  $\mu$ L
- Sample(s) to be tested
- 50% tartaric acid stock solution\*
- 100 mL graduated cylinder
- 100 mL glass beaker

#### Stock Solution:

- 50 g tartaric acid
- Distilled water
- Small beaker
- 100 mL volumetric flask

### **Procedure**

#### ***Prepare a 50% Tartaric Acid Stock Solution***

1. Measure 50 g of tartaric acid into a small beaker.
2. Add distilled water up to 80 mL and stir with a stir bar until the acid is *fully* dissolved. Note: this may take 15+ minutes.
3. Remove the stir bar and pour the contents of the beaker into a 100 mL volumetric flask.
4. Seal the flask with parafilm, a plastic cap, or your finger, then mix the solution by inverting the flask several times.
5. Using distilled water, bring the volume up to 100 mL.
6. Transfer stock solution to a labeled bottle with a cap and store in the refrigerator. This stock solution can be kept for at least a year. Agitate the solution prior to using to ensure continued solubility.

#### ***Bench Trials for Acid Additions:*** *determine how much the pH will change with varying levels of acid addition*

1. Ensure that the pH meter has been calibrated (see separate protocol).
2. Measure 50 mL of juice or wine into a graduated cylinder and pour into a beaker. Add a stir bar, then place the beaker onto a stir plate and stir gently.
3. Immerse the pH probe in the solution and make sure the stir bar does not contact the probe. Stirring speed should be sufficient to mix the added acid into the juice/wine, but not so fast as to pull a vortex.
4. Measure and record the initial pH of the sample on the scoresheet (page 3).

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5. Using a micropipette, add 25  $\mu\text{L}$  of 50% tartaric acid stock solution to the wine sample. Based on a 50 mL sample, this is the equivalent of adding 0.25 g/L of tartaric acid. Allow the pH to equilibrate, then record the pH on the scoresheet.
6. Continue adding the tartaric acid solution in 25  $\mu\text{L}$  increments, allowing the pH to equilibrate between additions. Following each addition, record the resulting pH until the target pH is reached (ex: 3.25 for white wine, 3.50 for red).

***Taste Trials for Acid Additions:*** *determine how sensory properties will change with varying levels of acid addition*

1. Using the bench trial data, identify the addition rates needed to achieve the target pH. It is common to evaluate samples above and below, as well as at, the target pH. For example, for a white wine taste trial with the target pH of 3.25, samples at pH 3.20, 3.25 and 3.30 could be evaluated.
2. A separate glass will be needed for each acid addition level. Measure 50 mL of wine into each glass. In the example above, there will be 3 glasses with 50 mL of wine each.
3. For each addition level, determine the volume of stock solution required to reach the desired pH. Remember that (for a 50 mL sample), 25  $\mu\text{L}$  of stock solution is equivalent to a 0.25 g/L addition of tartaric acid. For example, to evaluate the sensory effects of a 1.25 g/L acid addition, 125  $\mu\text{L}$  of tartaric acid stock solution will be needed.
4. Using a micropipette, add the calculated amount of tartaric acid stock solution to each glass. Mix well and cover each glass with a watch glass or disposable lid.
5. Taste each sample in increasing and decreasing order of acidity to determine the desired acid addition.

**To ensure best results**

Proper micropipette technique is essential for accurate results. Improper use of micropipettes can lead to contamination, loss of calibration and erroneous results.

For an excellent tutorial, check out Jayme Dyer's "How do you use a Micropipette? A step-by-step guide!" on YouTube (<https://www.youtube.com/watch?v=aSeod1Y5MRc>)

Sample score sheet for acid trials

**WINE**

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**DATE**

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**TA (g/L)**

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<b>µL added</b>	<b>g/L equivalent</b>	<b>pH</b>	<b>Sensory Impressions</b>
0	0.00		
25	0.25		
50	0.50		
75	0.75		
100	1.00		
125	1.25		
150	1.50		
175	1.75		
200	2.00		