MoreWine!™
Absolutely Everything!™ for Wine-Making

Advanced TA Test Kit

Another MoreManual!
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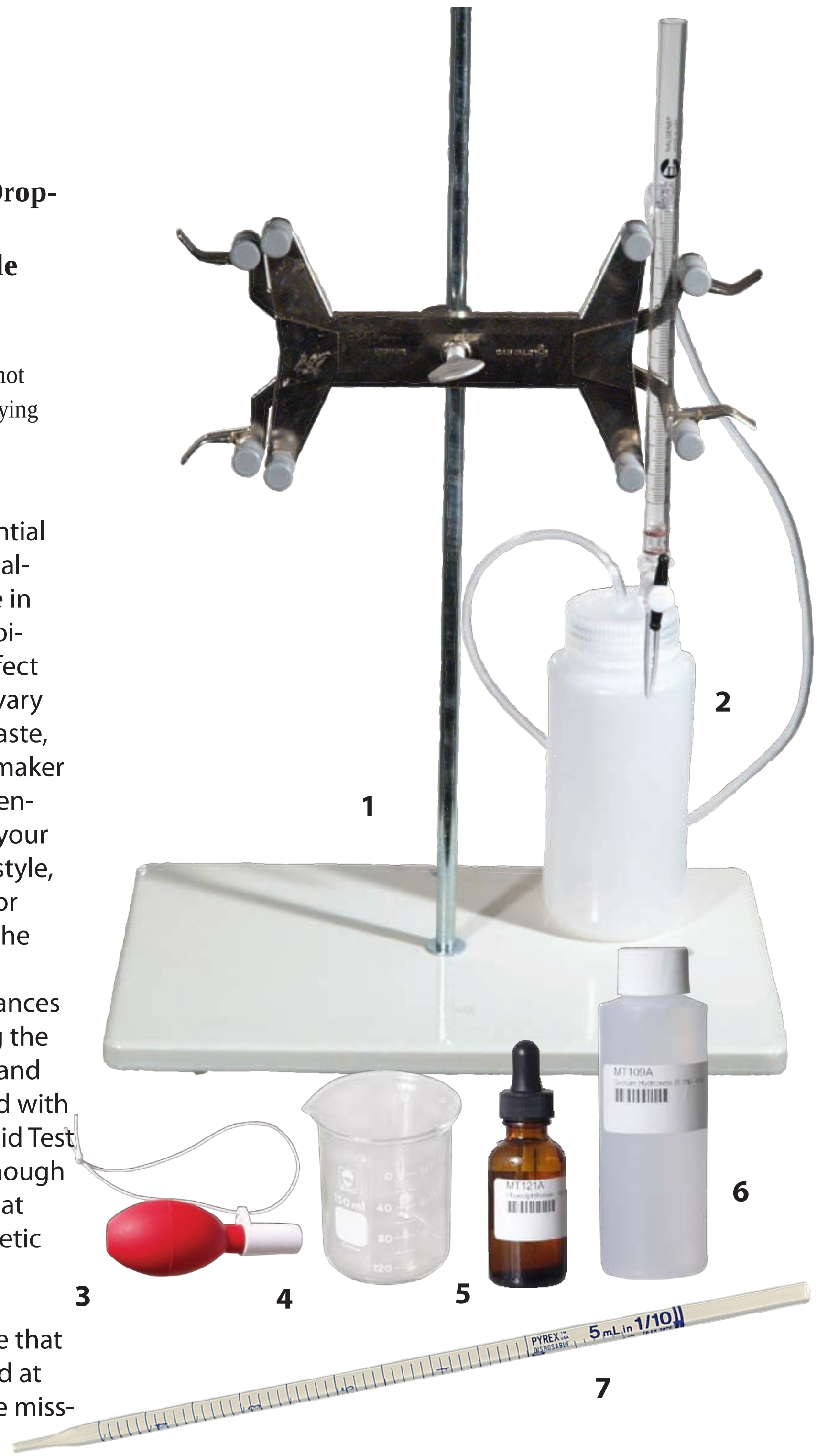
Kit Contents:

1) Support Stand w/ Base*
2) Self-Zeroing Buret
3) Pipet Filler
4) 150mL Glass Beaker
5) Phenolphthalein Indicator in Glass Dropper Bottle
6) 4oz Bottle of 0.1N Sodium Hydroxide (NaOH)
7) 5mL Pipet

*Please note that your support stand and base may not match the appearance of the one pictured due to varying availability from our suppliers



Introduction:

Proper acid concentration is an essential aspect to manage if one wishes to create a balanced, long lasting wine. Acidity plays a role in the flavor, bottle stability and microbial inhibition of a finished wine. While the actual perfect amount of acid for your particular wine will vary with varietal, growing region and personal taste, there are some good guidelines that a winemaker can follow to help pinpoint the correct concentration for their wine. Remember that once your wine falls within the published range for its style, the most accurate and sensitive instument for determining if you've gotten it right will be the tongue!

This kit for Advanced TA testing enhances the accuracy and speed of the TA test, giving the winemaker better information to work with and more time to work with it. This kit is supplied with all the same functionality as our standard Acid Test Kit and requires no additional hardware, although *MoreWine!* strongly recommends the use of at least a pH meter along with this kit. A magnetic stir plate also makes for a handy addition.

Please take a few moments to ensure that all of the hardware listed ablove and pictured at the right was included with your kit. If you're missing any parts please give us a call right away at the phone number listed in the header above.

Testing Procedure:

1) Using the pipet and pipet filler, draw up 5mL of wine and drain it into the 150mL beaker. The easiest way to use a pipet is to draw liquid up past the "0" mark, then quickly remove the filler from the top of the pipet and plug the open end with your fingertip to prevent liquid from running out. You can now slowly lower the liquid level back down to the "0" mark by slightly lifting your finger.
**Note: Pipets are designed to naturally deliver the amount of liquid they are calibrated for through simple gravity draining. The small amount of liquid which remains in the pipet after draining has been accounted for and was not part of the 5mL that you measured out.*

2) Add distilled water to the vial until it is about 2/3 full. The exact amount of water used here is unimportant, it is simply to dilute the sample so that you can see the color changes more clearly. Also, it is not necessary to pre-adjust the pH of the water to 8.2 as some earlier texts have suggested. Add 3 drops of the phenolphthalein indicator unless you are using a pH meter to determine the endpoint of the test. If you are using a pH meter the phenolphthalien indicator is not necessary.

3) Transfer the 4oz bottle of Sodium Hydroxide (NaOH) into the larger squeeze bottle from the Self-Zeroing Buret and re-attach the cap of the bottle, making sure that the tubing extends all the way to the base of the bottle. Double check that the stopcock at the bottom of the buret is in the closed position and then squeeze the bottle to force NaOH up the tubing and into the buret. Fill the buret up past the "T" section where the tubing attaches and then release your grip on the bottle. You will see the NaOH run out of the buret and back into the bottle until the buret reads at the "0" mark.

4) Place the beaker with the samle in it under the buret and open the stopcock on the buret very slightly until you are delivering sodium hydroxide at a rate of about 1 drop every 5 seconds. Keep one hand ready or at the buret so that you can shut it off quickly, as will be necessary at the end of the test. At the same time you should be swirling the beaker that the wine sample is in, or allowing it to mix while sitting on a magnetic stir plate. You should begin to see a magenta tinge to the solution where the sodium hydroxide is upon its addition. This will fade upon swirling the vial, taking a little longer to fade away each time.

Determining the Endpoint by Color Change:

White Wine: As you continue to add sodium hydroxide, more of the test solution will stay magenta for longer. Eventually you'll reach a point where a faint pink color stays for 30sec or more. This is the endpoint of the reaction.

Red Wine: With red wines, as the test proceeds certain of the color pigments in the wine will begin to change shape in response to the change in pH. This change in shape causes the compounds to exhibit a different color, and the test solution will begin to turn gray. This is NOT the color change that you are looking for to determine the end of the test. Because of the grayness of the solution, it will be difficult to see the faint, persistant pink color when it arrives. However, you will see the grey color of the solution begin to turn slightly green. This IS the endpoint you are looking for.

Determining the Endpoint by pH:

If you have a pH meter, you can use this to more accurately determine the endpoint of the test. With tartaric acid, achieving a pH of 8.2 indicates that all the acid has been neutralized and that no excess base has been added to the solution. It is important if you are going to use this method that you allow time for the pH reading to stabilize. Because of the specific chemical changes that are taking place, you will see the pH climb a little bit after each addition of Sodium Hydroxide, then begin to slide back; it is ok to add more base once the pH begins to slide. As the test progresses, the increment by which the pH rises with each addition of base will grow - be careful not to overshoot the endpoint as the test draws to an end, as this will lead to a false-high measurement for your acidity.

5) Once you've determined that the reaction is concluded (either by color change or by pH) make a note of the amount of sodium hydroxide you used to reach the endpoint of the test, to the nearest 10th of a mL. This may require that you estimate a little bit, which is a common and acceptable lab practice. Remember to read the meniscus of the liquid in the buret from the very bottom of the meniscus itself. A handy trick for this is to place a brightly colored post-it note behind the buret to make the bottom edge of the meniscus more visible.

6) Calculating the acidity from the amount of sodium hydroxide you used is simple. Just multiply the mLs of sodium hydroxide by 1.5. This will give you the acidity of the wine or juice in g/L of acid. For example: You use 4.5mL of sodium hydroxide to reach the endpoint of your reaction. 4.5mL x 1.5 = 6.75g/L of acid. It is common to see the acidity of a wine given in units of %TA. To convert between %TA and g/L of acid, simply move the decimal point by one place: 6.75g/L = 0.675% acidity.

Target Acid Values by Wine Style:

Remember that these are only guidelines and should not be taken as absolutes. The correct acidity for your wine will depend on the alcohol content, residual sweetnes and your personal taste.

Sherries: 5.0-6.0g/L
Fruit Wines: 5.0-6.5g/L
Dry Red Wine: 6.0-8.0g/L
Dry White Wine: 7.0-9.0g/L

Altering the Acidity of a Wine:

If you need to adjust the acidity of a wine or juice, there are multiple ways that you can get this done. If you need to increase the acidity of a wine, you can either blend it with a higher acidity wine or you can add Tartaric acid* directly. The addition of acid is very straigtforward: If your juice is at 6.5g/L and your target is 8.5g/L, then you must add 2.0g of tartaric acid per liter of wine (1g/L = 3.8g/gal). The direct addition of acid is the preferable method if you are trying to increase the acidity of a juice or must prior to fermentation. Post fermentation, blending is preferred (if you have something you can blend with) due to the fact that some portion of the acid that you add directly will not "take" to the solution and will precipitate out during aging, leaving a different flavor balance to the wine from when you bottled it. However, if you do not have a higher acid wine to blend into the wine in question, then go ahead and add Tartaric - just be aware of this potential for acid loss in the bottle.

Acid level reduction can be a tricky business to get in to. In all cases, prior to or post fermentation, acid reduction by blending with a lower acid juice or wine is favored. Other options include dilution with water, which runs the risk of over diluting the components of the juice or wine which will be responsible for flavor, color and mouthfeel, as well as the sugar levels if you dilute an unfermented juice or must. The final option for acid reduction is the addition of potassium carbonate. Potassium carbonate removes tartaric acid in a ratio of 1 molecule of acid per molecule of carbonate, so you just follow the reverse of the procedure for adding tartaric acid to a wine. Your wine is at 8.5g/L and you wish to be at 6.5g/L; so add 2.0g of potassium carbonate per liter of wine (2g/L = 7.6g/gal). Keep in mind that the wine needs to be cold stored (45degF or less) for a couple of weeks for this treatment to be effective. The use of calcium carbonate, which works the same way as potassium carbonate but without the need for cooling, is not recommended unless there is no other recourse available to the winemaker, as there is the very real potential for a negative flavor impact from this treatment.

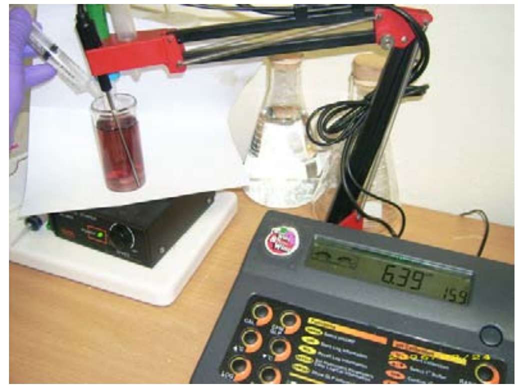
*Note: Some texts leave open the option to use Acid Blend for adjustments of this type. Acid Blend is a 33/33/33 mix of Tartaric, Malic and Citric acids. *MoreWine!* recommends against the use of acid blend in any wine other than a non-grape fruit wine or mead. The reason for this is that the presence of the Citric acid makes the wine more suceptible to acetic spoilage, or vinegaring.

**Note: Acids and bases (sodium hydroxide) are very real chemicals and have the potential to harm humans. The strength of the base used in this test is not of significant danger to individuals who do not have an abnormal sensitivity to sodium hydroxide, and incidental contact should not be harmful. If you have any doubt about your sensitivity to the substance, either wear latex laboratory gloves or wash your hands with baking soda (bicarbonate) after the test. The solid acids used in adjusting a wine or juice should be handled carefully and MoreWine recommends having baking soda on hand in any environment where acids or bases are handled, as it can neutralize either. Remember that a chemical burn is not a heat burn and you do not notice it right away - wash your hands thoroughly if you have any doubt about your exposure. Finally, remember that all chemicals should be kept tightly closed and stored out of the reach of children and pets. Good Winemaking!

Determining the endpoint by color:

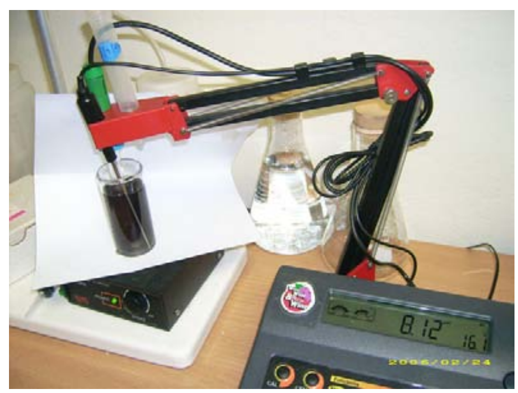
Here you will find a series of photos of the testing solution to help you determine the endpoint by color. As the test is being run, note the change in the color of the solution as the pH changes. This is red wine diluted in 40mL of water.

Solution is at pH 6.39



Solution is at pH 7.68

Solution is at pH 8.12



Closeup of final color of wine at pH 8.20