

Titration Acidity Procedure

Abstract:

Titration acidity is determined by titrating diluted tomato product to pH 8.00 with 0.1 N NaOH.

Reagents and Equipment:

Sodium Hydroxide solution, 0.1 N, normality established to +/-0.0001 N.

Plastic beaker, 250 ml

pH meter, analog Beckman Zeromatic SS-3

Magnetic stirrer with Teflon coated magnetic bar.

Analytical Balance, Mettler AE 100

Buret, Brinkmann Burette Buret 25

Computer loaded with Excel, Mac 7200

Primary Setup:

1. Turn on the balance and tare (re-zero) until all zeros appear. If anything but zeros appear, for example dashed lines, then it may be necessary to adjust the balance lever on the right side of the balance. The door should be closed when doing this.
2. Calibrate the pH meter. Push the "read" button to turn on. The function knob should be on pH.
 - a) Rinse the electrode with deionized water and wipe dry. Dip the electrode in pH 7 buffer solution and calibrate using the standardize knob.
 - b) Rinse and dry the electrode before dipping in pH 4 buffer solution. Calibrate by using the temperature knob.
 - c) Again rinse the electrode and when not in use place it in the clean storage solution.
3. Turn on the digital buret using the switch located on the right side of the instrument. Note: Make sure NaOH is full before starting.
4. To prime the buret, push the right switch to "add", then turn the blue knob until the buret is all the way down. To ensure that there are no bubbles in the line, turn the knob back and forth until the bubbles are gone.
5. Gently raise the buret by turning the blue knob until it's fully raised. Switch from "add" to "titr." and zero by pressing the left black switch. Do this between each sample.
6. Also make sure that the volumetric flask and bottle are full of deionized water (DI) and is at room temperature.

Sample Testing:

1. Have the work sheet and computer ready (see below).
 - a) Enter the data on Excel and label the columns.
2. Take the hot break sample (undecanted) and mix well with a spoon.

3. Then weight out three ~15 grams aliquots (spoonfuls) in each of the three pre-weighed plastic beakers and record each of the weight on the data sheet and the computer. Note: More trials maybe required if the three titration calculations are not within ± 0.05 of each other.
4. Then to each of the measured and aliquoted beakers, roughly add 100 milliliters of DI water.
5. Put a stir bar in each of the sample solution then place the sample solution one at a time on the stirrer and turn on. A vortex in the tomato solution will appear.
6. Carefully adjust the pH electrode position in the sample solution so that the tip is submerged in the solution but is not in contact with the stir bar.
7. Make sure that the buret is primed and zeroed and adjusted so that the tubing is just over the solution.
8. Slowly add the base until the pH of the solution registers pH 8 on the meter. As the pH needle approaches pH 8, slow down to drop wise additions to avoid a pH over 8. Record the amount of base from the digital buret onto the data sheet and computer.
9. Do this for all three trials. Don't forget to rinse the electrode with DI water between each trial.
10. Do calculations according to the data sheet and if all three calculations are within 0.05 standard of each other, then proceed to the next sample. Otherwise continue trials until any three trials are within 0.05 of each other. The calculation:

$$\frac{\text{mls. of base} \times 0.14878 \text{ (N of NaOH)} \times 100}{\text{weight of aliquot}}$$

Note: The computer should have this formula for the titrable acidity.

Clean-up:

1. Turn off the balance by lifting the bar.
2. Turn off the pH meter by pushing standby. Make sure the pH electrode meter is stored in DI water.
3. Turn off the buret and replenish the base. Recharge the buret overnight with the recharger.
4. Refill water bottles and volumetric flasks with DI water.
5. Clean all beakers and spoons

Number	Number		(ml)	Acidity	(%)	
1	4	15.3004	6.93	5.1317	0.329	
	5	15.2833	6.90	5.1152	0.328	
	6	15.6411	7.01	5.0779	0.325	0.327
2				#DIV/0!	#DIV/0!	
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				#DIV/0!	#DIV/0!	#DIV/0!
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5				#DIV/0!	#DIV/0!	
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6				#DIV/0!	#DIV/0!	
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