

## Acid Base Titration

Titration is used in several industries from medicine to food analysis to water quality control. In all cases titration is used to quantitatively analyze the unknown concentration of a solution or the amount of substance by comparing it to a solution of known concentration.

In this lab you will analyze the acid content of various solutions. The acid content of many foods and beverages contributes significantly to their taste. Soft drinks contain varying quantities of several acids, which give sodas their tart flavor. In cola products, these acids are predominantly carbonic acid and phosphoric acid. In citrus flavored sodas, such as Sprite, Sierra Mist, and 7-Up the acids are carbonic acid and citric acid.

Your task is to determine how much acid is in Sprite or vinegar. You are to develop and carry out a procedure to determine the acid concentration and pH of your preferred solution.

The following materials are available for your use:

- Beakers
- 50 mL buret
- Ring stand and buret clamp
- 250 mL Erlenmeyer flask
- Graduated cylinders
- 2 plastic pipet droppers
- 5.0 mL graduated pipet
- Pipet bulbs/fillers
- Wash bottle with distilled water
- 100 mL of 0.10 M NaOH
- 30 mL of Sprite or vinegar
- Phenolphthalein

## Acid Base Titration

Titration is used in several industries from medicine to food analysis to water quality control. In all cases titration is used to quantitatively analyze the unknown concentration of a solution or the amount of substance by comparing it to a solution of known concentration.

In this lab you will analyze the acid content of various solutions. The acid content of many foods and beverages contributes significantly to their taste. Soft drinks contain varying quantities of several acids, which give sodas their tart flavor. In cola products, these acids are predominantly carbonic acid and phosphoric acid. In citrus flavored sodas, such as Sprite, Sierra Mist, and 7-Up the acids are carbonic acid and citric acid.

Your task is to determine how much acid is in Sprite or vinegar. You are to develop and carry out a procedure to determine the acid concentration and pH of your preferred solution.

The following materials are available for your use:

- Beakers
- 50 mL buret
- Ring stand and buret clamp
- 250 mL Erlenmeyer flask
- Graduated cylinders
- 2 plastic pipet droppers
- 5.0 mL graduated pipet
- Pipet bulbs/fillers
- Wash bottle with distilled water
- 100 mL of 0.10 M NaOH
- 30 mL of Sprite or vinegar
- Phenolphthalein

**Pre-lab:**

Write the generic balanced equation to represent the reaction that will take place in this titration.

**Procedure:**

Write all steps taken to perform this lab. Be clear and concise.

**Data:**

Be sure to include appropriate data tables that include the volumes of acid solution and NaOH used per trial.

**Calculations:**

Calculate the acid concentration of the fruit juice or soda tested, being sure to show all work. Include units.

**Post-lab:**

1. A fellow student rinsed the buret with water, but neglected to rinse the buret with titrant before conducting the experiment. What effect would this have on the calculated acid concentration of the acid solution? Explain your reasoning.
2. Imagine a lab team that consistently added base past the first appearance of a pale pink color. What would happen to the average calculated acid concentration of the acid solution? Explain your reasoning.

**Pre-lab:**

Write the generic balanced equation to represent the reaction that will take place in this titration.

**Procedure:**

Write all steps taken to perform this lab. Be clear and concise.

**Data:**

Be sure to include appropriate data tables that include the volumes of acid solution and NaOH used per trial.

**Calculations:**

Calculate the acid concentration of the fruit juice or soda tested, being sure to show all work. Include units.

**Post-lab:**

1. A fellow student rinsed the buret with water, but neglected to rinse the buret with titrant before conducting the experiment. What effect would this have on the calculated acid concentration of the acid solution? Explain your reasoning.
2. Imagine a lab team that consistently added base past the first appearance of a pale pink color. What would happen to the average calculated acid concentration of the acid solution? Explain your reasoning.