

Titration is used in several industries from medicine to food analysis to water quality control. In all cases titrations are 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 beverages. 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 various fruit juices and soft drinks. You are to develop and carry out a procedure to determine the acid concentration and pH of your preferred fruit juice or soda.

The following materials are available for your use:

- Beakers
- 50 mL buret
- 250 mL Erlenmeyer flask
- Graduated cylinders

Calculations:

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

Post-lab:

1. Suppose a fellow student chose to measure solution volumes using the beakers or graduated cylinders provided. What effect would this have had on the calculated acid concentration? How might this affect the number of significant figures in your final answer? Explain your answers.
2. 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 in the juices or sodas? Why?
3. 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 juices or sodas? Explain your answer.
4. Sketch a titration curve of pH versus volume of titrant (NaOH) added. In general, as volume of titrant increases, what happens to pH? Why does this occur?