

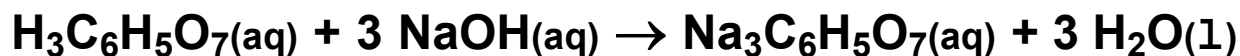
Citric Acid in Fruit Juices

Background

- A titration is a technique to determine how much analyte (species being analyzed) is present in a sample. This is done by reacting the analyte with a known amount of titrant (species added in small increments by a buret). In titrations, an indicator is often used to determine the end of the reaction (endpoint) by changing colors.
- A titration is a stoichiometric technique. That is, by knowing the amount of titrant added and the molarity of the titrant, you calculate the number of moles of titrant that reacted with the analyte. Next, a mole to mole ratio is applied to find the moles of analyte.
- In this experiment to estimate the amount of citric acid (analyte) in fruit juices, you will add NaOH (titrant) to the fruit juice until the solution with the phenolphthalein (indicator) changes color to pink. Since some of the juices are colored, the endpoint may be a slightly different color.

Calculations

For Analyzing a Juice Sample:



- $\text{mol}_{\text{NaOH}} = M_{\text{NaOH}} \times L_{\text{NaOH}}$
- $\text{mol}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7} = \text{mol}_{\text{NaOH}} \times \left(\frac{1 \text{ mol}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7}}{3 \text{ mol}_{\text{NaOH}}} \right)$
- $\text{mass}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7} = \text{mol}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7} \times \text{MW}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7}$
- $\text{mass}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7} / \text{mL}_{\text{juice}} = \left(\frac{\text{mass}_{\text{H}_3\text{C}_6\text{H}_5\text{O}_7}}{\text{mL}_{\text{juice}}} \right)$
- **Note:** We are assuming that all of the acid in fruit juice is citric acid. There are other acids present, but in much smaller amounts, such as ascorbic acid (Vitamin C). So the amount of citric acid you calculate will be larger than the "true" amount present (an overestimate).