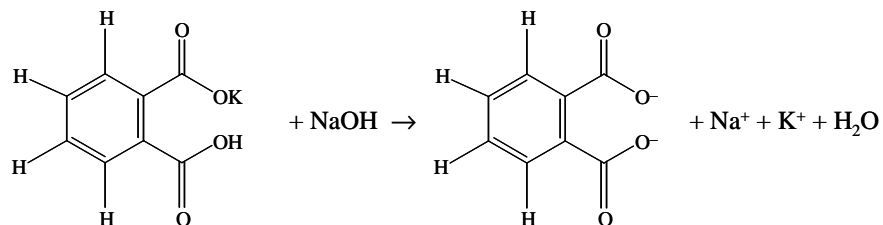


### 1. Standardization of NaOH Solution



*At the equivalence point:* Moles of KHP = Moles of NaOH

**Known:** Mass of KHP (g)  
Volume of NaOH used in titration (ml)

**To be determined:** Molarity of NaOH (mole/L)

**Calculations:** 1.  $\text{Moles KHP} = \frac{\text{g of KHP}}{\text{MW (KHP)}}$

2.  $\text{Moles NaOH} = \text{Moles KHP}$

3.  $M_{\text{NaOH}} = \frac{\text{Moles NaOH}}{V_{\text{NaOH}} \text{ (L)}}$

### 2. Determination of the Unknown Acid Concentration



*At the equivalence point:* Moles HCl = Moles NaOH

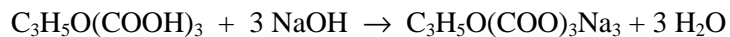
**Known:** Molarity of NaOH from Part 1 (mole/L)  
Volume of NaOH used in titration (ml)  
Volume of the unknown acid (ml)

**To be determined:** Molarity of HCl (mole/L)

**Calculations:** 1.  $\text{Moles NaOH} = M_{\text{NaOH}} \text{ (mole/L)} \times V_{\text{NaOH}} \text{ (L)}$

2.  $\text{Moles HCl} = \text{Moles NaOH}$  (this equation will be different for  $\text{H}_2\text{SO}_4$ )

3.  $M_{\text{HCl}} = \frac{\text{Moles HCl}}{V_{\text{HCl}} \text{ (L)}}$

**3. Determination of an Acid Content of a Fruit Juice**

*At the equivalence point:* Moles  $\text{C}_3\text{H}_5\text{O}(\text{COOH})_3 = \frac{1}{3} \times \text{Moles NaOH}$

**Known:** Molarity of NaOH from Part 1 (mole/L)  
Volume of NaOH used in titration (ml)  
Volume of the juice sample (ml)

**To be determined:** g of  $\text{C}_3\text{H}_5\text{O}(\text{COOH})_3$ /100 g of juice

- Calculations:**
1. Moles NaOH =  $M_{\text{NaOH}}$  (mole/L)  $\times V_{\text{NaOH}}$  (L)
  2. Moles  $\text{C}_3\text{H}_5\text{O}(\text{COOH})_3 = \frac{1}{3} \times \text{Moles NaOH}$
  3. Mass (g) of  $\text{C}_3\text{H}_5\text{O}(\text{COOH})_3 = \text{Moles } \text{C}_3\text{H}_5\text{O}(\text{COOH})_3 \times \text{MW (g/mole)}$
  4. Mass (g)  $\text{C}_3\text{H}_5\text{O}(\text{COOH})_3$  per 100 g juice =  $\frac{\text{Mass (g) } \text{C}_3\text{H}_5\text{O}(\text{COOH})_3 \times 100 \text{ ml}}{V_{\text{juice}} \text{ (ml)}}$