Chemistry 1105 Lab: Fatty Acids

Goals:

1. **Introduction to Titration.**
2. **Prepare and standardize 0.1 M NaOH.**
3. **Determine the Percentage of Acetic Acid(weight/volume) in Vinegar.**

Acid-Base Titration:

A titration is a process in which a controlled volume of one reagent(titrant) is added to a known amount or volume of a second reagent until a complete reaction is observed.

Base + Acid → Salt + Water

Preparation of 0.1 M NaOH:

Preparation of 150. mL of a solution of 0.1 M NaOH by dilution of a 1 M NaOH stock solution.

$$M_1 \times V_1 = M_2 \times V_2$$

M_1: Molarity of stock solution

V_1: Volume of stock solution

M_2: Molarity of dilute solution

V_2: Volume of dilute solution

Standardization of 0.1 M NaOH:

Base + Acid → Salt + Water

$NaOH + KHC_8H_4O_4 \rightarrow KNaC_8H_4O + H_2O$

? M
mL

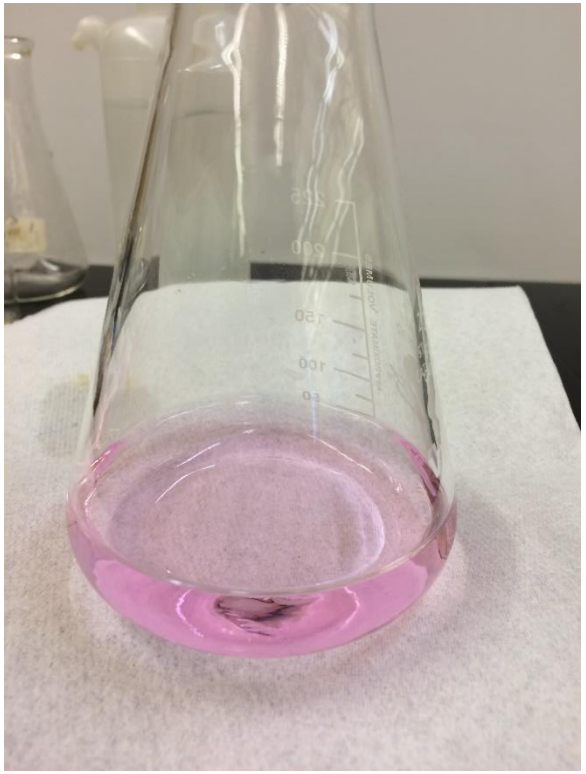
g
↓

moles $KHC_8H_4O_4$

moles $KHC_8H_4O_4$ = moles NaOH at equivalence point

Determination of the Endpoint/Equivalence Point:

Equivalence point determined using acid-base indicator.



Equivalence point is volume of base where the moles base = moles acid.

Endpoint. Volume of base that turns indicator color.

Determining Percent Acetic Acid in Vinegar:

$$\text{Percent Acetic Acid}\left(\frac{\text{w}}{\text{v}}\right) = \frac{\text{mass of acetic acid(g)}}{\text{100.00 mL of solution}}$$

NOTE: Can not analyse unaltered vinegar. Will perform 1/10th dilution.

Will analyse 25.00 mL of this diluted vinegar.

Base + Acid → Salt + Water

$NaOH + CH_3COOH \rightarrow CH_3COONa + H_2O$

Base + Acid →

$NaOH + CH_3COOH \rightarrow$

(now known)

0.1 M **M = moles/volume(L)**

mL **25.00 mL DILUTE**

↓ ↑

moles NaOH = moles CH_3COOH

Finding the Percent Acetic Acid:

Percent Acetic acid is the mass of acetic acid(g) in 100.00 mL.

$$\text{Percent Acetic Acid}\left(\frac{\text{w}}{\text{v}}\right) = \textit{Molarity}\left(\frac{\text{moles}}{L}\right) \times \frac{60.05\ \text{g}\ \textit{acetic acid}}{\textit{mole}} \times 0.10000L$$

Expected value: 7.% w/v