

Quantitative analysis of Vinegar (Weight-Volume Percent)

Most vinegar contains 4-5 % (W/V) acetic acid (CH₃COOH). Flavoring and coloring agents may also be added. The most usual way of expressing solution strength is the weight per unit volume percent (W/V %). It refers to a solution prepared by dissolving a measured weight of the solute (gm.) in a solvent to give 100 ml. of the final solution.

$$\text{weight - Volume percent} = \frac{\text{Wt solute , gm}}{\text{Vol. solution , ml}} \times 100\%$$

The weight -volume percent of acetic acid in vinegars is determined by titrating a measured volume of vinegar to a phenolphthaline end point with a measured volume of a standard NaOH solution.



At the end point the number of equivalents of NaOH equals the number of equivalents of CH₃COOH. By the end of this experiment the student should know how to calculate the concentration of solution by comparing the weight of solute with the total volume of solution. The units used to express the concentration of solute in blood and urine is milligram per 100 ml.

Procedure:

- 1- In a conical flask add 5 ml. of vinegars solution.
- 2- Rinse and fill a clean 25ml. burette with 0.1 N NaOH, be careful that no air bubbles are in tip of the burette.
- 3- Record the initial reading on the data sheet.
- 4- Add 2 drops of phenolphthalein indicator and titrate versus standard NaOH until the end point occurs.

Calculation:

Equivalent weight of CH_3COOH = 60.05 gm/eq. (GEW).

$$N_a V_a = N_b V_b$$

$$N_a = \frac{N_b V_b}{V_a}$$

No. of grams (wt/L) = $N_a \times (\text{GEW})$

The percent of CH_3COOH in vinegar = no. of gram $\times \frac{100}{1000} \%$