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Titrimetric Estimation of Acetic Acid Concentration Using Standard Sodium Hydroxide Solution

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We use this protocol and it's working

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Abstract

The protocol presents a simple and accurate titration method to determine the concentration and strength of acetic acid (CH_3COOH) using a standard sodium hydroxide (NaOH) solution. The procedure employs phenolphthalein as an acid-base indicator and follows the classical volumetric approach for weak acid–strong base titration. Key reagents and laboratory glassware are detailed, and each step from burette preparation to final endpoint detection is clearly described.

Guidelines

IN THIS EXPERIMENT, WE ADDED

Normality of NaOH : 0.12 Normality

Volume of NaOH : We need to find by titration (Range: 6.0–7.5)

Normality of Acetic acid mix: We need to calculate it

Volume of the acid mixture: 10 mL

The manuscript (CITATION) describes a **titration between acetic acid (CH_3COOH) and sodium hydroxide (NaOH)** using **phenolphthalein** as an indicator. However, in the **calculation section**, it mistakenly references **H_2SO_4 (sulfuric acid)** and uses its equivalent weight (49 g/equiv), which is **inaccurate** for acetic acid.



Materials

Sodium hydroxide solution (NaOH) is used in titration to neutralise.

Acetic acid solution (CH₃COOH) is an acid in titration.

Phenolphthalein is used as an indicator.

Safety warnings

! Wear a Lab Coat & Purple Nitrile Gloves while handling solutions

Before start

All the Glassware & Tools should be autoclaved

Titration Through NaOH base & Acetic Acid

- 1 Clean the burette thoroughly, wash it with distilled water and finally rinse it with sodium hydroxide solution.
- 2 Fill sodium hydroxide solution into the burette through a funnel above the zero mark.
- 3 Remove any air gap from the nozzle of the burette by forcing the solution out forcefully from the burette nozzle.
- 4 Note the initial reading by keeping the eye at the same level as the solution's meniscus.
- 5 Pipette out  10 mL of Acetic Acid solution into a washed and dried conical flask. Always wash the pipette with water and then rinse it.
- 6 Add 1-2 drops of phenolphthalein indicator to the conical flask. Titrate the acid with sodium hydroxide solution till a very faint permanent pink colour is obtained. Add sodium hydroxide solution in small amounts initially and then dropwise.
- 7 Read the lower meniscus of the solution in the burette again and record it as the final reading.
- 8 Repeat the procedure until three concordant readings are obtained.
- 9 Lastly Calculate strength of Acetic Acid = equivalent weight x normality
- 10 For Calculations use $C_1 V_1 = C_2 V_2$ Formula
- 11

Observations

S.no.	Initial burette reading	Final burette reading	Average(ml)
1.	0	6	
2.	0	6.2	6.1
3.	0	6.1	

Table (3.3): The initial burette reading is always zero when we perform titration of acid and base. Then after the completion of titration, we used to write the final burette reading.

OBSERVATION

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Normality of NaOH	0.12N
Volume of NaOH	6.1
Normality of acid mix.	Have to find
Volume of the acid mixture	10ml

Amount of solution took

13

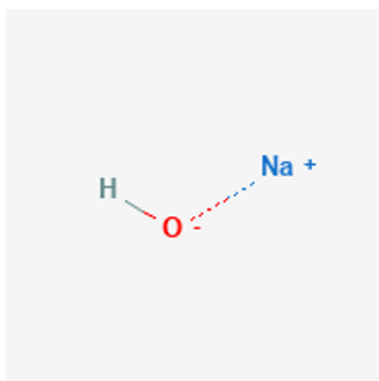


Figure (3.1): 2D structure of NaOH

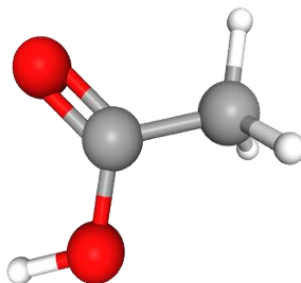


Figure (3.2): 3D structure of acetic acid

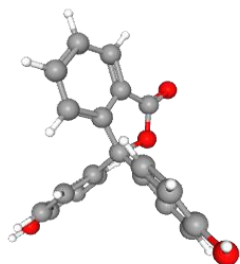


Figure (3.3): 3D structure of Phenolphthalein

Structure of All the chemical used in the experiments



Protocol references

To Learn more about this method, read this paper

(PDF) Comprehensive Review of Fundamental Biochemical Techniques: Integration of Quantification, Separation, and Analytical Methods in Biomolecular Studies

Cite the Article

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