



# DETERMINATION OF ACETIC ACID IN VINEGAR SAMPLE

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# Outline

- Vinegar
- Weak acid - strong base titration
- Determination of acetic acid in vinegar sample

# Objectives

- The students will be able to discuss the determination of acetic acid in vinegar sample.

# Vinegar



Vinegar is a mildly acidic liquid processed from the **fermentation of ethanol** in a process that yields its key ingredient, **(ethanoic acid)**.

Natural Vinegar also contains small amounts of Tartaric acid, Citric acid, and other acids (Gluconic acid, Malic acid, Succinic acid, and Lactic acid).

- The word “vinegar” derived from the Old French *vin aigre*, meaning “sour wine”
- In food preparation procedures, it is a multi-purpose product as an ingredient and condiment.
- Besides cooking, vinegar has medicinal, agricultural and cleaning application.

# Weak Acid-Strong Base Titration

The aim of this experiment is to **accurately determine** the concentration of **acetic acid (CH<sub>3</sub>COOH)** in vinegar via volumetric analysis using a strong base **sodium hydroxide (NaOH)**.



The titration shows the end point lies between **pH=8-10**.

This is due to the hydrolysis of sodium acetate formed.

Titration of a solution or dilute solution of vinegar against a standardized NaOH solution using **phenolphthalein** as an indicator.

# Weak Acid-Strong Base Titration

The sodium hydroxide will be gradually added to the vinegar in small amounts from a burette

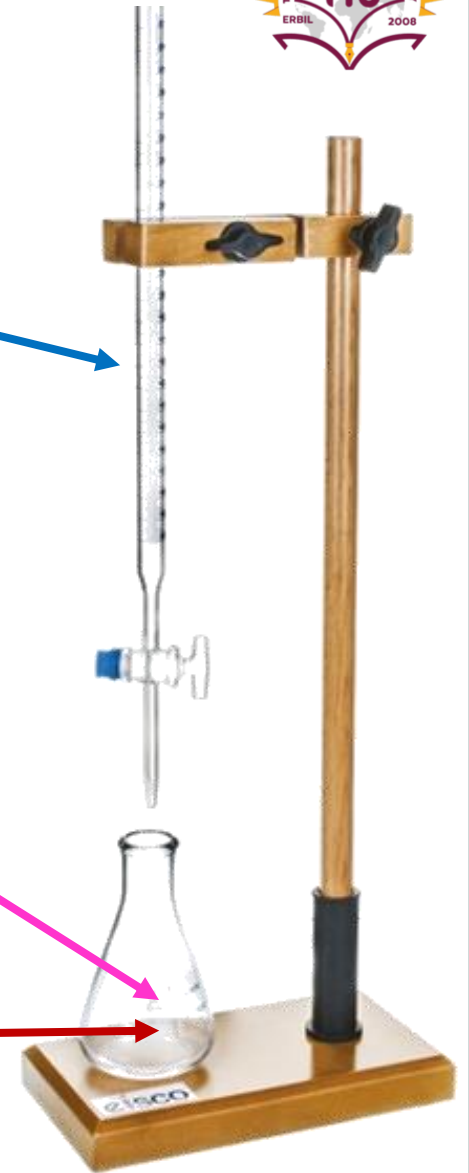
**Titrant**  
0.1 M (NaOH)  
Volume: Dropped from the burette

Phenolphthalein is colorless in vinegar, and deep pink color in basic solutions.

**Indicator**  
Phenolphthalein  
4 Drops

When mixed, a neutralization reaction occurs between **sodium hydroxide** and the **acetic acid** in vinegar.

**Analyte**  
Vinegar, known volume.  
Concentration found by YOU



# Procedure

1. Add **5 ml of a vinegar** solution to a conical flask and then add **20 ml of water**.
2. Add **three** drops of the **Phenolphthalein** indicator (the solution is Colorless).
3. Titrate it with **NaOH** solution (**0.1 M**) from the burette until the color change from Colorless to **Pink (endpoint)**.
4. By using the following equation, you can calculate the concentration of acetic acid in vinegar.

