

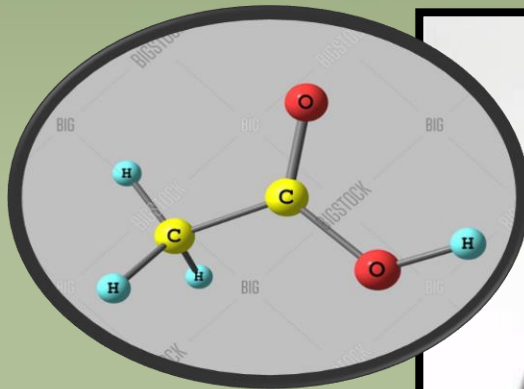


Determertation of the W/V acetic acid in vinegar sample

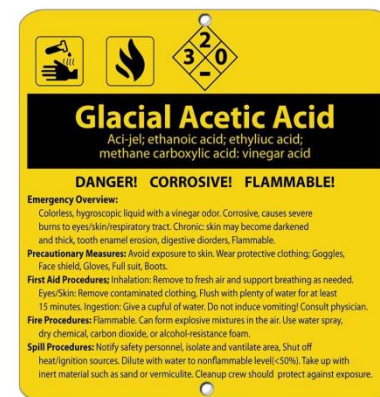
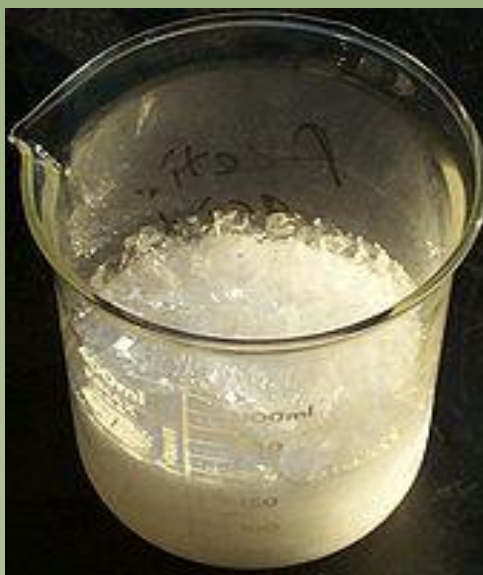
Saba Abd Ul-munemHabeeb
Ms.c Applied Chemistry

Vinegar

- is a liquid consisting of about 5-20% acetic acid (CH_3COOH), water, and other trace chemicals, which may include flavorings. The acetic acid is produced by the fermentation of ethanol by acetic acid bacteria



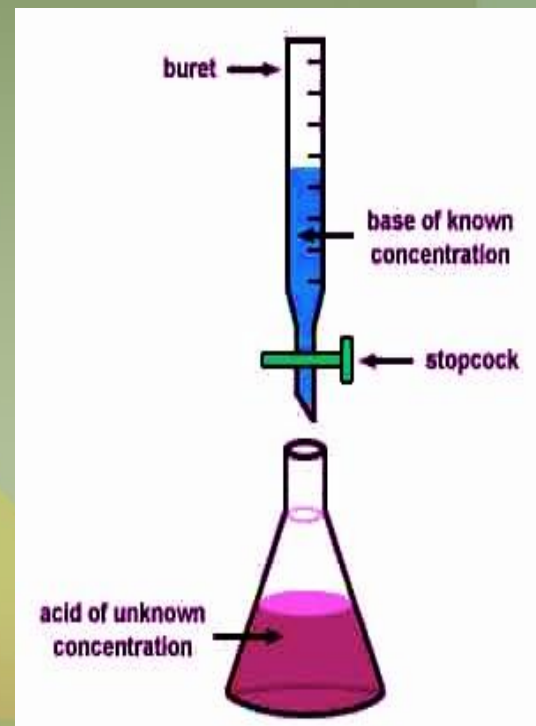
- Acetic acid that contains a very low amount of water (less than 1%) is called anhydrous (water-free) acetic acid or glacial acetic acid.
- The reason it's called glacial is because it solidifies into solid acetic acid crystals just cooler than room temperature at 16.7 °C, which is ice. Removing the water from acetic acid lowers its melting point by 0.2 °C



❑ **Aim of Experiment:** Determination of %w/v Acetic Acid

Principle:

- in an unknown Vinegar sample .
- Acetic acid is a weak acid $K_a = 1.8 \times 10^{-5}$, So titration of acetic acid against NaOH is a titration of a weak acid against a strong base. The end point will be not very sharp



Procedure:

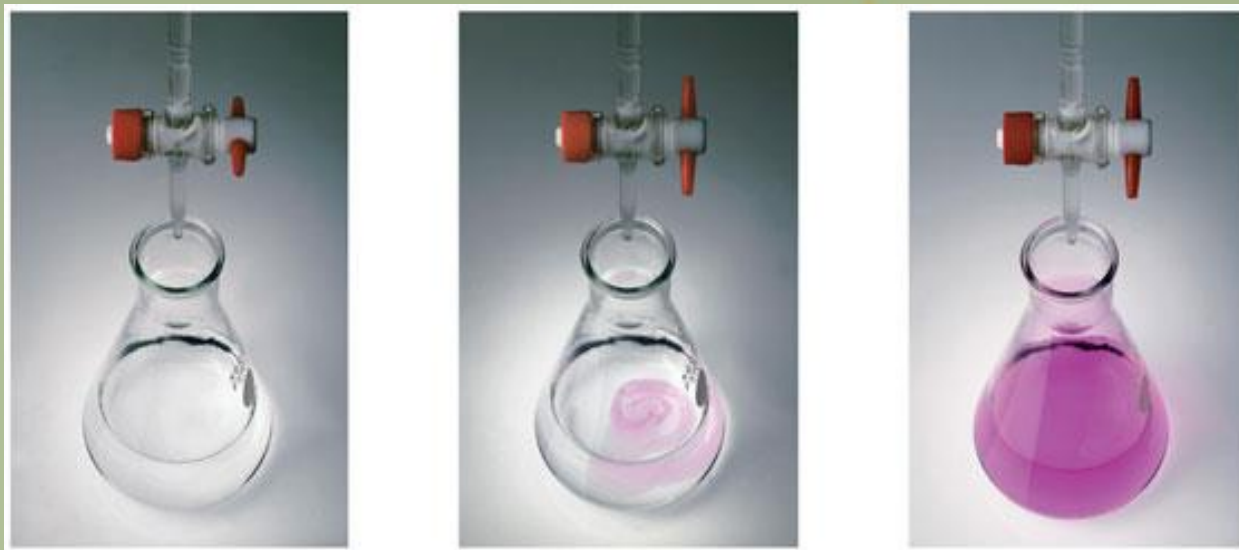
(A) preparation of unknown acetic acid solution :

- 1-Transfer 10 ml of unknown by using 10 ml bulb pipette into a 100 ml volumetric flask.
- 2- Complete the volume with distilled water.
- 3- Stopper the flask and shake well.



B) titration of acetic acid against NaOH

1. Using a funnel, fill the buret with the standardized NaOH solution. Make sure that the tip is also filled and there are no air bubbles in the tip.
2. Using a 10 ml bulb pipette transfer 10 ml of the prepared solution to a conical flask.
3. Add two drops of phenolphthalein indicator.
4. Place a white background underneath the flask with the vinegar solution.
5. Slowly add with constant swirling the NaOH drop wise to the vinegar solution.
6. Continue adding drop wise to the vinegar solution until the vinegar solution turns the faints shade of pink that remains for 30 seconds. This is called your endpoint.
7. Calculate the % by mass of acetic acid in the vinegar solution.



Calculations:

- Note the molar relationship. For every one mole of acetic acid, it would take one mole of NaOH to completely react it. For every one mole of NaOH, it takes one mole of acetic acid to react with it.
- moles of NaOH = moles of acetic acid
- The volume of NaOH added to the vinegar solution is read off the buret in milliliters and converted to liters (liters = ml / 1000)
- The moles of the sodium hydroxide used to react with the acetic acid in the vinegar solution can now be determined.
- moles of NaOH = (molarity of NaOH) x (liters of NaOH)
 - $N = M \times n$
- $N_1 V_1(\text{NaOH}) = N_2 V_2 (\text{HAc})$
- **$N_1 V_1(\text{NaOH}) = \text{Mass (HAc)} / \text{Eq. Mass (HAc)} \times 1000$**

Lab report

- **Group:**
- **Date:**
- **Title of experiment:**
- **Material:**
- **Indicator:**
- **Results and calculation:**

▪ Nb.	Volume of unknown Acetic Acid in vinegar N(ml)	Burette readings		Volume of NaOH (0.1 N) (ml)
		V =Initial ml	V=Final ml	

- **Calculations:**
- **Dissociation:**
- (Home work): describe the lab safety for this experiment???