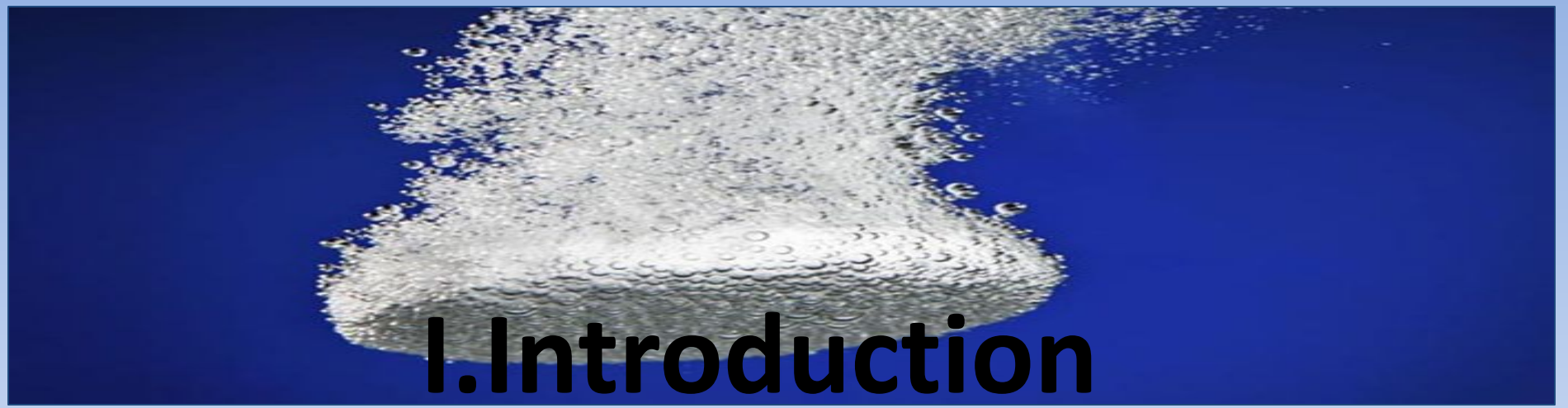
Solubilization of Aspirin

Lab2

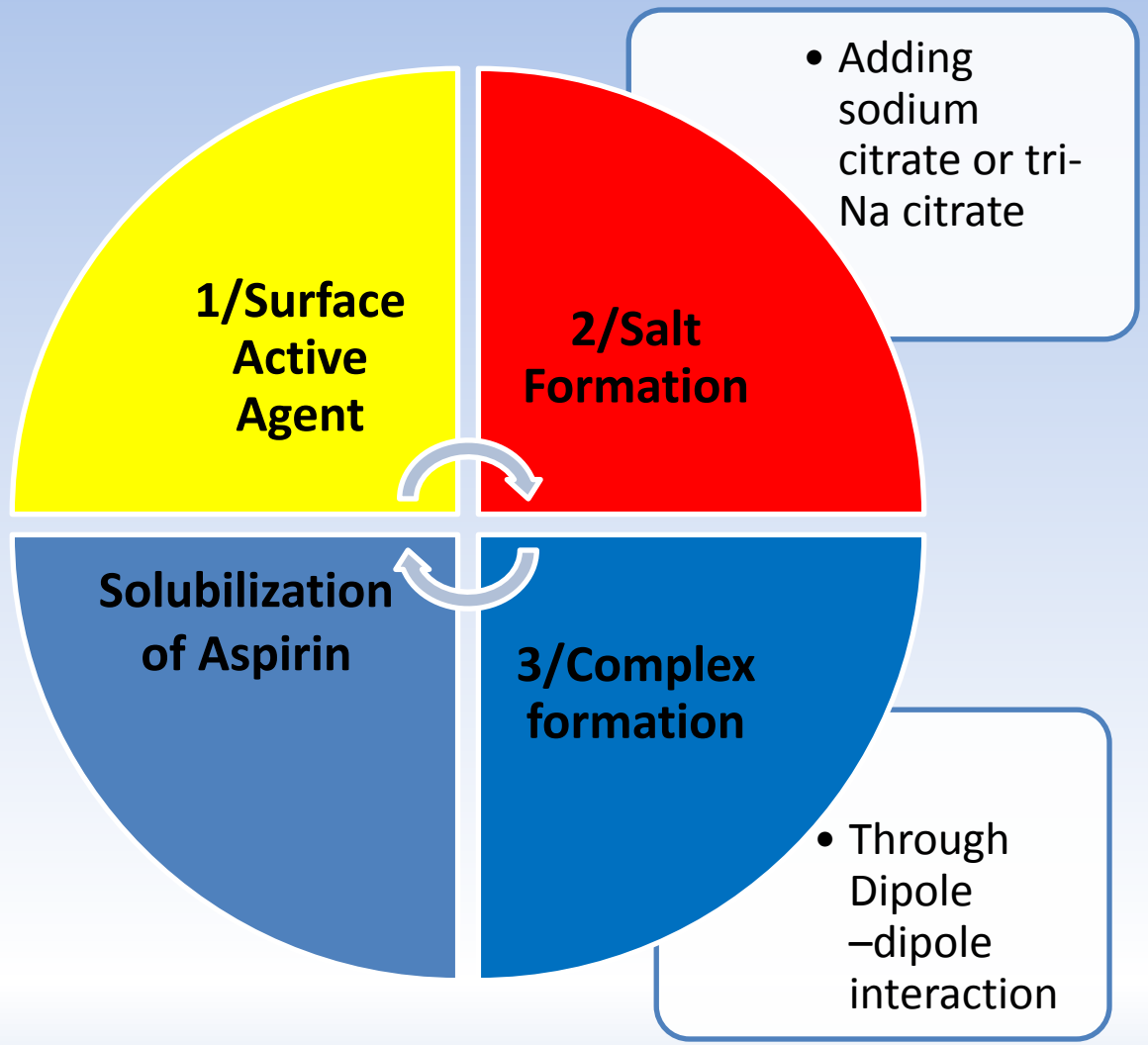


I.Introduction

- Acetylsalicylic acid is the scientific name of the aspirin, yet currently explored by various companies for commercial benefits has analgesic and antipyretic activity.

- Soluble formulations of aspirin are currently available on the market. Basically, it is slightly soluble in water; hence, aspirin needs enhancements to be solubilized as:

Enhancement of aspirin solubilization



- For instance, **Aspro Clear** is soluble, effervescent tablet containing aspirin. The effervescence and favorable pH condition required for solubility of aspirin are facilitated by:

  incorporating **sodium bicarbonate and citric acid** in the formulation.

- Aspro Clear reported to provide faster relief of pain than plain aspirin tablets. Another method is by forming dipole-dipole interaction.

II. Kinds of forces

Generally, there are two kinds of forces, or attractions, which operate in a molecule:

Intramolecular and **intermolecular**.

Intramolecular forces are the forces that hold atoms together within a molecule.

Intermolecular forces are forces that exist between molecules (Figure: 1).

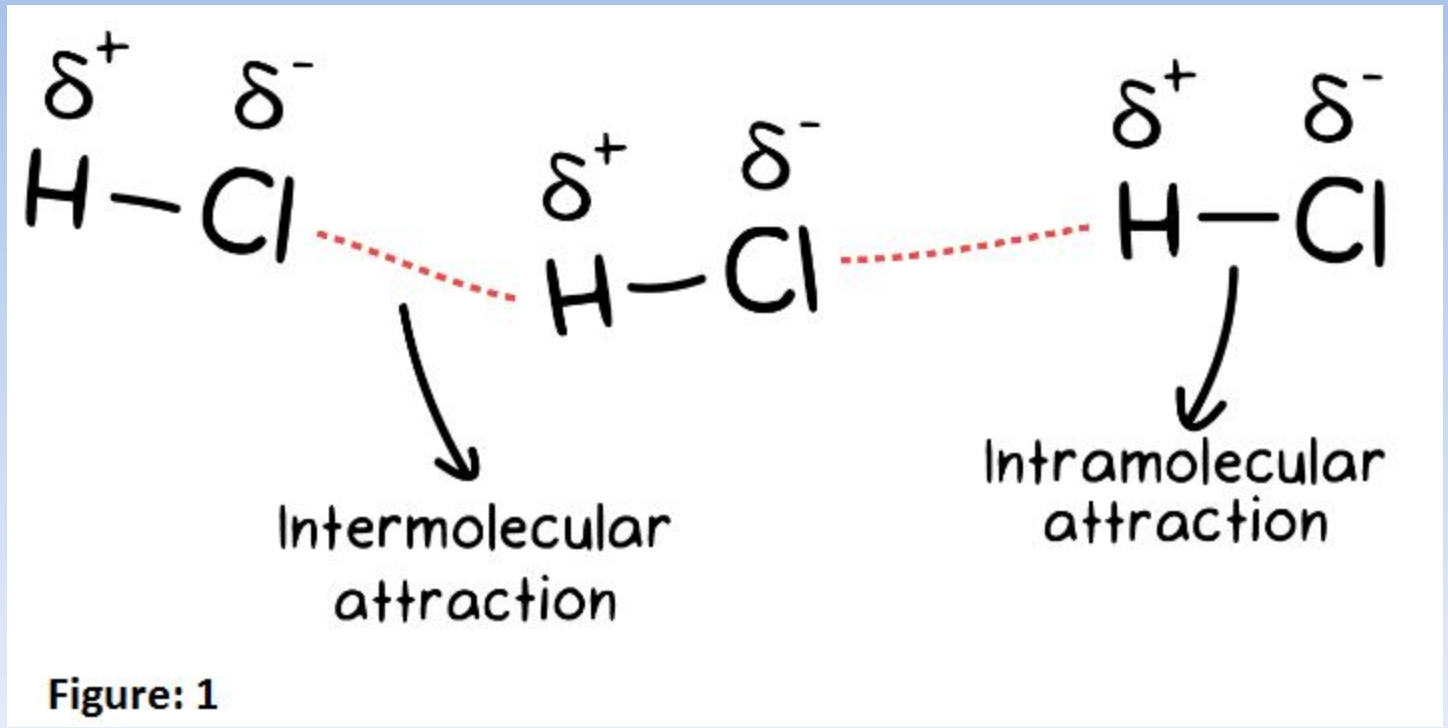
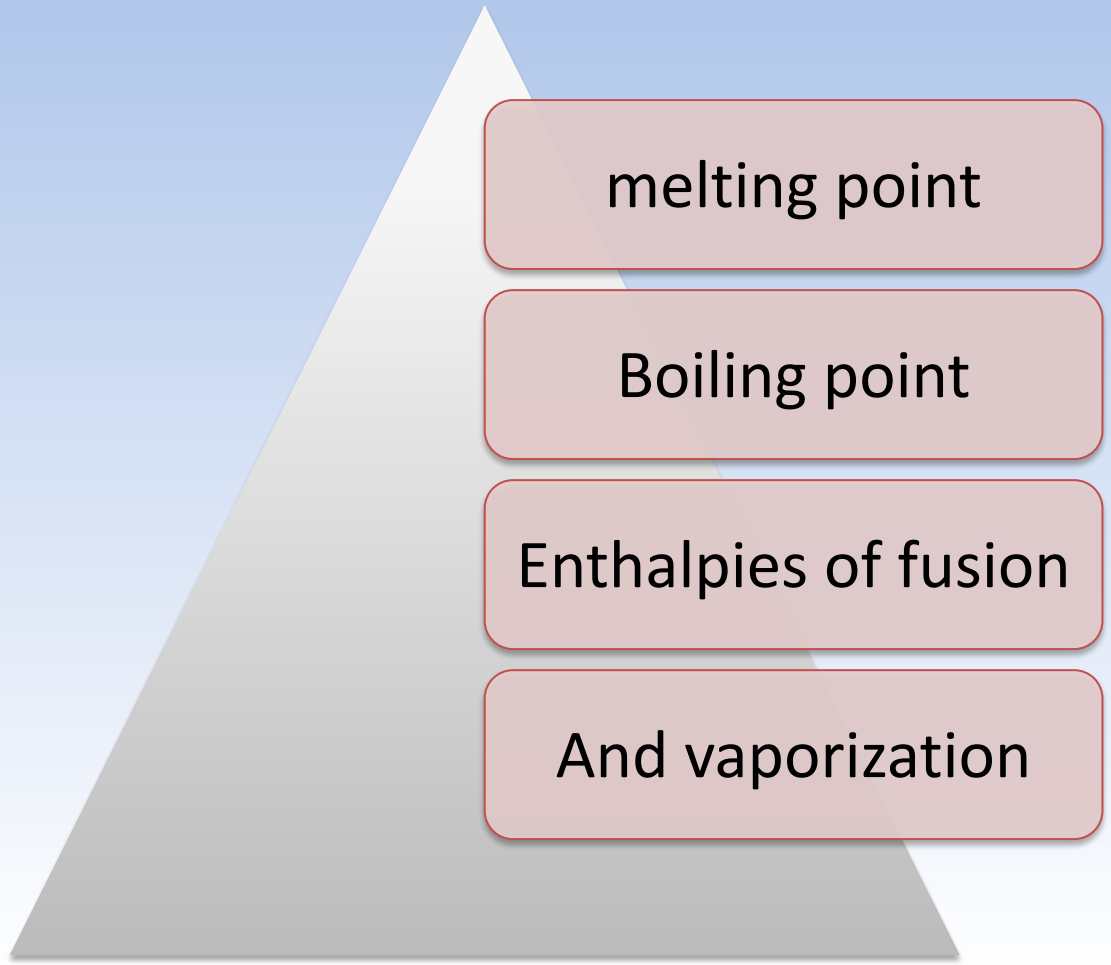

δ+ δ-
H—Cl
δ+ δ-
H—Cl
δ+ δ-
H—Cl
Intermolecular attraction
Intramolecular attraction

Figure: 1

- Intermolecular forces are much weaker than the intramolecular forces of attraction but are important because they determine the physical properties of molecules like

Physical properties



Therefore, the intermolecular force:

- 1. **Hydrogen bond.**
- 2. **London dispersion forces, under the category of van der Waal forces**
- 3. **Dipole-dipole Interactions**

Dipole –Dipole interaction

- These forces occur when the partially positively charged part of a molecule interacts with the partially negatively charged part of the neighboring molecule (Figure 2).
- Dipole-dipole interactions are the strongest intermolecular force of attraction.

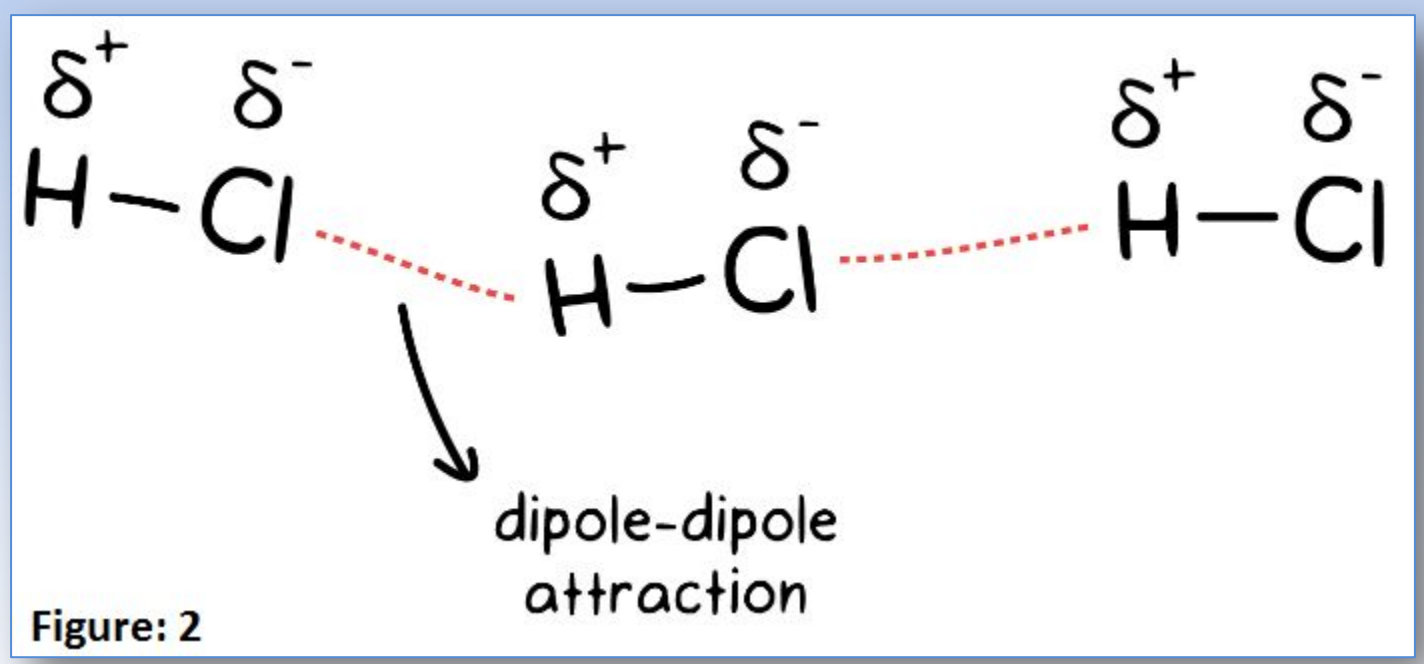


Figure: 2

III. Experimental Work

- Part I:
- MATERIALS :Acetyl salicylic acid , tri-sodium citrate, distilled water, phenol red , sodium hydroxide and filter paper
- GLASS WARE and EQUIPMENTS : conical flasks, graduated pipettes, funnel, burette. In addition to electrical balance.

Part ll: Experimental method

- 1. Add 1 g of Aspirin to the following flasks then :

Conical flask	Weight of tri-sodium citrate
1	0 g
2	1 g
3	2 g
4	3 g
5	4 g

- 2. Add 50 mL of distilled water to each flask.
- 3. Shake the flasks for 10 min., then apply filtration step. (Rinse the flask with the first portion of the filtrate).
- 4. Take 10 mL of the filtrate solution and titrate with NaOH (0.1N) using phenol red as an indicator.
- 5. Record the end point taking into account the end point appears when the color changes from yellow to pink.
- 6. Finally, plot percent of aspirin dissolved versus grams tri-sodium citrate used

- When the amount of tri-sodium citrate is higher than that required for dissolving aspirin, the excess will dissociate to citrate ion and sodium ion, the later will form with water NaOH which results in the reaching the end point faster, and less than the real end point.

The chemical factor will be:

1 M.wt Aspirin = 1 M.wt NaOH

1eq.wt of aspirin = 1eq.wt of NaOH

180 g = 1L of 1N NaOH

180/1000 g = 1ml of 1N NaOH

180/1000* 0.1 = 1ml of 0.1N NaOH

Each 1ml of 0.1N NaOH = 0.018 g Aspirin

- End point * chemical factor = g aspirin dissolve in 10ml
- Multiply the results by 10 = g%.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