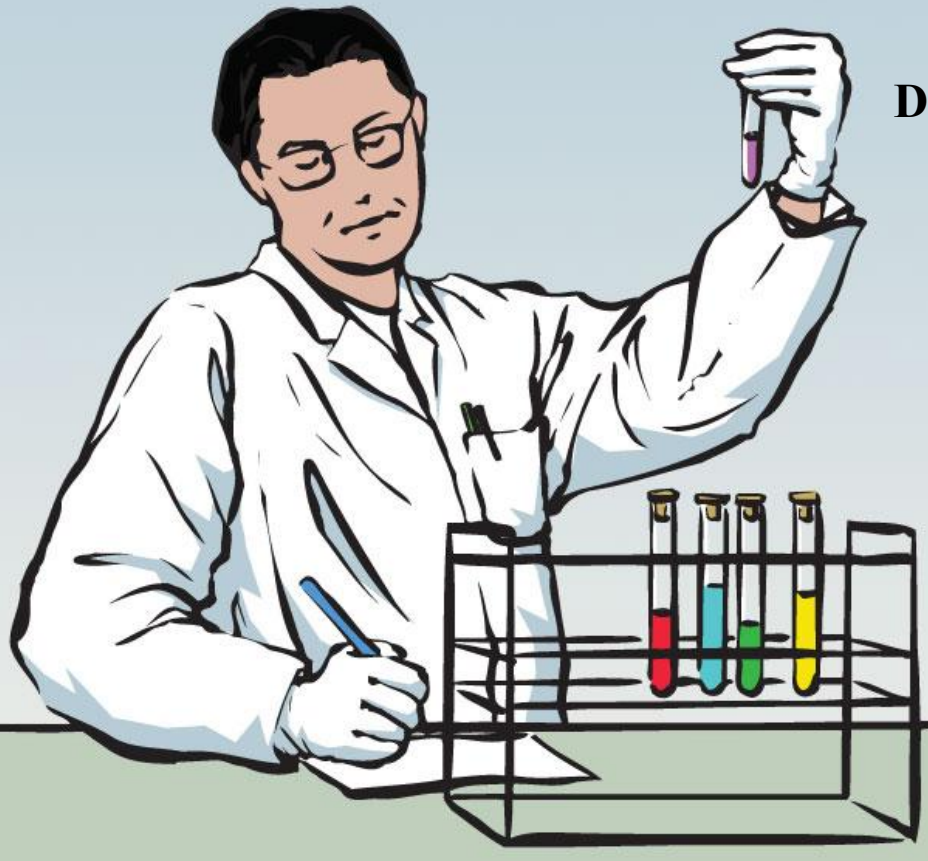

Tishk International University
Faculty of Applied Science
Department of Nutrition & Dietetics
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General Chemistry Lab (2)

Exp. 1: Preparation of Standard solution

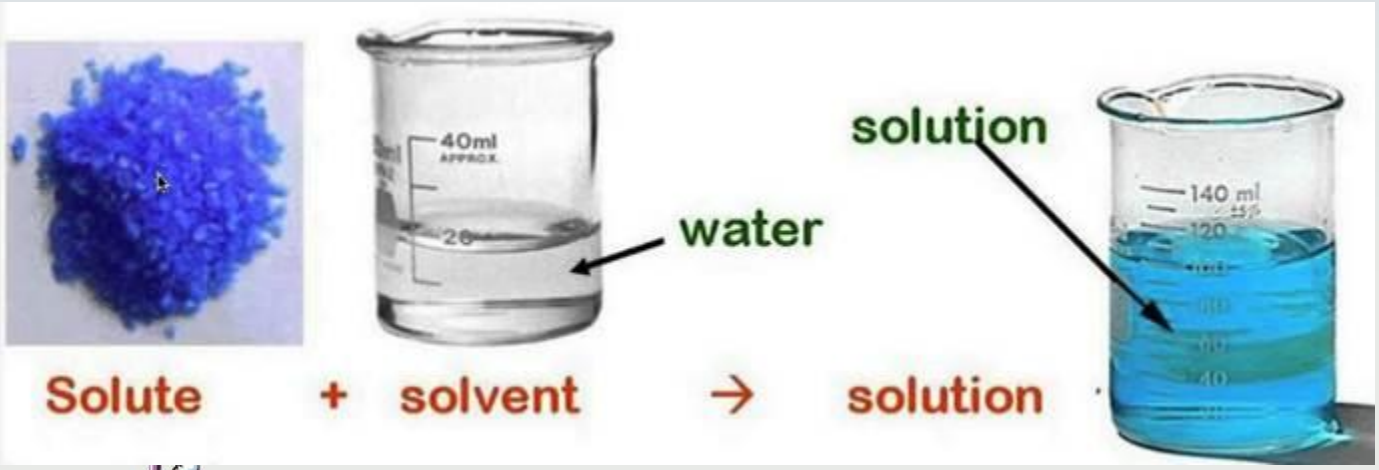
Lecturer: Amani Tahsin, BSc, MSc | PhD (c)
amani.tahsin@tiu.edu.iq

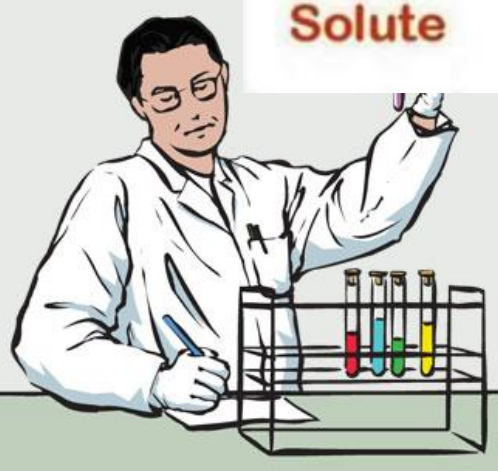
Theory/Aim

- The purpose of this experiment is to learn how **to prepare standard solutions** of varying concentrations using both solid and liquid materials.

Solution

- **A solution is defined as** : a homogenous mixture which mainly form two components namely **solute** and **solvent**.





Based on the physical states of the solute and solvent, solutions can be classified into three types:

1.Solid solutions

2.Liquid solutions

3.Gaseous solutions.

Depending upon the dissolution of the solute in the solvent, solutions can be classified into **three types:**

- **supersaturated solution.(crystals form)**
- **saturated solutions. (no more solute dissolves)**
- **unsaturated solutions. (more solute dissolves)**

* The solutions are of **two forms**, depending on the solvent is **water or not.**

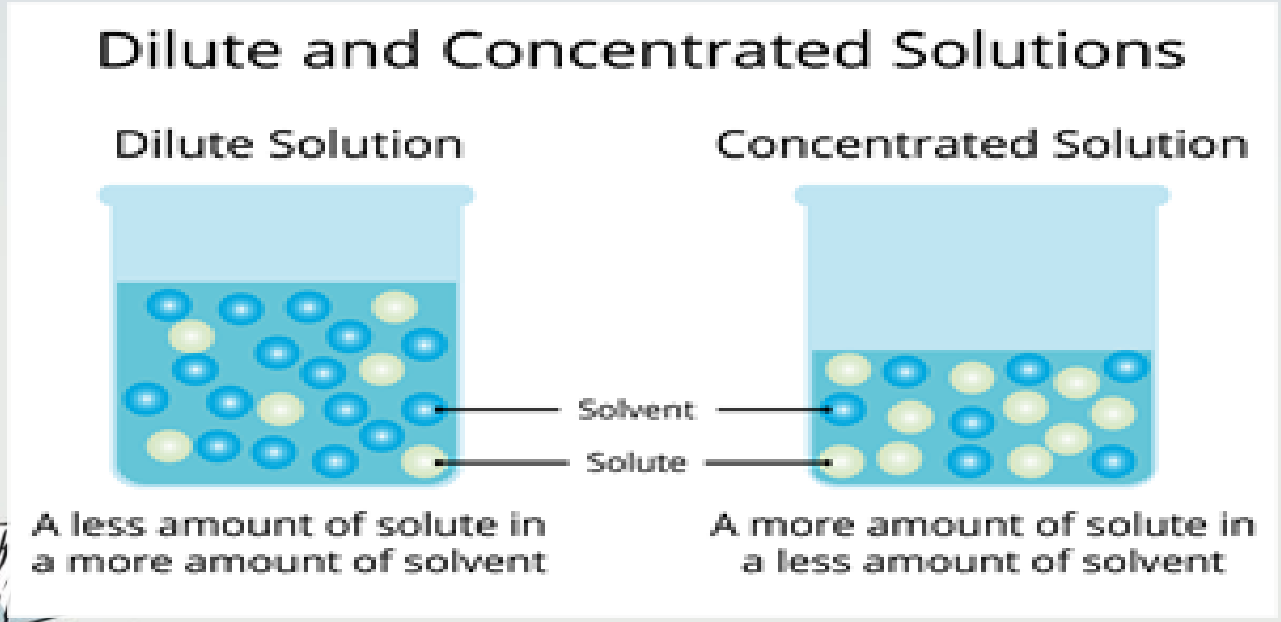
 Aqueous solution – When a solute is dissolved in water the solution is called an aqueous solution.

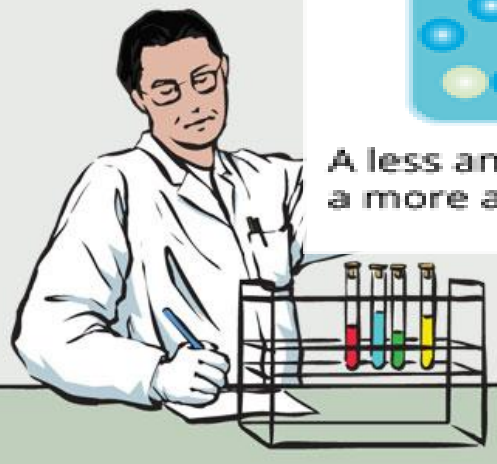
 Non-aqueous solution – When a solute is dissolved in a solvent other than water, it is called a non-aqueous solution.

* Another classification of the solution depends on the **amount of solute added to the solvent.**

 A dilute solution contains a small amount of solute in a large amount of solvent.

 A concentrated solution contains a large amount of solute dissolved in a small amount of solvent.





Standard solution is defined as

A solution that have precisely known concentration

There are two types of standard solution:

- **Primary standard solution.**
- **secondary standard solution.**

Primary standard solutions: are those chemical reagents having high percent purity, stability toward air , having high molecular mass, readily solubility in the solvent , having medium cost and readily availability.

 Secondary Standard solution: is a substance which may be used for standardisations and whose content of the active substance has been found by comparison against primary standard.

Standard Solutions can be prepared in two ways:

1. Solids are added to liquids.

2. Liquids added to liquids.

Tools: Funnel –Stirrer –Beaker –Spatula –Watch Glass– Volumetric Flask – Washing bottle – Sensitive scale.

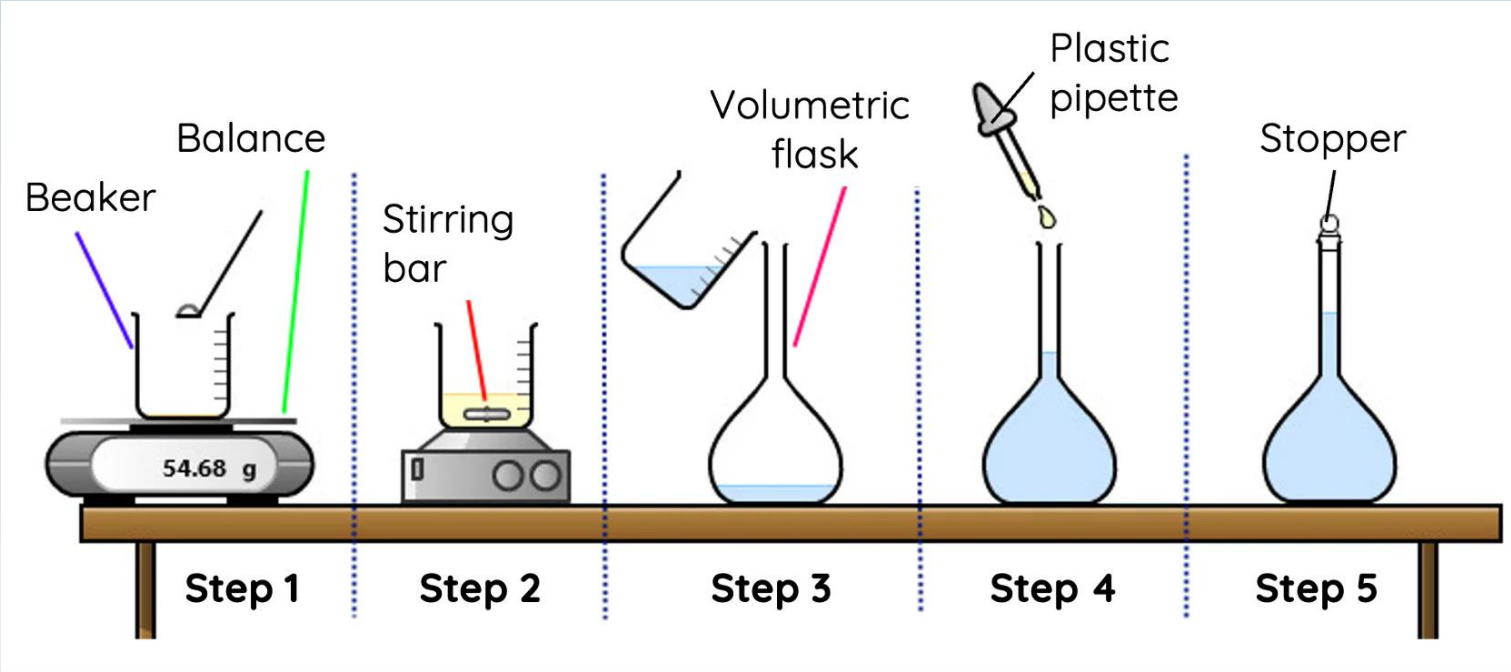
Procedure

1. Solids added to liquids.

- Weight the solid substance in a watch glass.
- Transfer to a beaker and add a small amount of solvent to the beaker and stirred the solution until the solid substance is dissolved.
- Transfer the solution to the volumetric flask.
- Put a funnel into the slim neck of the volumetric flask.
- Complete the additional of solvent to required volume (add solvent until the liquid level reaches the calibration mark).
- Capped the volumetric flask and inverted until the contents are thoroughly mixed.

$$Wt = \frac{N \times Eq.wt \times V_{ml}}{1000}$$

1. Solids added to liquids.



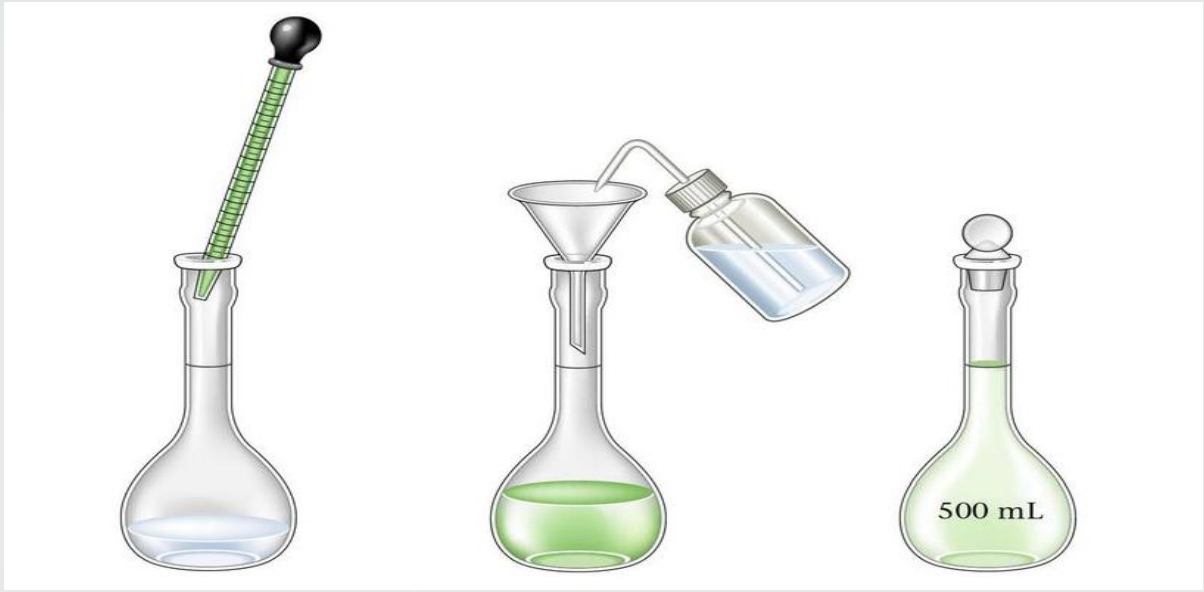
2. Liquid added to liquids.

$$N = \frac{\% \times Sp.gr. \times 1000}{Eq.wt}$$

o Use a pipet to take an exact amount from the stock solution (concentrated) into a clean volumetric flask.

 Put a funnel into the slim neck of the volumetric flask.

 Add the solvent until the liquid level reaches to the mark on the neck.



Discussion:

- Preparing a standard solution requires accuracy, especially when using a balance, as any increase or decrease in the amount of material can lead to incorrect concentrations. Similarly, for liquid materials, any variation in the volume of the solution—whether increased or decreased—will also affect the accuracy of the final concentration.