



Department of anesthesia techniques  
Title of the lecture:- preparation of standard solutions

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## Preparation of Standard Solutions

### Theory:

the purpose of this experiment is Know Preparation of Standard Solutions from Solid Materials and Liquid Materials different concentrations.

There are two types of standard solution: **primary** and **secondary** standard solution. Standard Solution can be prepared by two ways:

1. Solids added to liquids.
2. Liquids added to liquids.

#### *Primary standard solution:*

The primary standard is a highly purified compound that serves as a reference material in volumetric and mass titrimetric methods. The accuracy of a method is critically dependent on the properties of this compound. Important requirements for primary standard are the following: **High purity (e.g.99.9%by weight)**, **atmospheric stability**, **absent of hydrate water**, **modest cost**, reasonable **solubility in the titration medium** and reasonable **large molar mass**. One of such compounds is sodium carbonate ( $\text{Na}_2\text{CO}_3$ ).

#### *Secondary Standard solution*

Some compounds consider as secondary standard solution **due missing one of the important requirements for primary standard**. For that can prepare as an approximate normal solution and then calibrate with a known standard chemical solution by **volumetric analysis**. Such as: hydrochloric acid HCL, sodium hydroxide NaOH.



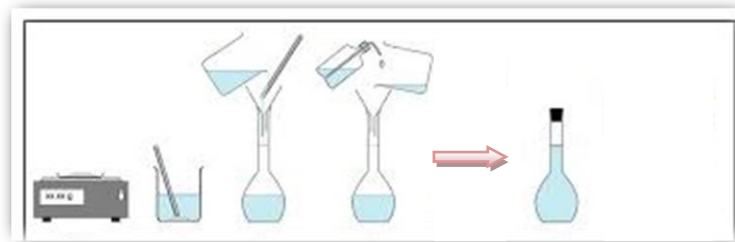
## Tools:

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

## Procedure:

### A. Solids

$$Wt = \frac{N * Eq. wt * Vml}{1000}$$



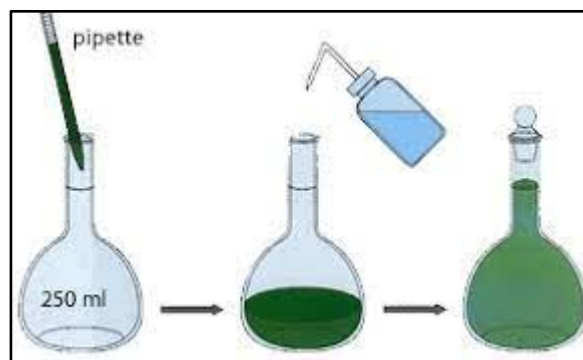
1. Weight the solid substance in a watch glass.
2. Transfer to a beaker and add a small amount of solvent to the beaker and stirred the solution until the solid substance is dissolved.
3. Transfer the solution to the volumetric flask.
4. Put a funnel into the slim neck of the volumetric flask.
5. Complete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



## B. Liquids

$$N = \frac{\% * sp. gr * 1000}{eq. wt}$$

$$N_1 V_1 (CONC) = N_2 V_2$$



1. Use a pipet to take an exact amount from the stock solution (concentrated) into a clean volumetric flask.
2. Put a funnel into the slim neck of the volumetric flask.
3. Add the solvent until the liquid level reaches to the mark on the neck.

### Discussion:

The preparing a standard solution must be accurate when using of balance because the increasing or decreasing of materials result wrong concentration and so for liquids materials when using increasing or decreasing of volume of solution.