

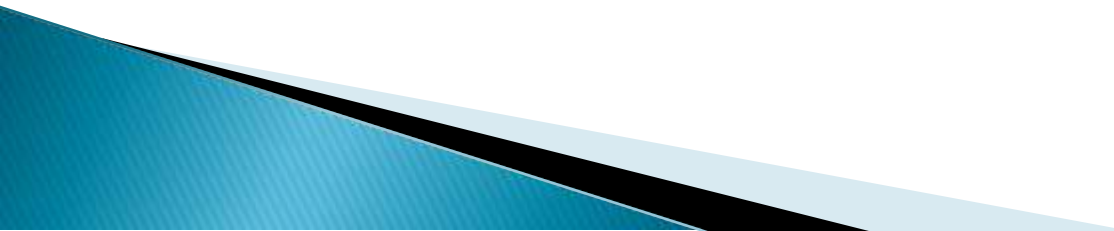
**Metrology: Systems of weights and measure,
Calculations including conversion from one to another
system and Percentage calculations and adjustments
of products**

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Metrology

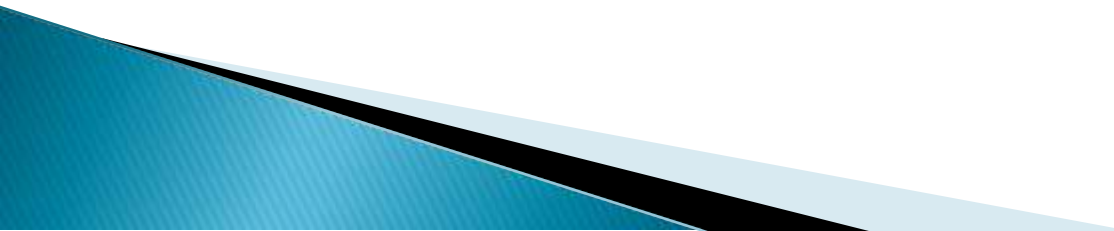
- ▶ Metrology comes from the Greek word “Merton” and “logos” which literally means the study of measurement.
- ▶ Pharmaceutical preparations have a wide range and their several forms are dispensed as mixture, solutions, emulsions, suspensions, powders, tablets, capsules, ointments, lotions, liniments, creams, pastes, suppositories etc

Measurement system

- ▶ 1. Imperial system
 - ▶ 2. Metric system
 - ▶ 3. Avoirdupois system
 - ▶ 4. Apothecaries system
 - ▶ 5. Household measurements
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Calculation involving percentage solutions

- ▶ Percentage means “ parts per hundred”
- ▶ The terms 10 percent solution can be expressed as 10%, $10/100$, 0.10 or 10 parts per 100 parts.
- ▶ It is the duty of a pharmacist to compound solutions of desired percentage strength. Percentage in that respect means parts of active ingredient per 100 parts of the total preparation.

- ▶ Percentage concentrations of the solutions are usually expressed in any one of the three common forms.
 - ▶ Weight in volume percent(w/v)=[Weight of solute(in gm)/Volume of solution (in ml)] ×100
 - ▶ Weight per cent(w/w)=[Weight of solute/Weight of solution]×100
 - ▶ Volume percent (v/v)=[Volume of solute/volume of solution]×100
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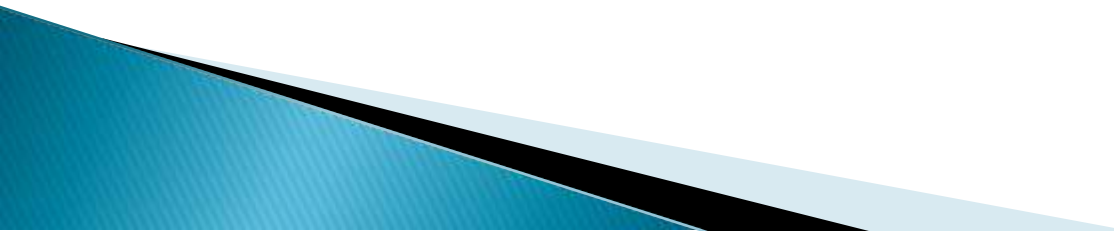
Weight in volume solutions(%w/v)

- ▶ Example: Calculate the quantity of sodium chloride required for 200ml of 0.9% solution.
- ▶ Solution: 1 gm of solute with solvent to produce 100ml = 1%w/v
- ▶ 1x0.9gm solute with solvent to produce 100 ml = 0.9%w/v
- ▶ Hence for 200ml quantity of sodium chloride:
$$= (200/100) \times 1 \times 0.9 = 1.8 \text{ gm}$$

Given, w/v = 0.9

Volume of solution = 200

Weight of solute = ?

- ▶ As we know ,Weight in volume percent(w/v)=[weight of solute/volume of solution]x100
 - ▶ Putting the given values:
 - ▶ $0.9=(x/200)\times 100$
- $$X=(200/100)\times 0.9=1.8\text{gm}$$
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Weight in weight solution

- ▶ Example: What is the weight percent of glucose in a solution made by dissolving 4.6 gm of glucose in 145.2gm of water?
- ▶ Solution: To get weight percent we need the weight of the solute and the total weight of the solution.

To determine total weight of solution:

= 4.6gm glucose + 145.2gm water

= 149.8gm solution

To calculate percent: $[\text{Weight \% Glucose} = \frac{4.6\text{gm glucose}}{149.8\text{gm solution}} \times 100 = 3.1\% \text{ glucose}]$

Volume by volume solutions(%v/v)

- ▶ Example: Prepare 1000 ml of 5%v/v solution of ethylene glycol in water.
- ▶ Solution: Given $v/v=5\%$, volume of solution=1000ml suppose, volume of solute= x
- ▶ As we know , Volume percent(v/v)= $[\text{volume of solute}/\text{volume of solution}]\times 100$
- ▶ $5=[x/1000]\times 100$
- ▶ $X=50\text{ml}$

THANK YOU

