Ministry of Higher Education and Scientific Research
Al-Mustaqbal University
Faculty of Pharmacy

Pharmaceutical Calculation

Lab - 6 -

Stock Solutions and Dilution Technique

- *Stock solutions* are concentrated solutions of active (e.g., drug) or inactive (e.g., colorant) substances and are used by pharmacists as a convenience to prepare solutions of lesser concentration.

- **Advantages of stock solution:**

1. No requirement for storing different solutions of the same active ingredient.
2. Ease of preparing the required strength of the medicament when needed.
3. Saving time and money.

Ex.1: How many milliliters of a 1:400 w/v stock solution should be used to make 4 liters of a 1:2000 w/v solution ?

$C1.V1 = C2.V2 \rightarrow$

$$\frac{1}{400} \times V1 = \frac{1}{2000} \times 4000 \text{ mL}$$

$$V1 = \frac{4000 \times 400}{2000} = 800 \text{ mL}$$

Ex.2: How many milliliters of a 1% stock solution of a certified red dye should be used in preparing 4000 mL of a mouthwash that is to contain 1:20,000 w/v of the certified red dye as a coloring agent ?

$$\frac{1}{20000} = \frac{X}{100} \rightarrow X = 0.005\%$$

$C1.V1 = C2.V2 \rightarrow 1\% \times V1 = 0.005\% \times 4000mL$

$V1 = 20\ mL$

- The dilution of a liquid dosage form, as a solution or suspension, may be desired to provide product strength more suitable for use by a particular patient (e.g., pediatric, elderly, those in disease states).

- The diluent is selected based on compatibility with the vehicle of the original product; that is, aqueous, alcoholic, hydroalcoholic, or other.

- The dilution of a solid dosage form (as a powder or the contents of a capsule) or a semisolid dosage form (as an ointment or cream) also may be performed to alter the dose or strength of a product.
  An equation useful in these calculations is:

- *(1st quantity) × (1st concentration) = (2nd quantity) × (2nd concentration)*

- Q1.C1=Q2.C2 (or C1.V1=C2.V2)

Ex.1: **If 500 mL of a 15% v/v solution are diluted to 1500 mL, what will be the percentage strength (v/v)?**

C1.V1 = C2.V2 → 15% x 500mL = C2 x 1500mL

C2= 5%

Ex.2: **If 50 mL of a 1:20 w/v solution are diluted to 1000 mL, what is the ratio strength (w/v) ?**

C1.V1=C2.V2 → $\frac{1}{20}\ x\ 50\ mL = X\ x\ 1000\ mL$

X= $\frac{50}{20000} = \frac{1}{400} \rightarrow 1{:}400\ \text{w/v}$

Thank You