Pharmaceutical Calculations

Reducing & Enlarging Formulas

Dr. Ali Albadrawy

Reducing and enlarging formulas

1) Formulas that specify amounts of ingredients

- **Example 1: From the following formula, calculate the quantity of each ingredient required to prepare 240 ml of chalk mixture?**

R_X

Prepared chalk		60 gm
Saccharin sodium		0.3 gm
Bentonite magma		500 ml
Cinnamon water		400 ml
Distilled water	ad	1000 ml

- The last item in ingredients is the “vehicle” for the formula.

- After the last item ad “**to be added**” or **to** or **q.s. “quantity sufficient to**”, this means that the total volume of the formula is to be at this volume **(present volume)** and is used to calculate the factor to determine the required amount/volume for each ingredient.

- Total (present) amount = 1000 ml

- Required amount = 240 ml

- **Adjustment factor = Required / present = 240 / 1000 = 0.24**

- The quantity of each ingredient:

1. Prepared chalk = 60 g x 0.24 = 14.4 g
2. Saccharin sodium = 0.3 x 0.24 = 0.072 g
3. Bentonite magma = 500 ml x 0.24 = 120 ml
4. Cinnamon water = 400 ml x 0.24 = 96 ml
5. Distilled water, sufficiently added to make 240 ml (required volume).

Final Formula

R_X

Prepared chalk		14.4 g
Saccharin sodium		0.072 g
Bentonite magma		120 ml
Cinnamon water		96 ml
Distilled water	ad	240 ml

- **Example 2: From the following formula, calculate the quantity of each ingredient required to prepare 453.6 g of the ointment?**

Rx

Coal tar	50 g
Starch	250 g
Zinc oxide	150 g
Petrolatum	550 g

- In this formula, the last ingredient is **NOT followed** by "**ad, to or q.s**.", this means that the quantity is **NOT the total quantity** of the formula but it **is the quantity of this ingredient only.**

- To calculate the total quantity, you should to add the all quantities of all ingredients to each other.

- Total (present) amount = 50 + 250 + 150 + 550 = 1000 g
- Required amount = 453.6 g
- Factor = Required / present = 453.6 / 1000 = 0.4536

1. Coal tar = 50 g x 0.4536 = 22.68 g
2. Starch = 250 g x 0.4536 = 113.4 g
3. Zinc oxide = 150 g x 0.4536 = 68.04 g
4. Petrolatum = 550 g x 0.4536 = 249.48 g

❑ **Example 3: The following formula is for 100 capsules, calculate the quantity of each ingredient required to make 1000 capsules?**

Rx

Belladonna extract	1 g
Ephedrine sulphate	1.6 g
Phenobarbital	2 g
Phenacetin	32 g

- Total number of capsules = **100 capsules**
- Required number of capsules = **1000 capsules**
- Factor = 1000 / 100 = 10

✓ Belladonna extract = 1 g x 10 = 10 g
✓ Ephedrine = 1.6 g x 10 = 16 g
✓ Phenobarbital = 2 g x 10 = 20 g
✓ Phenacetin = 32 g x 10 = 320 g

2) Formulas that specify proportional parts

- Total quantity of the formula can be obtained by the **addition of the parts** of each ingredient.
- To calculate the quantity of each ingredient, **divide the part of each ingredient by the total parts**, and **then multiply to the total quantity of the formula**.

❑ **Example 1: From the following formula, calculate the quantity of each ingredient to make 1000 g of the ointment?**

Rx

Olive oil	5 parts
Zinc oxide	10 parts
Hydrophilic ointment	50 parts

- Total parts = 5 + 10 + 50 = 65 parts

✓ Olive oil = 1000 g x 5/65 = 76.92 g

✓ Zinc oxide = 1000 g x 10/65 = 153.85 g

✓ Hydrophilic ointment = 1000 g x 50/65 = 769.23 g

- **Final formula**

Rx

Olive oil	**76.92 g**
Zinc oxide	**153.85 g**
Hydrophilic ointment	**769.23 g**


Thank you