Calculations: Weighing & Measuring Aliquot Method

Objectives

- **Calculate the minimum measurable and weighable quantities using the sensitivity requirement of the balance.**
- **Calculate the maximum expected percentage errors.**
- **Apply the aliquot method to perform prescriptions calculations with quantities below the sensitivity limits of the available balances and glassware.**

What is the definition?
How can we decide on?

1- Sensitivity requirement?

2- Limit of % error ?

SR is needed to

I. Calculation of minimum weighable quantity:

$$MWQ = \frac{100\%\, x\, SR}{\%Error}$$

II. Calculating minimum weighable quantity (MWQ)

$$\%Error = \frac{100\%\, x\, SR}{MWQ}$$

Percentage Error

Calculate the maximum expected percentage error upon weighing 190 mg and 1900 mg using a torsion balance with SR = 6 mg?

$$\%Error = \frac{100\% \, x \, SR}{MWQ}$$

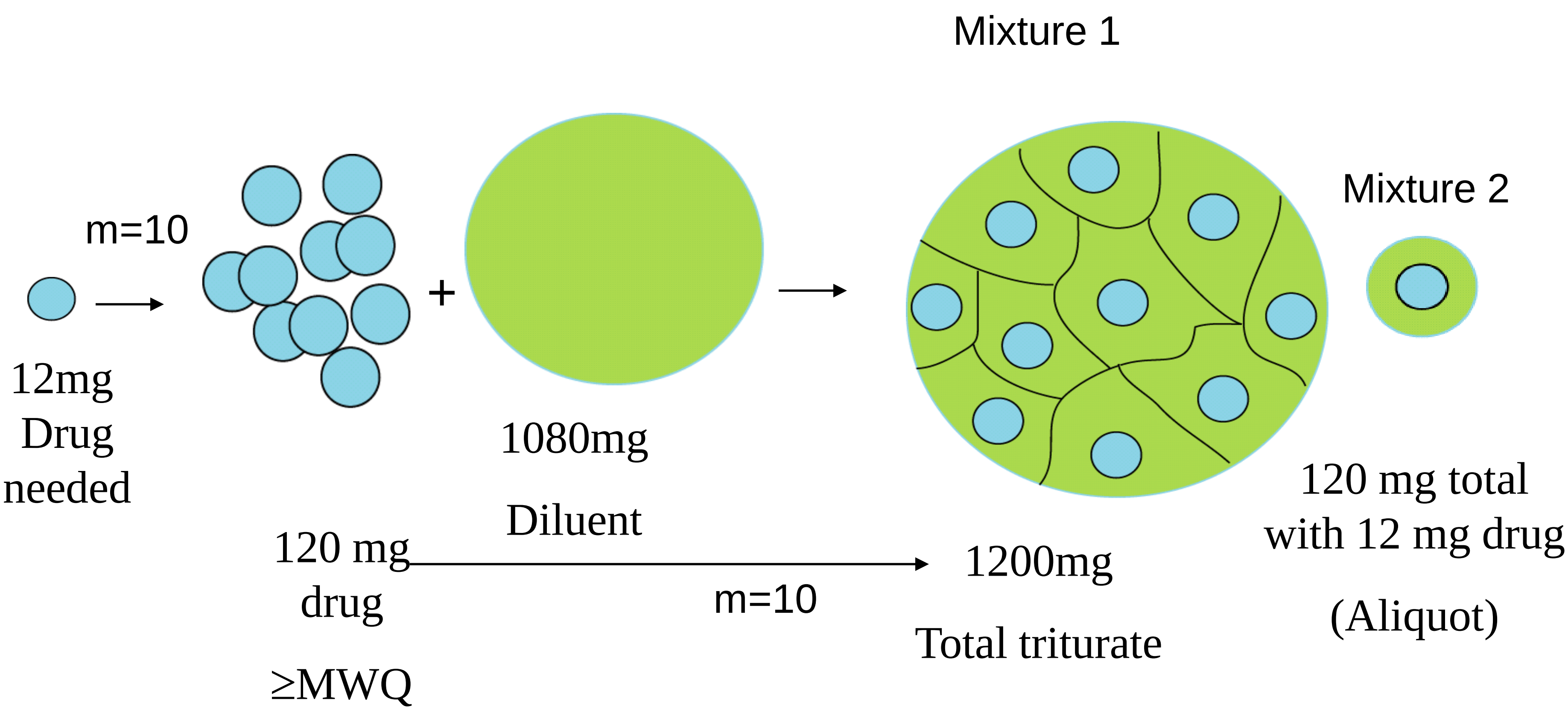
MWQ

What is the minimum weighable quantity (MWQ) for a balance with **SR 6 mg**? If the maximum allowed error is 5% or 3%?

Aliquot

- How can I weigh 12 mg if the MWQ is 120mg?

DRY ALIQUOT METHOD



Double check your answer:
Drug1/mixture1 = x/ mixture2
120 mg/ 1200mg = x / 120 mg

Rx

Atropine Sulfate 0.025 mg/kg

Lactose

Sucrose aa QSAD 120 mg

Mix et ft molded tablets DTD # 10

The patient’s weight = 154 lb

How can you fill this prescription with accuracy = 95%?

DRY ALIQUOT METHOD

Rx

Digoxin **30 mg**

Calcium carbonate **qs ad 30 g**

M. ft div. Charts # 100

Set the MWQ at <u>200 mg</u>

Explain the correct procedure that you may follow to fill this prescription?

- I will weigh ....digoxin
- Mix it with .... $CaCO_3$
- From the mixture I will use .... , as a source of 30 mg of digoxin
- I will add more ......$CaCO_3$ to bring the final weight to 30 gram.

Triturations

- Solid dilutions of potent drugs, their concentration is expressed as ratio strength.

- If you have a trituration of drug A with 1:20 w/w ratio strength, and you need 50 mg of drug A. How much is your aliquot?

Trituration

If you need to need to weigh 5 mg of drug A, what is the minimum trituation strength can you use? Your MWQ is 120

- 1:20
- 1:24
- 1:30
- 1:50

Calculating Volume Errors

A 100 mL measuring cylinder has an error of 1 mL, what is the maximum expected percentage error when you use this cylinder to measure 20 mL and 90 mL?

- $$\%\ \text{error} = \frac{\text{error x 100}}{\text{Measured Volume}}$$

**The measuring cylinders have constant error magnitude, but the % error depends on the measured volume.

WET ALIQUOT METHOD

The least measurable quantity (LMQ) in liquids = 20% of the available measuring cylinder.

LMQ of 100 mL cylinder is 20 mL

LMQ of 50 mL cylinder is 10 mL

LMQ of 20 mL cylinder is 4 mL

LMQ of 10 mL cylinder is 2 mL

WET ALIQUOT METHOD

Strong Iodine Solution	0.15 mL
Aq. dist.	Qs ad 30 mL

The available measuring cylinders are 10, 50 and 100 mL, LMQ = ? mL

Explain the steps of filling the prescription.

You have the following prescription to fill….

Rx

Drug A 2 mg

Lactose QSAD 120 mg

DTD 14 tablets

The available balance has SR of 6 mg, and the required accuracy is 95%.

When performing the calculations count for one excess tablet.

How to solve this problem?

A prescription calls for a desired quantity of 10 mL of 2 % w/v drug solution in total of 40 mL liquid, the smallest measuring cylinder you have is 100 mL, with divisions of 2 mL, the first division is at 10 mL.

How can you fill this prescription?

Calculate the ratio strength of the resultant solution?