Writing Good Prescription

Following are some tips for writing good prescription:

1. Careful use of decimal points to avoid ambiguity.
2. Avoid unnecessary decimal points: 5 ml instead of 5.0 ml to avoid possible misinterpretation of 5.0 = 50
3. Always zero prefix decimals: e.g. 0.5 instead of .5 to avoid misinterpretation with .5 = 5.
4. Avoid decimals altogether by changing the units: 0.5 g = 500 mg.
5. "ml" is used instead of "cc" or "cm^3" even though they are technically equivalent.
6. Quantities can be given directly or implied by the frequency and duration of the direction.
7. Where possible, usage directions should specify times (7 am, 3 pm, 11 pm) rather than simply frequency (3 times a day) and especially relationship to meals for orally consumed medication.

PHARMACEUTICAL CALCULATIONS

To have a complete understanding of various types calculations, which are involved in dispensing, it is desirable that the pharmacist should have a thorough knowledge regarding weights and measures which are used in calculations.

There are two systems of weights and measures:

1. The imperial system
2. The metric system

Table 1.1: Partial lists of prescription abbreviations

Abbreviation	*Latin*	*Meaning*
aa	ana	of each
ad	Ad	up to
ac	ante cibum	before meals
ad	aurio dextra	right ear
ad lib	Ad libitum	use as much as one desires; freely
admov	admove	apply
agit	agita	stir/shake

(Contd.)

4. **v/w percent:** It is defined as the volume in milliliters of a substance in 100 g (q.s) of solution.

   For example, a 10% (v/w) alcoholic solution would contain 10 milliliters of alcohol in every 100 g (q.s) of quantity sufficient solution.

When the type of percent is not stated, it is understood that dilutions are:

1. For dry ingredient in a dry preparation is percent w/w
2. For dry ingredients in a liquid are percent w/v
3. For a liquid in a liquid is percent v/v.

ALCOHOL DILUTION

Dilute alcohols are prepared from 95% alcohol which contains 95 ml of ethyl alcohol and 5 ml of purified water quantity sufficient. When alcohol is mixed with water, the following changes take place:

1. Rise in temperature.
2. Contraction in volume.
3. There is turbid appearance in the solution, because solubility of air is more in alcohol than in water. When alcohol is diluted with water, minute bubbles of air get evolved and make turbid appearance. When alcohol is diluted with water, it is necessary to cool the mixture to about 20°C and then final volume is made up. The formula used is:

   Volume of stronger alcohol to be used

$$= \frac{\text{Volume required} \times \text{percentage required}}{\text{Percentage used}}$$

Example: Calculate the amount of 95% alcohol required to prepare 200 ml of 45% alcohol.

Calculation:

Volume required = 200 ml

Percentage of alcohol required = 45

Percentage of alcohol used = 95

Answers

1. 5 parts of 30% and 10 parts of 15%
2. 45.6%
3. 10 parts of 70% and 20 parts of 40%.
4. 10:20:30:10
5. 5504 ml.

PROOF SPIRIT

For excise purpose, the strength of alcoholic preparations are indicated by degrees, **"over proof"** or **"under proof"**. Proof spirit is that mixture of alcohol and water which at 51°F weighs 12/13th of an equal volume of water.

In India, 57.1 volume of ethyl alcohol is considered to be equal to 100 volumes of proof spirit. This means that any alcoholic solution which contains 57.1% v/v alcohol is a proof spirit which is said to be 100 proof. Hence strength above proof strength is expressed as over proof (OP) and any strength below proof strength is expressed as under proof (UP)

For excise purpose in India the proof alcohol is calculated in terms of rupees per litre of proof alcohol. So any percentage volume in volume of alcohol can be converted into proof strength and vice versa by using the following method:

1. Multiply the percentage strength of alcohol by 1.753 and subtracting 100 from it.
2. If the result is positive, it is known as over proof (OP)
3. If the result is negative, it is known as under proof (UP).

The value 1.753 used in the formula is calculated as

57.1 volumes of ethyl alcohol = 100 volume of proof spirit

1 volume of ethyl alcohol = 100/57.1 = 1.753 volume of proof spirit.

Example: Find strength of 85% v/v alcohol in terms of proof spirit.

Solution:

By applying the formula

Percentage strength of alcohol × 1.73 – 100

= 85 × 1.753 – 100

= 149 – 100 = + 49, i.e. 49° OP.

Example: Find strength of 60% v/v alcohol in terms of proof spirit.

Solution: By applying the formula

Immiscibility

a. Oils are immiscible with water and hence combination of oily drugs with water produces a product possessing two separate layers.

   Remedy: This problem can be overcome by emulsification or solubilization.

b. Care must be taken when concentrated hydroalcoholic solutions of volatile oils, such as spirits and concentrated waters, are used as adjuncts (e.g. as flavouring agents) in aqueous preparations. Large globules of oils may be separated.

   Remedy: To prevent the formation of large globules, the hydroalcoholic solution should either be gradually diluted with the vehicle before admixture with the remaining ingredients or poured into the vehicle with constant stirring.

Insolubility

a. Some insoluble powders, such as sulphur and certain corticosteroids (hydrocortisone acetate) and antibiotics are difficult to wet with water.

   Remedy: Wetting agents like saponins for sulphur containing lotions and polysorbates in parenteral suspensions of corticosteroids

b. When a resinous tincture is added to water the water insoluble resin agglomerate forming indiffusible clots.

   Remedy: This is prevented by slowly adding the undiluted dispersion of protective colloid (Tragacanth mucilage), e.g. Lobelia and Stramonium tincture which should be mixed with tragacanth mucilage and stirred constantly. This will produce a stable preparation.

Liquefaction

When certain low melting point solids are powdered together a liquid or soft mass is produced due to lowering of the melting point of the mixture to below room temperature. Thus an eutectic mixture is formed. Any two of the following exhibits this type of behaviour, camphor, menthol, phenol, thymol and chloral hydrate, also sodium salicylate with phenazone, e.g.