Pharmaceutical Technology

Lab:1

True solutions

Solutions are stable homogeneous mixtures of two or more components. They contain one or more solutes dissolved in one or more solvents. The solvent is often aqueous, but can be oily or alcoholic.

Types of true solutions:

- 1. Solutions of liquids in liquids e.g. liquefied phenol in water or ether in water.
- 2. Solutions of gases in liquid e.g. hydrogen chloride in water or ammonia in water.
- 3. Solutions of solids in liquids e.g. sucrose in water or sodium chloride in water.

In medicines, solid in liquid systems are the most widely used, having the most applications in practice.

Classification of true solutions:

There are many classifications of pharmaceutical solutions based on their compositions or medical use. The solutions may be classified according to their uses as:

- 1. Oral dosage forms.
- 2. Mouth washes
- 3. Gargles
- 4. Drops (nasal and ears drops)
- 5. Spray
- 6. Externally, for example as lotions, limments or plants
- 7. Ophthalmic preparations.
- 8. Injections.

There is another classification based on the type of procedure involved in the preparation of the solutions:

- 1. Solutions prepared by simple solution.
- 2. Solutions prepared by chemical reaction.
- 3. Solutions prepared by simple solution with sterilization e.g.:
 - Anti-coagulant, irrigation and physiologic solutions.
 - Ophthalmic solutions.
 - Ophthalmic solutions prepared from sterile ophthalmic powders.
- 4. Solutions prepared by extraction. The methods used for extraction:

- Maceration.
- Percolation
- Decoction
- Digestion
- Infusion.

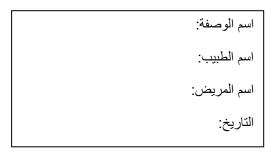
Several problems associated with the preparation of solutions:

- 1. If there are two solvents in the same prescription, we must know the solubility of the solutes.
- 2. If there are prescriptions that liberate CO2 we must wait until there is no liberation of CO2 gas.
- 3. If there is gum substance which must be prepared by circulating method in wide mouth container and should avoid using stirrer.
- 4. If there are fine powder from it must be prepare in a mortar and add solvent gradually with mixing.
- 5. If there are substances with large particle size (crystals) we must reduce the particle size by using a mortar to increase the solubility of the substance e.g. ferrous sulfate.
- 6. If there are substance insoluble in the vehicle, we must add other substance to increase the solubility of the substance e.g. surfactants.

The general procedure for the preparation of simple solution:

- 1. Weigh the solid ingredients, mix them together in beaker.
- 2. Dissolve the solids in about three quarters of the vehicle.
- 3. If there is any liquid ingredients in the prescription, so subtract the volume of liquids from 3/4 volume, the dissolve the solids in the remaining amount of the solvent.
- 4. Filter if necessary.
- 5. Add any liquid ingredients. After measuring each rinse the vessel used with a little of the vehicle.
- 6. Transfers the contents of the beaker to the graduated measure and add more of the vehicle to produce the prescribed volume.
- 7. Convert the mixture to a suitable reagent bottle and attach the label.

The label used contains:



Note: white label for the internal use while red label for the external use:

Experimental work:

Rx1		
Carminative mixture for infant		
Sodium bicarbonate	0.06g	
Aromatic spirit of ammonia	0.06ml	
Compound tincture of cardamom	0.12m1	
Glycerin	0.3m1	
Peppermint water q.s	4m1	
Ft. mist		
Mitt.	40m1	
Sig. One teaspoonful t.i.c	d p.c	

<u>Uses:</u> It promotes expulsion of gases from GI tract and provides a feeling of warmth and comfort in epigastrium.

Rx2	
Carminative mixture for adult	
Sodium bicarbonate	gr vii
Aromatic spirit of ammonia	M XV
Compound tincture of cardamom	η_{ix}
Strong tincture of ginger	Щi
Peppermint water q.s	f3 i
Ft. mist	
Mitt.	3 iv
Sig. One teaspoonful	t.i.d p.c

Uses: As above.

Rx3		
Potassium citrate mixture (mist-diuretic)		
Acidic:		
Potassium citrate	2 g	
Citric acid monohydrate	400 mg	
Lemon syrup	1 ml	
Concentrated chloroform water	0.2 ml	
Purified water q.s.	10 ml	
Ft. mist		
Mitt.	30ml	
Sig. 10-20 ml diluted with water	t.i.d p.c	

<u>Uses:</u> it acts as urinary acidifier to inhibit the formation of precipitate of calcium phosphate, calcium carbonate and magnesium ammonium phosphate and allow dissolution of the stones.

Rx4	
Potassium citrate mixture (mist-diuretic)	
Alkaline:	
Potassium citrate	20 g
Sodium bicarbonate	20 g
Concentrated infusion of buchu	20 ml
Syrup of orange	40 ml
Chloroform water q.s.	300 ml
Ft. mist	
Mitt.	30ml
Sig. 10-20 ml diluted with water	t.i.d p.c

<u>Uses:</u> It increase the pH of the urine (alkaline urine) and this changes in urine induced by potassium citrate produce a urine that is less conducive to the crystallization of stone-forming salts (calcium oxalate, calcium phosphate and uric acid).

Rx6	
<u>Ferrous sulphate mixture</u>	
Ferrous sulphate	grx
Tincture of nuxymomiea	η_{X}
Tincture of hydrastis	η _{vi}
Syrup	fзi
Chloroform water q.s.	f3 i
Ft. mist	
Mitt.	f3 iv
Sig. 3ss q.i.d.	p.c.

Uses: in treatment of anemia

Rx5		
Bella donna mixture, pediatric		
Belladonna tincture	0.15 ml	
Compound orange spirit	0.01 ml	
Benzoic acid solution	0.1 ml	
Glycerin	0.5 ml	
Syrup	1 ml	
Water q.s.	5ml	
Ft. mist		
Mitt.	25ml	
Sig. one teaspoonful	p.r.n.	

<u>Uses</u>: as antispasmodic to remove renal and gastro-intestinal colic.

Rx7 Salicylic acid mixture Salicylic acid Coal tar a.a. 5% Alcohol (60%) q.s. $\overline{3}$ iii Ft. mist Mitt. $\overline{3}$ i Sig. Apply to scalp.

Uses: treatment of psoriasis

Rx8

Solution no. 1 and solution no. 2

Solution no. 1 20% w/v sodium thio sulfate

Solution no. 2 4-5% w/v tartaric acid

Sig. External use

Reference text: Lab Manual for Practical pharmaceutical Technology Adopted by the Department.