

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, liniments or plasters
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:

اسم الوصفة:
اسم الطبيب:
اسم المريض:
التاريخ:

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

Experimental work:

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

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

Rx2		
<u>Carminative mixture for adult</u>		
Sodium bicarbonate		gr vii
Aromatic spirit of ammonia		℥ xv
Compound tincture of cardamom		℥ix
Strong tincture of ginger		℥i
Peppermint water	q.s	fʒ i
Ft. mist		
Mitt.		℥ iv
Sig. One teaspoonful	t.i.d	p.c

Uses: As above.

Rx3		
<u>Potassium citrate mixture (mist-diuretic)</u>		
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

Uses: 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		
<u>Potassium citrate mixture (mist-diuretic)</u>		
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

Uses: 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		gr x
Tincture of nuxymomiea		℥x
Tincture of hydrastis		℥vi
Syrup		fʒ i
Chloroform water	q. s.	fʒ i
Ft. mist		
Mitt.		fʒ iv
Sig. ʒss q.i.d.		p.c.

Uses: in treatment of anemia

Rx5		
<u>Bella donna mixture, pediatric</u>		
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.

Uses: as antispasmodic to remove renal and gastro-intestinal colic.

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

Uses: treatment of psoriasis

Rx8		
<u>Solution no. 1 and solution no. 2</u>		
Solution no. 1	20% w/v	sodium thiosulfate
Solution no. 2	4-5% w/v	tartaric acid
Sig. External use		

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