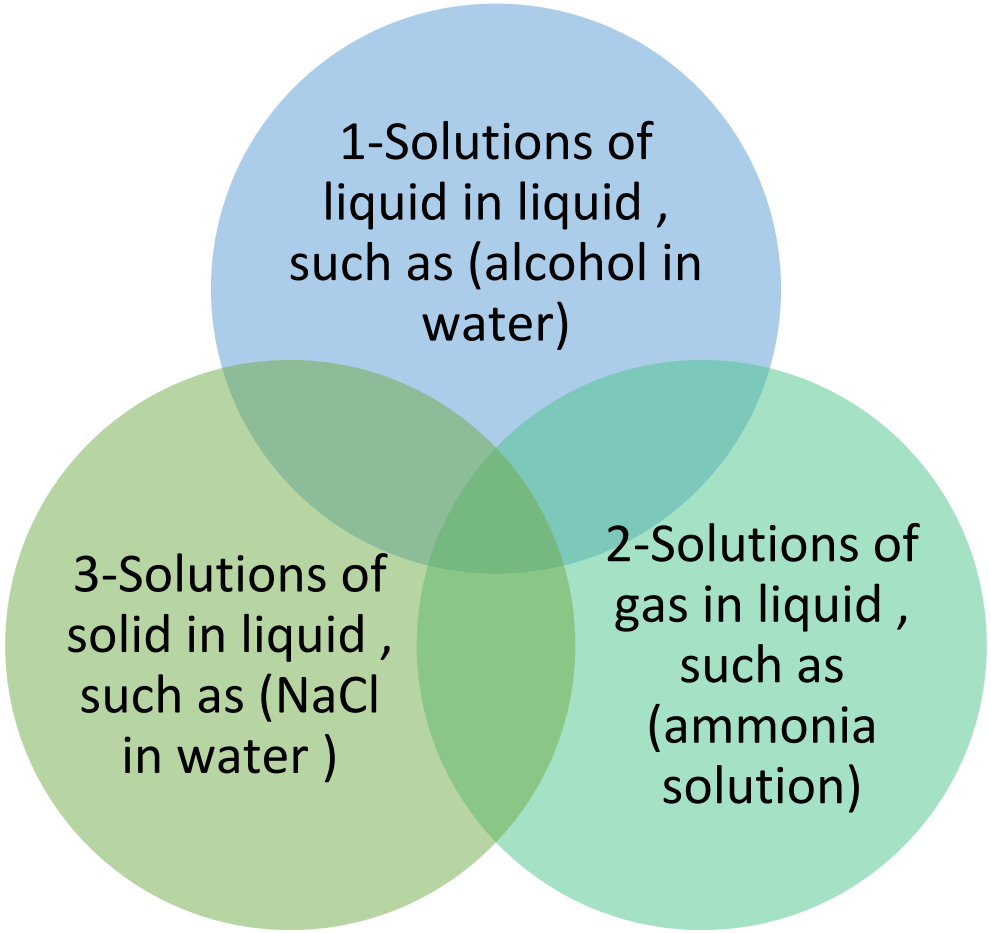
Pharmaceutical Technology
Stage three

Solutions

Lab no. 3

- **Solutions** are liquid pharmaceutical preparation contain one or more chemical substance dissolved in one or more suitable solvent to produce single phase system

Types of solutions



Classifications of solutions according to the procedure of preparation

1. Solutions prepared by simple solution method
2. Solution prepared by chemical reactions
3. Solution prepared by simple solution with sterilizations such as ophthalmic solution, anticoagulant ,irrigating solution , physiological solution
4. Solution prepared by extraction.

Classification of solutions according to dosage forms

- Syrup (aqueous solution containing sugar.
- Elixirs (combination of water and alcohol).
- Spirits (solution of aromatic materials if the solvent is alcoholic).
- Aromatic waters (solutions of aromatic material if the solvent is aqueous).
- Tinctures or fluid extracts (solution prepared by extracting active constituents from crude drugs depending on their methods of preparation and their concentration).
- Injections (solutions prepared to be sterile pyrogen – free and intended for parenteral administration).

Notes :-

We can overcome some problems that may occur during preparation of solutions by following:

1. To increase the solubility of substances ,we can reduce the particle size by using mortar and pestle (example crystal form ,large particles)
2. If we have two solvents in the same prescriptions , we dissolve the solid substance in the solvent that have more ability to dissolve it (alcohol, water).
3. If we have material that has very fine particle size we must not use stirrer in dissolving it because particles will adhere around stirrer, so we use circulating of the beaker instead of stirrer .
4. If there is liberation of any gas , the container must be opened , without using stopper , until liberation of gas .
5. Some times we need to increase the solubility by certain method ex. pH , complexation ….

General procedure of preparation of simple solution

1-Weigh the solid ingredient and put it in beaker

2-Subtract the volume of liquid ingredients (if present from ¾ of the final volume of prescription.

3-dissolve the solid ingredients in the remaining amount of the vehicle

4-Add the liquid ingredient

5-Convert the content of the beaker into the measuring cylinder and complete the volume up to the required amount by addition of the vehicle

6-transfer the content of the measuring cylinder to a wide mouth bottle and put suitable label (label of external use is pink ,while label for internal use is white)

•Carminative mixture for infants

Rx

Sodium bicarbonate		**0.06 g**
Aromatic spirit of ammonia		**0.06 ml**
Compound tincture of cardamom		**0.12 ml**
Glycerin		**0.3 ml**
Peppermint water	**Q.S**	**4 ml**

Ft. mist

Mitt 40 ml

Sig t.i.d pc

Calculations

Factor = 40/4= 10

Sod. bicar.= 0.06 x 10= 0.6 gm

Ar.sp .of ammonia = 0.06 x 10= 0.6 ml

Comp. tr. of cardamom = 0.12 x 10= 1.2 ml

Glycerin = 0.3ml x 10= 3 ml

Peppermint water = 4 x 10= 40 ml

40 x ¾ = 30 ml

30 ml – (0.6+ 1.2+3ml) =25.2 ml

Procedure

1. Dissolve 0.6 g sod. bicarb in 25.2 ml of pepp. water in beaker.
2. Add 0.6 ml of Ar. spirit of ammonia ,1.2 ml of comp. tr. cardamom and 3 ml of glycerin to the content of the beaker .
3. Convert the content of the beaker into measuring cylinder and complete the volume up to 40 ml by addition of pepp. water .
4. Transfer the content of the measuring cylinder to a wide mouth bottle and put a suitable label.

Note:-

Glycerin act as soothing and sweetening agent .

Carminative mixture for adult (H.W)

Rx

Sodium bicarbonate	gr vii
Aromatic spirit of ammonia	xv
Compound tincture of cardamom	x
Strong tincture of ginger	i
Peppermint water Q.S	f

Fit.mist

Mitt f iv

Sig. f ss t.i.d p.c.

Procedure

as the procedure of mist carminative of infant

Notes

- Sodium bicarb .act as gastric antacid.
- Aromatic spirit act as carminative agent.
- Comp.tr. cardamom act as flavoring agent
- Tr.of ginger act as flavoring and antispasmodic agent.
- Pepp. water act as flavoring and carminative agent ,also it is diluting agent used as solvent.
- Strong tr. of ginger which is used in carminative mixture of adult must not added for infant because it is strong for use to infant.

Aqueous iodine solution (lugals sol)

Rx

Iodine	50 g
Potassium iodide	100 g
Purified water Q.S	1000 ml

Sig 0.3 ml diluted with milk or water three times daily

Procedure

1. Dissolve iodine in concentrated KI solution
2. Shake well until iodine dissolved
3. Complete the volume with purified water to 1000 ml

Notes:

- Lugals sol. Used internally in treatment of thyrotoxicosis (preoperative treatment) and in hypothyroidism
- We dissolve the iodine in KI instead of water because the iodine has more solubility in KI than in water.

Sol. I and Sol. II

Sol I sodium thiosulfate 15-20%

Sol II tartaric acid 3-5%

Sig. apply sol I then after two minutes apply sol II on the skin.

Procedure

By simple solution method

Notes:-

- **This prescription used as antifungal**
- **We can not mix sol I and sol II in the same bottle due to the chemical reaction between them which we use it to precipitate the sulphur in infected area of the skin as antifungal**

Quality Evaluation of Oral Solutions

Quality Evaluation of Oral Solutions

1. Appearance and Clarity

- • The solution should be clear and free from suspended particles or precipitation.
- • Visual inspection is performed against both dark and light backgrounds.

2. Color, Odor, and Taste

- • Must be consistent with formulation standards.
- • Any color or odor change may indicate degradation.

4. Assay of Active Ingredient

- • Quantitative analysis ensures drug content within 95–105% of label claim.
- • Techniques include titration, spectrophotometry, or HPLC.

3. pH Determination

- • pH affects drug stability and patient acceptability.
- • Measured using a calibrated pH meter.
- • Typical range: acidic for syrups, near neutral for oral rehydration solutions.

5. Viscosity

- • Measured using a viscometer.
- • Affects mouthfeel, stability, and pourability of syrups.

7. Microbial Limits Test

- • Oral solutions must comply with microbial limits.
- • Preservatives like parabens or benzoates are added to control microbial growth.

8. Stability Studies

- • Include physical, chemical, and microbiological stability.
- • Conducted under different conditions of temperature and light exposure.

10. Overall Quality Considerations

- • Regular quality control ensures efficacy, safety, and consistency.
- • Each parameter contributes to final product stability and patient satisfaction.


Thanks