

3. PHARMACEUTICAL SOLUTIONS

Homogeneous liquid preparations in which one or more substances are dissolved or dispersed at a molecular level in a suitable solvent or solvent mixture are referred to as "pharmaceutical solution".

If the molecules of the solute are completely mixed with each other or form a single phase, the system is also called "real solution" or "single phase systems". The uniform distribution of the molecules in the solutes is extremely important in terms of the concentration of the solutions and the reliability of the dosage. Solvents have at least one solute and one solvent.

Solvent and solubles come together in various forms to form solution forms.

Types of solutions that are important in pharmaceutical technology;

- The solubilized gas - solvent is liquid (such as oxygenated water, formaldehyde solution)
- The solubilized liquid-solvent is liquid (such as water-alcohol, water-glycerin)
- The solubilized solid - solvent is liquid (such as sugared water, isotonic sodium chloride solution).

Concentration expressions used in the preparation of solutions;

- The amount of active substance in grams per 100 gram solution (w/w)
- The amount of active substance in grams per 100 ml solution (w/v)
- The amount of active substance in mililiter per 100 ml solution (v/v)

If the % concentration is not precisely specified as above,

- "w / w" for formulas prepared by mixing solid in solid.
- "w/ v" for formulas prepared by dissolving solid matter in liquid.
- "v / v" for formulas prepared by dissolving liquid in liquid.

Formulations of Pharmaceutical Solutions

According to pharmaceutical solubilizers;

- Solutions with solvent is water
- Solutions with solvent isn't water

Important formulation parameters in solutions with solvent is water:

- Solubility in water
- pH control
- Complexation
- Particle size
- Co-solvent
- Dissolution
- Chemical modification

In solutions with solvent isn't water, suitable alternative solvents are used instead of water.

Solvents that can be used in place of water are:

- Fixed vegetable oil
- Alcohols
- Polyhydric alcohols
- Dimethyl sulphoxide
- Ethyl ether
- Liquid paraffin
- Various solvents

Excipient within the formulations of pharmaceutical solutions:

- Buffers
- Color materials

- Flavors and aromatizer
- Intensity regulators
- Isotoni regulators
- Preservative
- Antioxidants
- Flavorings

The types of formulations contained in the pharmaceutical solution group are:

- Aromatic waters
- Syrups
- Elixires
- Linktus
- Mouth water and gargaras
- Nasal solutions
- Ear drops
- Enemas
- Externally used preparations

According to the methods of preparing pharmaceutical solutions,

- Simple solutions (eg Rivanol solution, Lugol solution etc.)
- Solutions prepared by chemical reaction (eg: Aluminum subacetate solution)
- Extracted solutions (eg infusion, decoction etc.).

Stability of Pharmaceutical Solvents

The solids contained in the solutions are less stable than the solid forms in terms of chemical stability. All solutions, especially those containing volatile solvents, must be stored and used in tightly closed containers protected from high temperatures.

Study 3.2.

Aluminium Subacetate Topical Solution (USP 27)

Aluminum Sulfate	145 g
Acetic Acid	160 mL
Calcium Carbonate	70 g
Purified Water, a sufficient quantity, to make	1000 mL

Dissolve the Aluminum Sulfate in 600 mL of cold water, filter the solution, and add the Calcium Carbonate gradually, in several portions, with constant stirring. Then slowly add the Acetic Acid, mix, and set the mixture aside for 24 hours. Filter the product with the aid of vacuum if necessary, returning the first portion of the filtrate to the funnel. Wash the magma on the filter with small portions of cold water, until the total filtrate measures 1000 mL.

Questions:

1. What is Baume grade? Explain it by investigating its usage in Pharmaceutical Technology.