



Unit - I

Solubility of drugs

Solubility of liquids in liquids:

Liquid – liquid system may be divided into the following categories according to the solution of liquids in one another.

- Completely miscible.
- Practically immiscible or insoluble.
- Partially miscible.

The term ‘miscible’ refers to the solubility of the components in liquid – liquid systems.

Complete miscibility:

In this system, liquids are **completely miscible (soluble)** when they are mixed in any proportions.

For example, **polar and polar solvents** such as water – alcohol, alcohol – glycerine, water – glycerine etc. are said to be completely miscible since they mix in all proportions.

Similarly, **non-polar and non – polar solvents are also completely miscible** such as CCl_4 and Benzene.

These liquids are also known as **binary liquids**.

Practically immiscible (insoluble):

These liquids **do not mix** in any proportion. If they are shaken vigorously, they mix but soon form the layers on standing.

These liquids are entirely **different from each other** chemically as well as polarity wise.

For example, castor oil (organic & non- polar) is completely immiscible with water (inorganic & polar).

Partially miscible:

These liquids are miscible to each other but to a limited extent i.e. partially. These liquids **mix but form two layers**. Each layer is a solution of one liquid into the other.

Some liquid 'A' is dissolved into 'B' and some liquid 'B' is dissolved into liquid 'A'. Both of these layers (i.e. solutions) are known as **conjugate solutions**. If such a mixture is heated, the two layers disappear and form one layer.

The temperature at which two partially miscible liquids become completely miscible is called "**critical solution temperature or upper consolute temperature**".

For example, when water and phenol are mixed in equal quantities, they form two layers at 25 °C. The upper layer contains solution of 95% water + 5% phenol, and lower layer contains solution of 70% phenol + 30 % water. But at 68.4 °C (critical solution temperature), two layers disappear to form one phenol-water solution.

Other examples of partially miscible liquids include; Aniline – water, nicotine – water, triethylamine – water etc.