Course… … .. B. Pharm

Sem…….............. 3

Year… …. … … … 2

Subject… … ..Physical Pharmaceutics I

Code… … … … BP-302T

Topic… … … .solubility of drugs

SOLUBILITY OF DRUGS

Solubility means dissolution of solute in solvent to give a homogeneous system so that we can achieve a desired concentration of drug in systemic circulation for desired pharmacological response.

Importance of solubility

The importance of solubility is to influence bioavailability , dissolution rate and NDM permeability. Therefore, improving the solubility and dissolution rate of NDM is one of the main aspects that need to be investigated in the development of dosage forms, particularly those intended for oral or transdermal administration.

Basic Principles and Methods of Solubilization.

Preformulation and optimization of pharmaceutical systems in the form of solutions with poorly soluble bioactive compounds is currently a challenge in pharmaceutical research. Ideally, a well-balanced drug molecule must be sufficiently hydrophilic to be soluble in aqueous biological liquids and buffer solutions but also sufficiently lipophilic to penetrate through biological membranes .

A polar substance is soluble, but it has less liposolubility to be permeable through the membranes. Also, the presence of an ionic charge causes poor absorption despite good dissolution.

Distribution law

According to Nernst's Distribution law (1891) or Partition law, "When a solute is taken up with two immiscible liquids, in both of which the solute is soluble, the solute distributes

itself between the two liquids in such a way that the ratio of its concentration in the two liquid phases is constant at a given temperature provided the molecular state of the distributed solute is same in both the phases".

I.e.

$C_1/C_2 = K_D$

Where $C_1 \backslash C_2$ are the concentrations of the solute in two phases. K_D is called distribution coefficient or partition coefficient.

(A) When solute undergoes association in one of the solvents, we have

$K_D = C_1/n\sqrt{C_2}$ or $K_D = n\sqrt{C_1}/C_2$

Where 'n' =order of association.

(B) When solute undergoes dissociation, we have

$K_D = C_1/C_2(1-a)$ or $K_D = C_1 (1- a)/C_2$

Where a = on degree of dissociation.

(C) When solute is to be extracted from solution by another suitable solvent, we have.

Amount left unextracted = $W[K_D/V/K_DV + v_1]n$

Where 'W' =Initial amount present in solution,

'V' =volume of solution,

v_1 volume of extracting solvent,

K_D = Distribution coefficient,

'n' = Number of extraction operations.

Applications of Distribution Law

(a) The degree of hydrolysis of substances can be conveniently.

(c) Another example of the application of the distribution law can be demonstrated by finding the equilibrium constant for the equilibrium.