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Phytosomes: An Advanced Drug Delivery System for Herbal Drug

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Abstract

Plant extracts have been proved useful in treatment of various diseases, but their hydrophilic nature and unique chemical structure has imposed major challenges because of their poor bioavailability. Phytosomes, a complex between phytoconstituents and phospholipid improves absorption of phytoconstituents orally as well as topically. Phytosomes technology applied to poorly absorbable phytoconstituents. The bioavailability of phytoconstituents can be improved by the use of drug delivery system which has the capacity to cross the biological membrane. Phytosomes have better pharmacokinetic profile than conventional herbal extracts.

Keywords: Phytosome; Phytoconstituents; Hydrophilicity; Phospholipids; Vesicular Drug; Phytoconstituents; Liposomes

Introduction

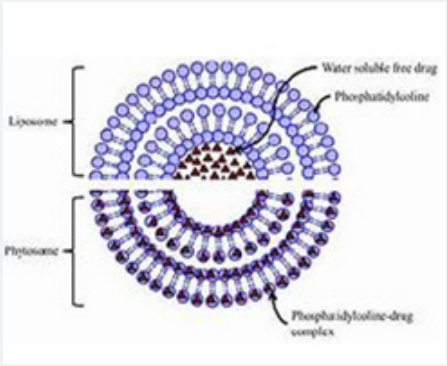

Figure 1: Phytosomes differs from liposomes.

Phytosome is a complex of phospholipids and natural active ingredients. Phytosome increases absorption of herbal extract when applied topically or taken orally [1]. Phytosomes or herbosomes are lipid compatible phospholipid complex, contains herbal extract bounded with phospholipids [2]. It is a vesicular drug delivery system containing phytoconstituents surrounds by lipid. Phytosome increases absorption of phytoconstituents through GIT hence improves bioavailability of phytoconstituents [3,4]. Phytosomes differs from liposomes, in phytosomes phytoconstituents and phospholipids are present in 1:1 or 1:2 ratio whereas in liposomes water soluble constituents is surrounded by several phosphatidyl choline units [4]. Phytosomes are lipophilic vesicular drug delivery system with definite melting point, these are freely soluble in non-polar solvents and moderately soluble in fats (Figure 1).

Advantages [4-6]

a) Better stability of phytoconstituents

b) Improve bioavailability of phytoconstituents

c) They can also improve permeation of drug through skin

d) It improves absorption of lipid insoluble phytoconstituents orally as well as topically.

e) Significant drug entrapment

Preparation of Phytosomes

Phytosomes can be prepared by reacting phosphatidylcholine and phytoconstituents in 1:1 ration in an aprotic solvent. In phyto-phospholipid complex the ration between phospholipid phytoconstituent is in the range 0.5-2 mole. The most preferable ration between phospholipid and phytoconstituents is 1:1. The phospholipid are mostly selected from group consisting soya-lecithin phosphtidylcholine, phosphstidylserine and phosphatidylethanolamine. Spectroscopic study shows that the molecules of phospholipid are bonded with phytoconstituents by means of chemical bonds.

Characterization of Pharmacosomes

To study interaction between the drugs and the pho, following spectroscopic methods are used.

FTIR (Fourier transform infrared spectroscopy)

FTIR spectroscopy is also a useful tool for the evaluation of

stability of the Pharmacosomes. The formation of the complex can also be confirmed by the IR spectroscopy comparing the spectrum of the complex with the spectrum of the individual components and their mechanical mixtures. [7]

Physicochemical evaluation of phytosomes [5]

Solubility: Solubility study can be performed by taking an excess of drug in different solvents like water, phosphate buffer (PH 6.8) acetate buffer (PH 4.5).

Particle size distribution: To study particle size distribution dispersion of prepared phytosomes can be made in alcoholic solution (isopropyl alcohol) and analyzed under size analyzer

Stability of pharmacosomes: Stability of the complex can be studied by correlating the spectrum of complex at various points of time in the solid state with spectrum of a dispersion in water consisting of small particles.

Dissolution studies: In vitro dissolution studies are done in media of different PH using standard dissolution apparatus available for the purpose. The results are assessed on the basis of apprehended activity of the active constituents therapeutically [2,8].

Scanning electron microscopy/transmission electron microscopy: For studying the surface order of pharmacosomes these techniques can be utilized [2]. The shape and size of pharmacosomes may be affected by purity grade of phospholipid and the process variables such as speed of rotation, vaccum applied or the method used [9]. Pharmacosomes prepared by low purity grade lipids yields greasy product. Pharmacosomes prepared by high purity grades lipids are prone to oxidative degradation [10].

Conclusion

Vesicular systems such as (Pharmacosomes, liposomes, niosomes) are the emerging carrier systems in the pharmaceutical industry. A phytosome is a complex made between herbal extracts and dietary phospholipid, shows improved bioavailability of phytoconstituents. Phytosome technology were first investigated for cosmetic application but it's use as a drug delivery system for herbal products has been observed over past few years. They have advantages in targeting drug to a specific site in body. Phytosomes technology has improved pharmacokinetic profile herbal extracts and can be used advantageously in various herbal products.

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