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Phytosomes: An Advanced Drug Delivery System for Herbal Drugs

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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.

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INTRODUCTION

Phytosome is a complex of phospholipids and natural active ingredients. Phytosome increases absorption of herbal extract when applied topically or taken orally. (Singh et al., 2011) Phytosomes or herbosomes are lipid compatible phospholipid complex, contains herbal extract bounded with phospholipids. (Dhyani and Juyal, 2014) It is a vesicular drug delivery system containing phytoconstituents surrounds by lipid. Phytosome increases absorption of phytoconstituents through GIT hence improves bioavailability of phytoconstituents. (Deshpande et al., 2014, Pawar et al., 2015)

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 (Pawar et al., 2015). Phytosomes are lipophilic vesicular drug delivery system with definite melting point, these are freely soluble in non-polar solvents and moderately soluble in fats.

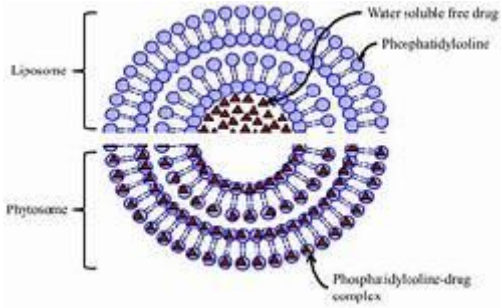

Figure. 1 Structure of Phytosome

Advantages (Deshpande et al., 2014, Pawar et al., 2015**,** Dhase and saboos, 2015**)**

1) Better stability of phytoconstituents
2) Improve bioavailability of phytoconstituents
3) They can also improves permeation of drug through skin
4) It improves absorption of lipid insoluble phytocontituents orally as well as topically.
5) 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 0.5-1 mole. The most preferable ration between lipid and plant extracts is 1:1. The phospholipids are mostly selected from group consisting soya-lecithin phosphtidylcholine, phosphstidylserine and phosphatidylethanolamine. Spectroscopic study shows that the molecules of phospholipid are bonded with phytocontituents by means of chemical bonds.

Characterization of Pharmacosomes

Following spectroscopic methods may be used to study the drug-lipid interactions.

FTIR (Fourier Transform Infrared Spectroscopy):

Fourier Transform Infrared Spectroscopy is a useful tool for study the stability of the Phytosomes. By comparing the IR spectrum of complex formed with the spectrum of individual components formation of complex can be confirmed. (Semalty et al., 2017)

Physicochemical Evaluation of Phytosomes (Das and Kalita, 2013)

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

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. (Dhyani and Juyal, 2014, Kumar and Arnav, 2012)

Scanning Electron Microscopy/Transmission Electron Microscopy.

SEM and TEM can be used for study the surface order of pharmacosomes (Dhyani and Juyal, 2014). Process variables during formation of phytosomes may affect shape and size of phytosomes. Lipid with low purity grade produce yields greasy product. Pharmacosomes prepared by high purity grades lipids are prone to oxidative degradation. (Kumar and Arnav, 2012)

Marketed formulations of Phytosomes (Kalita et al., 2013, Kareparamban et al., 2012)

S. No.	Phytosome	Phytoconstituents	Uses
1	Hawthorne Phytosome	Flavanoids	It is used as antioxidant and cardio-protective
2	Naringenin Phytosomes	Narengenin	It is used as anti-oxidant
3	Ginselect Phytosome	Ginsenosides	adaptogenic
4	Meriva	curcuminoids	It is used in osteoarthritis
5	Ginko biloba terpenes	Gingolides	Adaptogenic

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CONCLUSION

Vesicular systems such as (Pharmacosomes, liposomes, niosomes) are the emerging carrier systems in the pharmaceutical industry. A phytosome is a complex made beween herbal extracts and dietry 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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