

Phytosomes: Enhance the Bioavailability and Therapeutic Efficacy of Herbal Extract

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Abstract: *Plant extract have been proved useful in treatment of various disease ,but their hydrophilic nature and unique chemical structure has imposed a major challenges. People are drawn to therapeutic herbs because of their minimal side effects. Herbal medicines' uses are limited by the traditional dose Form's low absorption, decreased bioavailability, and reduced penetration through biological membranes. To address all of these problems with herbal extract or plant actives, a revolutionary drug delivery system known as Phyto-Phospholipid Complexes (Phyto some) approach was introduced. This cutting-edge technology technique Produced the desired therapeutic effect at a lower dose. Increased pharmacokinetic characteristics, skin penetration Through strategic targeting to transition from hydrophilic to lipophilic environments, and improved stability due to Chemical coupling. The most recent research on the potential use of Phyto complexes for the treatment of various Diseases, their marketable form, the mechanism of Phyto transportation, and the prospects for the future are Summarized in this review. The Prospectus of the Phytosomes Method can provide new directions and a boundless Frontier as revolutionary medicinal therapy.*

Keywords: Plant extract.

I. INTRODUCTION

Most of the biologically active constituents of plants are polar or water soluble but due to the problem in absorption, Restricts the utilization of these type of compounds which ultimately decreases the bioavailability. For improvement of bioavailability, herbal products must have proper homeostasis between hydrophilic (for absorption into gastrointestinal tract fluid) and lipophilic (to cross lipid bio membrane balance).

Plant preparations are widely used in traditional as well as modern medicine system. During the traditional time, various pharmacological studies have been carried out with many plants extracts and their constituents to check their therapeutic application. Over the Past year, great advancement has been made for the development of novel drug delivery system (NDDS) for various Plant extracts and their active constituents. Novel drug delivery such as targeted drug delivery which directly channels The active entity on the site of action and such delivery system could offer targeted and sustained release of drug so that pharmacological effect could be achieved at lower dose. The development in the area of herbal medicine started earlier to cure human diseases with lesser side effects.

A number of chief constituents of herbal medicine are easily soluble in water (glycoside, flavonoid); however, these Constituents are bounded in their potency because they may be partially soluble or hydrophobic in nature, so when Applied topically shows less therapeutic efficacy .

Numerous efforts have been put forward to enhance the bioavailability Of such drug by formulating them to target drug delivery system such as phytosomes and liposomes are good options. The use of these techniques in formulation development process may lead to good bioavailability of herbal drugs as Compare to conventional herbal extracts.

Phytosome means herbal drug loaded in vesicles, which is available in the Nano form. The phytosome provide an Envelope, like coating around the active constituent of drug and due to this the chief constituent of herbal extract remains Safe from degradation by digestive secretion and bacteria. Phytosome is effectively able to absorb from a water loving Environment

into lipid loving environment of the cell membrane and finally reaching to blood circulation. The current Review highlights the future scope and emerging technologies in the field of NDDS for the benefit of herbal and traditional Medicines prepared from plant origins.

The term “Phyto” means plant and “some” means cell like. It is also mentioned as herb phytosome . This is a new patented Technology, where standardized plant extracts or water soluble phyto constituents are complexed with phospholipids To produce lipid compatible molecular complexes, there by greatly increasing absorption and bioavailability. Phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, phosphatidylinositol are the phospholipids used, But phosphatidylcholine are widely used because of their certain therapeutic value in case of liver diseases, alcoholic Steatosis, drug induced liver damage and hepatitis.

Phospholipids are also employed as natural digestive aids and as Carriers for both fat miscible and water miscible nutrients. Phytosomes can easily traverse the lipophilic path of the Enterohepatic cell membranes and also stratum corneum layer of the skin.

Standardized plant extracts mainly flavonoids are derived as phytosomes. Selection of flavonoids are done from the Groups consisting of quercetin, kaemferol, quercetin-3, rhamnoglucoside, quercetin-3-rhamnoside, hyperoxide, Vitexin, diosmine, 3-rhamnoside, (+) catechin , (-) epicatechin, apigenin-7-glucoside, luteolin , luteolin glucoside, Ginkgonetine, isoginkgonetine and bilobetine etc.

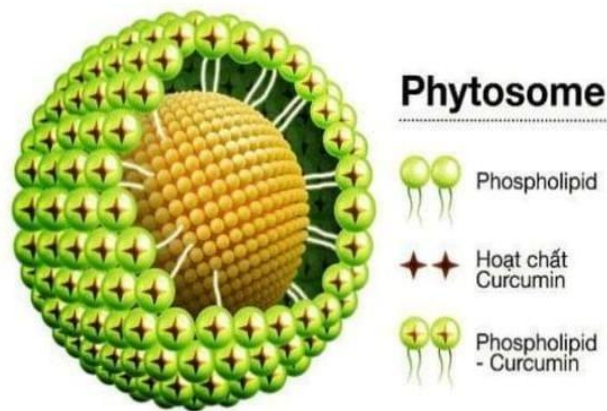


Fig: Phytosome

Phytosomes have many advantages, including:

- Bioavailability: Phytosomes can improve the absorption of herbal extracts and natural ingredients. They can also help with the delivery of herbal active ingredients to tissues.
- Chemical stability: The chemical bonds in phytosomes allow for a higher capacity to load compounds.
- Biocompatibility: Phytosomes are biocompatible and have a favorable alignment between the drug and the polar phospholipid head groups.
- Small size: Phytosomes are small in size and can be stored in a freeze-dried form.
- Pharmacological benefits: Formulations containing phytosomes can have anti-inflammatory, antioxidant, and neuroprotective properties.
- Improved permeation: Phytosomes can improve the permeation of drugs through the skin.
- Controlled release: Phytosomes can mediate controlled release systems.
- Targeted delivery: Phytosomes can be used for targeted delivery systems.

Phytosomes have some disadvantages, including:

- Rapid elimination of phytoconstituents the phytoconstituents in phytosomes can be quickly eliminated, which can reduce the concentration of the target drug. This can indicate that the phytosomes are unstable.

- Phospholipids can promote breast cancer cell growth the phospholipids in phytosomes, such as lecithin, can promote the growth of breast cancer cells.
- Limited bioavailability Phytosomes can limit bioavailability when administered orally or topically.
- Susceptibility to pH variations Phytosomes are susceptible to pH variations.

Physicochemical evaluation of phytosomes

- 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.
- Scanning electron microscopy/transmission electron Microscopy: For studying the surface order of pharmacosomes These techniques can be utilized .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 . Pharmacosomes prepared by Low purity grade lipids yields greasy product. Pharmacosomes Prepared by high purity grades lipids are prone to oxidative Degradation.

Table 1: Methods used for the preparation of phytosome

Methods	Procedure
Solvent evaporation	A 100 ml. Circular bottom flask is filled with the necessary amount of plant material and phospholipids, along with 20 ml. Of acetone, and is then refluxed for two hours at 50-60°C. The precipitate was filtered off after the mixture was condensed to 5-10 ml... The dried precipitate phytosome complex was stored at room temperature in an amber-colored glass container
Rotary evaporation technique	A rotating circular bottom flask was used to dissolve the appropriate amount of plant material and phospholipid in 30 ml. of tetrahydrofuran. The mixture was then stirred for three hours at a temperature below 40°C. N- hexane was added after a thin layer of the sample was collected, and the mixture was continually agitated using a magnetic stirrer. The precipitate was taken out and cooled to som temperature in a glass container that was amber in colour
Ether-injection technique	In this his process, an organic solvent is used to dissolve the drug lipid complex. After that, vesicles are created by slowly slov injecting the mixture into an aqueous agent that has been heated. The focus of amphiphiles determines their state. Amphiphiles take on a monomer form while the concentration is low, but as the concentration rises, other configurations, such as circular, cylinder, disc, cubic, or hexagonal structures, may appear.
Lyophilization technique	Lyophilization process Both natural and synthetic phospholipids and phytoconstituents are dissolved in various solvents, and then additional solutions containing the phytoconstituent were added to solutions already containing the phospholipids, which were then stirred until complex formation occurred. By lyophilization, the produced complex is isolated

II. CONCLUSION

This article aims to provide a succinct overview of Phytosomes as a delivery method. Phytosomes are innovative formulations that increase the bioavailability of hydrophilic flavonoids and other comparable substances through the skin or digestive system. They differ from other traditional formulas in numerous notable ways. Phytosome formulation is a straightforward process that is easily scaled up for commercial use. For this kind of new formulation, the characterization approaches and analytical tools are well established. For novel phytosome formulations, procedures and applications, many patents have previously been approved. Phytosome technology has a bright future as far as applications for hydrophilic plant chemicals and formulation technology are concerned.

REFERENCES

- [1]. WHO (2004). Guidelines on Safety Monitoring of Herbal Medicines in Pharmacovigilance Systems. Geneva, Switzerland: World Health Organization. Available at <https://apps.who.int/iris/handle/10665/43034>
- [2]. C. Manach, A. Scalbert, C. Morand. Polyphenols: Food sources and bioavailability, *Am. J. Clin. Nutr.*, 2004; 79: 727-47.
- [3]. Ajazuddin, S. Saraf. Applications of novel drug delivery system for herbal formulations, *Fitoterapia*, 2010; 81: 680-689.
- [4]. Jain N, Gupta PB, Thakur N, Jain R, Banweer J. Phytosome a novel Drug delivery system for herbal medicine. *Int J Pharm Sci Drug Res* 2010;2(4):224.
- [5]. Kareparamban AJ, Nikam HP, Jadhav PA, Kadam JV. Phytosome a Novel revolution in herbal drugs. *Int J Res Pharm Chem* 2012;2(2):300.
- [6]. Amin T, Bhat S. A review on phytosome technology as a novel approach to improve the bioavailability of nutraceuticals. *Int J Online Adv Res Technol* 2012;1:1-15.
- [7]. Kidd PM. Bioavailability and activity of phytosome complexes from botanical polyphenols: The silymarin, curcumin, green tea, and grape seed extracts. *Altern Med Rev* 2009;14(3):226-46.
- [8]. Bombardelli E, Mustich G. Bilobalide Phospholipid Complex their Uses and Formulation Containing them. U.S Patent No. EPO275005; 1991.
- [9]. Ghanbarzadeh B, Babazadeh A, Hamishekhar H. Nano-phytosome as a Potential food-grade delivery system. *J Food Sci* 2016;15:126-35.
- [10]. Pandita A, Sharma P. Pharmacosomes: an emerging novel vesicular drug delivery system for poorly soluble synthetic and herbal drugs. *ISRN Pharm*, 2013; 2013: 348186.
- [11]. Monica G, Naik VV. Herbosomes: A potential carriers for the bioavailability enhancement of herbal extracts. *World J Pharm Pharm Sci.*, 2014; 4(10): 1052-79.
- [12]. Li Y, Yang DJ, Chen SL, Chen SB, Chan AS (2008); Comparative physicochemical
- [13]. Characterization of phospholipids complex of Puerarin formulated by conventional and supercritical methods; *Pharm Res.*, 2008; 25(3): 563-77.
- [14]. Sikarwar MS, Sharma S, Jain AK, Parial SD. Preparation, characterization and evaluation of Marsupin phospholipid complex; *AAPS PharmSciTech*, 2008; 9(1): 129-37.
- [15]. Mascarella S. Therapeutic and anti-lipoperoxidant effects of the silybin-phosphatidylcholine complex in chronic liver disease; *Curr Ther Res.*, 1993; 53: 98-102.