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Review Article

Phytosomes: A New Vesicular Delivery for Herbal Medicine

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ABSTRACT:

Phytoconstituents such as flavonoids, tannins, glycosides, Alkaloids and terpenoids have therapeutic properties. In recent years Herbal Medicines are developed and used to treat almost all diseases with little or no side effects. But it is a plantnutrient with a lower half-life, Bad Bioavailability problems and stability due to their high particle size and high qualitywater melting. Phytosomes are the carriers of a new drug delivery system. Contains two words "phyto"means "plant" and "others" means "as a cell".They are used to improve absorption, Systemic bioavailabilityand increaseits release in combination with phospholipids.Creates a weak hydrogen bond between polar heads over timenonpolar. The tail of phospholipids blocks out more complex thus transmitting lipophilic compounds extracted by herbs. Soincreases plant absorption than normal herbal extract. Current update defines overview of phytosomes and their structures, Method of preparation, test of novel technology and significancePhytosomes.

INTRODUCTION:

The new drug delivery system aims to deliver the drug at a controlled rate using body parts using different carriers such as aquasome, liposomes, transferosomes, phytosomes, virosomes, ethomosomes, and electrosomes. The bioavailability of plant nutrients can be enhanced by incorporating them into a phospholipid-based delivery system, i.e. the phytosome. The biological components of plants are usually soluble in water or naturally (i.e., flavonoids, glycosides, tannins). Water-soluble nutrients have a Drug Delivery system. Poor bioavailability of plant nutrients can be enhanced by their incorporation into a Phospholipid-based Integrated Delivery System, i.e. phytosome. Biologically Active Nutrients are usually insoluble in water or Polar naturally (i.e., flavonoids, glycosides, Tannins). Water-soluble nutrients are larger in size than soluble lipid solvents than lipid soluble nutrients.
The absorption of soluble nutrients in water is very bad because of their size. Passive Diffusion is not possible due to their size limit, and they cannot cross lipid-rich membranes leading to impaired bioavailability. Plant exhaustion can cause partial or complete reduction of Bioavailability, and may result in loss of the interaction of natural elements. It has often been observed that chemical complexity is required so that the Bioavailability of the active components of the raw or purified drug in the gastrointestinal tract may reduce the effectiveness of other active components when taken orally. For this reason, extracts show low bioavailability, and their clinical benefit is questionable. To overcome these problems, botanical drugs are incorporated into portable systems such as phytosomes, liposomes, nanoparticles, nano-crystals, etc., in order to improve the number of processes such as melting, absorption and bioavailability, continuous delivery. Among these phytosomes carriers are efficient vehicles for delivering plant components. Phytosomes is a novel technology developed in 1989 to combine aqueous solubility of plant nutrients with phospholipids to regulate the complexity of lipid cells and Phytoconstituents. Phytosome technology is a patented technology that involves the interaction between phospholipid and Phyto-constituents soluble in water shown in Fig. 1, suitable for oral and oral drug delivery programs. They are similar in structure to liposomes and have higher configuration.

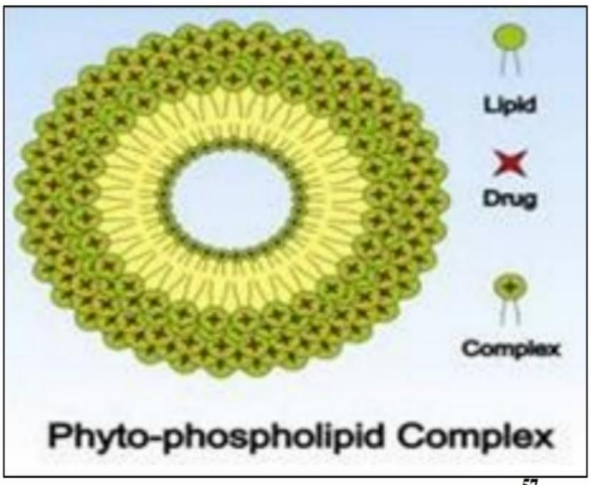

FIG. 1: STRUCTURE OF PHYTOSOME

They are prepared by attaching an individual ingredient to phosphatidylcholine (PC), which leads to the formation of high solubility and absorption and leads to improved Pharmacokinetic and pharmacodynamics properties compared to conventional drug extraction. Phytosomes are also known as phospholipid Complexes. They are lipid-based novel delivery systems with a high volume of Nutraceutical compounds to be added to. As a Stable Compound with a Chemically Bound Compound, plant extracts can easily bind to Phosphatidylcholine due to the presence of Terpenoids and flavonoids or other phyto-Constituents. They are widely used in the delivery of Low Solubility and Low Bioavailability Compounds Where production methods are available.

1. Anti-solvent precipitation method
2. Rotary evaporation method
3. Solvent evaporation method
4. Thin film hydration method
5. Sonication method

Properties:

Physicochemical Properties:

a. Phytosomes are complex between plant elements and natural or synthetic Phospholipid and complex is obtained by reacting with the right amount of Phospholipid and the key elements in a specific solvent.
b. The interaction between the phospholipid and the substrate is due to the development of Hydrogen bonds between the white Phospholipid head and the polar performance of the major voters.
c. In hydrophilic environment treatment, the Phytosomes exhibit a cell-like structure, but in the liposome the primary component communicates within the inner pocket while in the phytosome the active component is covered by the poppolipid head and becomes an integral part of the Membrane.
d. The phytosome is a compound of a few cells put together, whereas liposomes are a combination of a number of phospholipids that respond to key elements but without complete interaction with them. This can be confirmed with the help of various spectroscopic techniques.
e. Phytosomes dissolve freely in non-polar Solvent, as well as micelle formation in Polar solvents (water) and show medium melting in oil.
f. The point of melting of phytosomes is clear.
g. The phytosome size is 50 nm to a few hundred µm.

Biological Properties:

A. Phytosomes increase the active absorption of an active molecule and increase systemic absorption when administered orally.
B. They are an advanced form of herbal products and are more effective compared to conventional herbal extracts.
C. Phytosomes have an excellent pharmacokinetic compared to simple herbal medicine.

General Procedure for the Preparation of Phytosomes:

Take the required amount of Phosphatidylcholine and in a dose of 0.5: 1, 1: 1, 2: 1 (drug: phospholipid). Among those 1: 1 ratio is the most preferred. The mixture also reacts with reflux with the appropriate solvent such as Acetone or dioxane or methylene chloride (di Methyl chloride) for 2 hours at 60 ° C or 40 ° -50 ° C for 3H after which to dissolve the solvent. Into 5–10 ml Formulated mixture. Rain with non-solvent (eg: n-hexane) or aliphatic hydrocarbons and dried by spraying by suspension or by lyophilization technique and dried phytosomes are stored in an amber colored bottle.

Preparation Methods:

a. **Anti-solvent Precipitation Method:**The required dose of the drug and phospholipid is reacted and re-mixed with 20 ml of acetone for 2 hours at 60 ° C or 40-50 ° C for 3 hours and then concentrated for 5 to 10ml and increase the concentration of n-hexane carefully to reduce. Phytosomes are also dried using an ice dryer or vacuum desiccator and the resulting powder store in an amber colored bottle.

b. **Rotary Evaporation Method:**A certain amount of the drug and so cithin was taken and placed in 100ml of the lower circular flask and dissolved in 30ml of tetrahydrofurantoin in a circular bottom flask followed by a 3-hour movement at a temperature not exceeding 40 ° C. A thin sample film was obtained in which n-hexane was added continuously by means of a magnetic field. The resulting rain was collected, stored in an amber glass bottle and stored at room temperature.

c. **Solvent Evaporation Method:**Some amount of the drug and soy cithin was taken into a round flask at the bottom and dissolved in 20 ml of acetone or any other aprotic solvent and filtered for 2 hours at 60 ° C or 40-50 ° C for hours 3 and the solvent is concentrated. 5 to 10 ml and strain the solvent Collect rain and dry using a vacuum desiccator and store in a tightly closed container.

d. **Thin Film Hydration Method:**Phospholipid i.e., soy lecithin, reacts with polyphenolic extract in an amount equal to 5 ml of dichloro-methane (DCM) by stirring until evaporation. Once the DCM has evaporated, 5 ml of n-hexane is added to the thin film by stirring and left on the fume hood to completely remove the n-hexane; the film was wet and sonicated for the phyto-soma complex you want.

e. **Sonication Method:** Accurately measure the amount of phospholipid and cholesterol in the lower circular flask and dispense with 10 ml of chloroform, followed by sonication using a bath sonicator. Removal of organic solvent can be done by placing it under reduced pressure in a rotating evaporator (40 ° C) .After complete removal of the small solvent; a layer is formed that is coated with a polyphenolic extract of the drug in a rotating evaporator. The Phospholipid mixture was placed in an amber colored bottle.

Characterization of Phytosomes:

1. **Visualization**:

A. **Microscopic View:**Optical microscope was used for phytosome complex separation. The structure was suspended in water and a drop was placed on a glass slide and covered with a coverslip. Microscopic view of the phytosome was observed under different magnification.

B. **Transmission Electron Microscopy (TEM):**Morphological tests were performed on modified phytosomes. The sample was prepared by centrifuging the phytosomal dispersion was placed in a carbon-sealed brace, leaving a thin film dry and finally looking at the particle size in the middle of the vesicle.

2. **Scanning Electron Microscopy (SEM):**Electron microscopy scanning studies were performed to detect local morphology, size and shape of phytosomes.
3. **Measurement of Particle Size:**The particle size of the phytosomes was measured by a particle size analyzer. For the determination of particle size 100 µl of the sample was diluted with an appropriate volume of distilled water, and diameter of vesicle was determined.
4. **Vesicle Size and Zeta Potential:** Dynamic light scattering (DLS) using a computerized scanning system and photon correlation spectroscopy (PCS) used to determine vesicle size and zeta capacity.
5. **Surface Tension Measurement:** Area tension is measured by the ring in the dunuoy ring of the drug tree in the aqueous solution.
6. **Spectroscopic Evaluation:**

   NMR Studies (Nuclear Magnetic Resonance): It is an effective tool for cellular structural precision. It is also helpful to know the distribution of electrons in molecules and the nature of quantum mechanical bonding, based on the formation of data of phytosomes can be concluded. e.g., H1-NMR, 13C-NMR.

   FTIR Studies (Fourier Transformed Infra-red Spectroscopy):FTIR spectral data can be taken to determine the composition, and chemical stability of phospholipid-filled phytosome and polymer samples and drugs. The sample can be crushed with potassium bromide (KBr) to obtain pellets at 600kg / cm2 pressure. Spectral scanning can be done at a distance of between 4000-400cm-1.
7. **Entrapment Efficiency:**Phytosomal fixation has been subjected to centrifugation using a cooling centrifuge at 4 ° C at high rpm to lyse the vesicle for some time. The clear supernatant was then carefully extracted to separate the absorption into the product and the supernatant absorption of the absorption was recorded at λmax appropriate using a UV-visible spectro-photometer. Sediment was treated with a trion-X100 solution for attaching vesicles and diluted with a suitable buffer and an absorbent extract from λmax. Then the amount of Phytoconstituents in the supernatant and sediment gave the total amount of Phytoconstituents in 1 ml of phytosomal dispersion.

   Effectiveness of% entrapment calculated by formula% Efficiency of Entrapment = (Price of drug in the middle / Total drug value) × 100.
8. **Drug Content:** The drug content in the phytosomes was determined by dissolving the precise amount of phytosomal dispersion in 10ml of methanol. After proper purification, the absorption was determined by spectroscopic methods at the appropriate lengths and the drug content was determined using a formula.

% Drug Content = (actual drug content in phytosomes / theory harvest) × 100

9. **In-vitro Drug Release Studies:**The modified phytosome is loaded with zero-size capsules. In-vitro dissipation studies of the prepared structure were performed using type 2 materials at the appropriate rpm in a suitable dispersion area kept at 37 ° ± 2 ° C. 5ml of aliquots were extracted at intervals of time intervals and were evaluated spectrometrically. An equal number of new media was changed after each sample to maintain a constant volume.
10. **Determination of Release Kinetics:**In order to study the phytosomal release kinetics, data obtained from termination studies were computerized by different kinetic models (a) zero order (cumulative% drug release relative to time) (b) first order (compact log % of the tree stored compared to time.) (c) Higuchi (compact log tree released compared to the square root of time) (d) Korsemayerpeppas number (accumulated log% of release compared to time). The reverse coefficient values of different kinetics extraction calculations were analyzed by compiling data for phytosomal emission profiles.
11. **Stability Studies:**Corrected phytosomes were detected in stabilization studies at 40 ± 2 ° C / 75 ± 5% RH according to ICH guidelines for a period of 3 months and assessed the formation of microscopic testing and drug release and drug entry and in-vitro drug release studies .

Improved Bioavailability of Phytosome and its Importance:

Advances in phytosomal delivery system are as follows:

- S Sylimarin exhibits a satisfactory delivery of sylibin when formulated as a phospholipid complex. This study is an attempt to synthesize phytosomes of sylibin and its in vivo experiments in mice. There is a significant improvement after oral administration due to the development of the sylibin-phospholipid complex.
- Tedesco et al. (2004) studied a synthetic sylimarin phytosome that has greater antihepatotoxic activity than sylimarin alone and may provide protection against the harmful effect of aflatoxin B1 in meat chicks.
- Unye Some research is about bacopside. It is an active component of the Bacopamonnieri plant that has amnesic activity. It shows a significant change in the effectiveness of phytosomal therapy.
- Barzaghi el. al., (1990): A study of sylibin absorption. This sylibin is formed as a phospholipid complex; oral sylibin absorption from the sylibinphytosome is enhanced than normal sylibin absorption in the milk thistle because it is bound to the phospholipid. This test was performed after oral administration of the same amount of sylibinphytosome and sylibin from the milk thistle.
- Ber the Berberine phospholipid complex increases the rate of melting and dispersing than berberine Phytoconstituents.
- Sinigrin with wound healing properties this sinigrin property is enhanced because it is made up of phytosomes and the effects are also considered to be comparable to sinigrin alone.
- Grape seed contains proanthocyanidin / procyanidin. These are embedded in the phospholipid complex; show contribution to the damage caused by ischemia and play a role in the fight against atherosclerosis.
- Green tea leaves contain Epigallocatechin 3-o-gallate. This key active ingredient has been implicated in the effect of phytosomes on the development of oral bioavailability and in comparison to extracting just green tea.
- Other clinical studies, namely, phytosomes of green tea, caffeine-free anti-obesity and anti-oxidant, and hypolipid-micproperty.
- Quercetin phospholipid complex shows better therapeutic efficacy in liver tetrachloride damage in mice.

CONCLUSION:

Phytoconstituents such as flavonoids, glycosides, tannins, terpenoids, and glycosides are found in the value of the drug but due to their white head, low melting and low absorption rate, and poor systemic bioavailability, thus reducing the effectiveness of the treatment. These problems can be overcome by phytosomes. Phytosomes are an advanced form of herbal medicine that is better absorbed than ordinary plant extract. They are an advanced type of botanical and Phyto-constituents. That fits well with oral and topical due to their presence of enhanced melting, which allows them to cross the biological membrane leading to improved system bio-availability, i.e., a more efficient system in circulating the system. Phytosome also enhances pharmacokinetics and pharmacological parameters, and is widespread in cosmetology. Phytosomes are higher than liposomes due to their excellent absorption profile and stability.

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