

“Phytosomes” Novel Herbal Drug Delivery System

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ABSTRACT:

Phytosomes are novel form of herbal formulations. Phytosomes are cell like structure. Phytosomes process was developed by India. Phytosomes as anti-inflammatory as well as the antioxidant. They contain the bioactive constituents, Phytoconstituents. There are different types of products are available in the market. Such as Camellia sinesis, Silybummavianum and Ginkgo biloba. It is a patented technology. Phytosomes are use for development of formulations to improved the bioavailability of medicaments in phytoconstituents prevent in the herbal extract and preparation.

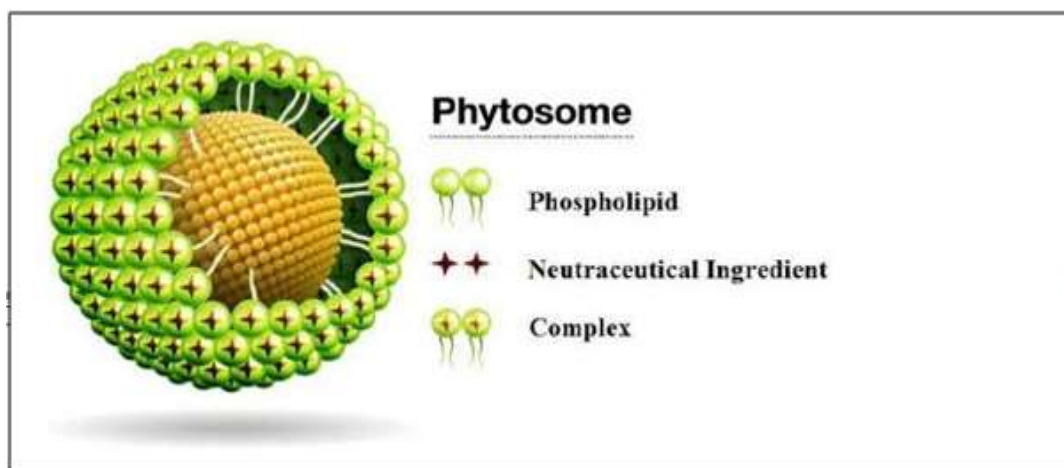
Key words: Phytosomes, Phospholipids and Phytoconstituents.

I. INTRODUCTION:

Phytosomes are novel drug delivery dosage form. Phytosomes are one type of term. Where “Phyto” means the plant and “Some” means cell i.e. Plant Cell. Also known as the Phytosomes. The phytosomes technology markedly enhances the bioavailability of phytomedicine & has effectively enhance the bioavailability of many popular herbal extracts including milk thistle, grape

seed, hawthorn & Genseng. One of the active components ECGS has received attentions Room major supplement brands for weight management supplements. They are advanced herbal products produced by binding individual component of herbal extract to phosphatidylcholine resulting in a product i.e. better absorbed & produces better results than the conventional herbal extracts.

Phytosomes is newly introduced patented technologies by India to developed & incorporate the standardized plant extracts (Awasthi et al., 2011). The Phytosomes process produced a little cell because of that the valuable component of the herbal extract are protected from distribution by digestive secretions & gut bacteria. Phytosomes have improve Pharmacokinetic & Pharmacological parameter. They are more bioavailability as comported to herbal extract owing the their enhanced capacity to cross the lipid rich biomembrances & finally reaching the blood. Phosphatidylcholine is Phospholipids. It is the key component of Phytosomes. It is used in the treatment of various disease in ancient times. Such as brain stimulant, immune-modulator, Skin improver, anti-wrinkle and anti-aging etc. Widely used in the cosmetics.



Benefits of Green Tea Phytosomes for Health:

- ❖ Promotes weight loss.
- ❖ It helps maintain weight loss over time.
- ❖ Reduces risk of heart diseases stroke and diabetes.
- ❖ It passes anti-cancer properties.
- ❖ Aids in detoxification.^[3]

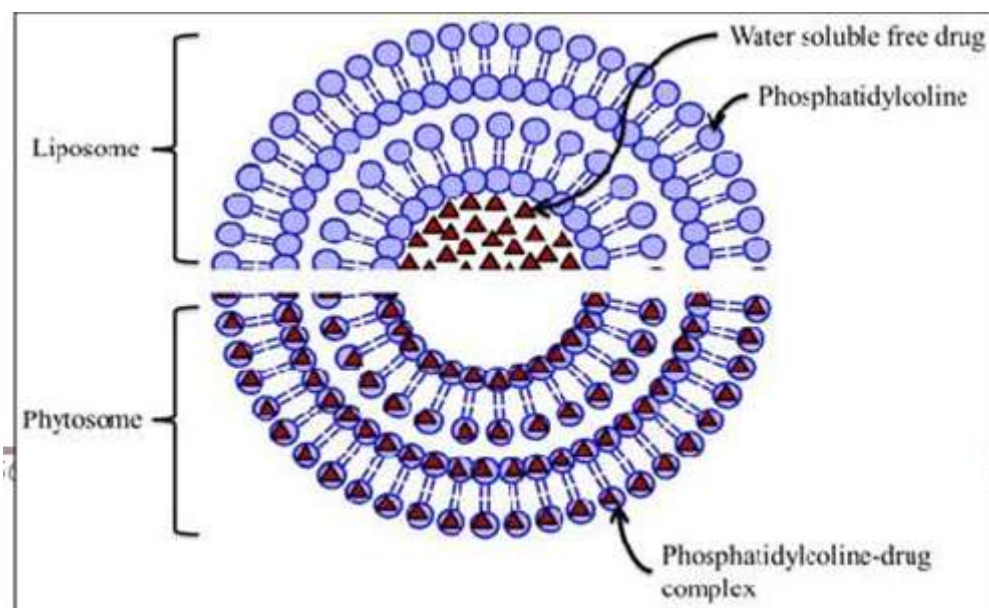
Mechanism Of Phytosome Formation

The polyphenolic constituents of plant extracts lend themselves quite well for direct binding to phosphatidylcholine. Phytosomes are formed from the reaction of the phospholipids like phosphatidylcholine with the standardized extract or polyphenolic constituents like simple flavonoids in aprotic solvent.^[2,3] Phosphatidylcholine is a bifunctional compound, the phosphatidyl moiety being lipophilic and the choline moiety being hydrophilic in nature. Specifically the choline head of the phosphatidylcholine binds to these compounds while lipid soluble phosphatidyl

portion comprising the body and tail which then envelopes the choline bound material. Hence, the Phytomolecules produce a lipid soluble molecular complex with phospholipids called as phyto-phospholipid complex. Phytomolecules are anchored through chemical bonds to the polar choline head of phospholipids, as can be demonstrated by specific spectroscopic techniques.^[3] Often Precise chemical analysis indicates the unit phytosome is usually a flavonoid molecule linked with at least one phosphatidylcholine molecule. The result is a little microsphere or cell is produced. These drug-phospholipids complexes can be formulated in the form of solution, suspension, emulsion, syrup, lotion, gel, cream, aqueous micro dispersion, pill, capsule, powder, granules and chewable tablet phosphatidylcholine resulting in a product that is better absorbed and produces better result than the conventional herbal extracts.^[4]

Difference between Liposome and phytosome:

Phytosome	Liposome
<ul style="list-style-type: none"> • In phytosome, the phosphatidyl-choline and the plant components actually form a 1:3 or a 1:21 molecular complex depending on the substance(s) complexes. • Phytosome involves chemical bonds. • Phytosome are much better absorbed than liposomes showing better bioavailability. 	<ul style="list-style-type: none"> • A liposome is formed by mixing a water soluble substance with phosphatidylcholine in definite ratio under specific conditions. • Here, no chemical bond is formed; the phosphatidylcholine molecules surround the water soluble substance. • Bioavailability of liposomes is less than phytosomes.



Advantages:

1. Enhanced absorption of herbal constituents.
2. The absorption of active constituent is improved, its dose requirement is also reduced.
3. Phosphatidylcholine acts as the hepatoprotective giving synergistic effect.
4. It shows better stability profile.
5. It assures proper delivery of drugs to the respective tissues.
6. Entrapment efficiency is high.
7. Phytosomes are also superior to liposomes in skin care product.
8. Better availability.
9. Nutritional benefit.
10. Enhanced permeation of drug through skin. (Google)

Disadvantages:

1. When administered orally or topically they limit their, bioavailability.
2. Phytoconstituents is quickly eliminated form phytosome.

3. Stability problem.
4. Rapid elimination of Phytoconstituents from Phytosomes.
5. Flavonoids are multiple ring so less absorbed & poor miscibility in oil.

Ingredients of Phytosomes:

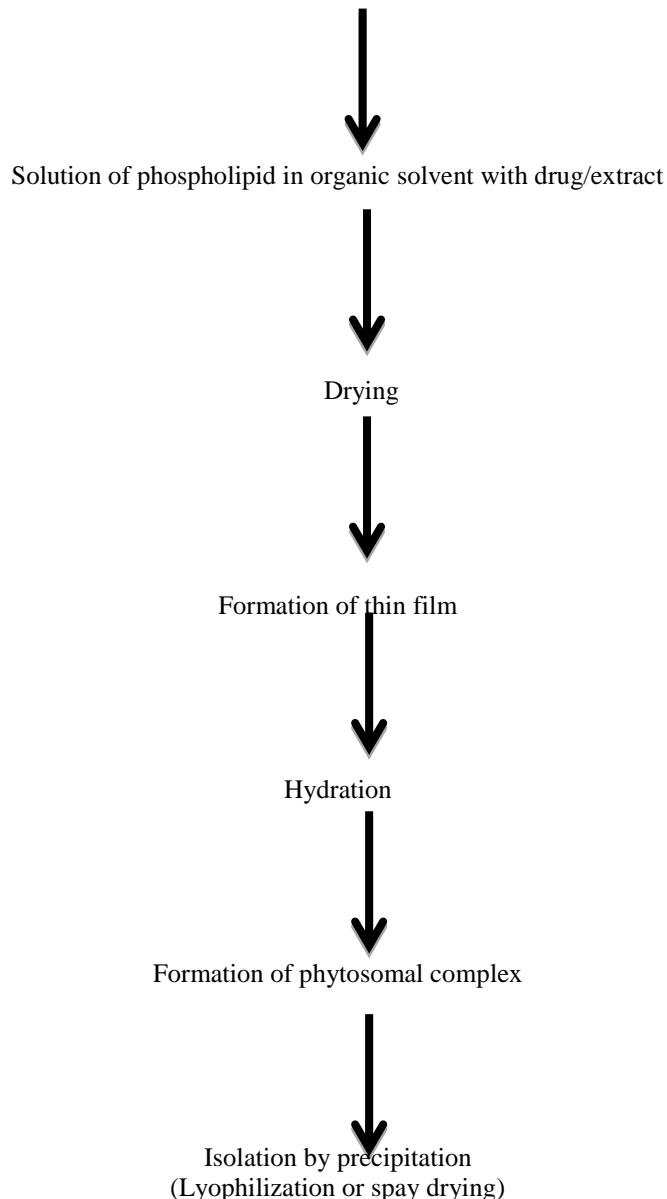
- Nonpolar solvents such as the dioxane, methylene, chloride, acetone and ethyl acetate which are used for production of the phytosomes.
- They proved proper interactions between phospholipids and polyphenols.

Preparation of Phytosomes:

- Phytosomes are prepared by complexing the polyphenolicphytoconstituents in the ratio of 1:2 or 1:1 with the phosphatidylcholine.
- They are prepared through the attachment of individual ingredients of herbal extracts to phosphatidylcholine.
- In this Preparation the soxhlet apparatus is used.

Preparation of Methods:

Phospholipid is dissolved in organic solvent containing drug/extract (1:1)



Properties of Phytosomes:

Biological Properties:

- Phytosomes are advanced forms of herbal products that are better absorbed, utilized and as a result produce better results than conventional herbal extracts.
- Freely soluble in non-polar and aprotic solvent Solvents in which the hydrophilic moiety is not present.
- Moderately soluble in fats.
- Insoluble in water.

Chemical Properties:

- Phytosome is a complex between natural product and natural phospholipid.
- The phytosome complex is obtained by reaction of suitable amount of phospholipid and the substrate in appropriate solvent such as glycerol.
- The main phospholipid-substrate interaction is due to formation of hydrogen bonds between polar head of phospholipid and polar functionalities of substrate.

- When treated with water, they assume a micelle shape, forming structures which resembles liposomes.

Application of Phytosomes:

Silymarin Phytosome:

- Most of the phytosomes are focused to Silybummarianum which contains premier liver-protectant flavonoids.
- The fruit of the milk thistle plant (*S. marianum*, Family Steraceae) contains flavonoids known for hepato-protective effects.
- Silymarin has been shown to have positive effects in treating liver diseases of various kinds, including hepatitis, cirrhosis, fatty infiltration of the liver (chemical and alcohol induced fatty liver) and inflammation of the bile duct, Silymarin Phytosome

Phytosomes of grape seed:

- Grape seed phytosome is composed of oligomeric polyphenols of varying molecular size complexed with phospholipids.
- The main properties of procyanidin flavonoids of grape seed are an increase in total antioxidant capacity and stimulation of physiological defenses of plasma.

Evaluation:

1. Entrapment efficiency
2. Vesicle size
3. Surface tension activity measurement
4. Spectroscopic evaluation

Transition temperature:

The transition temperature of the vesicular lipid system can be settled via differential scanning calorimetry.

Entrapment efficiency:

The entrapment efficiency of a phytosomal preparation can be determined by exposing the preparation to ultracentrifugation method.

Vesicle size and zeta potential:

The particle size and zeta potential at phytosomes can be confirmed by dynamic light scattering, which uses a computerized examination system and photon correlation spectroscopy.

Surface tension activity measurement:

The surface tension activity of the drug in aqueous solution can be determined by the Du Nouy ring tensiometer.

II. CONCLUSION:

Regarding usefulness of phytosomes in novel drug delivery systems. They have many distinctive advantages over other conventional formulations.

The formulation methodology for phytosome is simple and can be easily upgraded to a commercial scale. The characterization methodologies and analytical techniques are well established for this type of novel formulation. It has a great future for use in formulation technology hydrophilic plant compounds.

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