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Phytosome : As an Nanotechnology and Improve Bioavability

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Abstract: "Phyto" means plant and "some" means something like a cell. The pharmacokinetic and pharmacodynamic properties of phospholipid complexes are superior to traditional herbal extracts [1].Phospholipid complexes are also known as new drugs with lipophilic complexes consisting of glycerophospholipids obtained from different plants. Phytosomes are used in phytomedicine, herbal medicines and Ayurvedic formulations [2].It is also called Herbosome, which is a new patented technology. Phytosome or Herbosome technology increases the hydrophilicity of highly lipophilic drugs, making them suitable for drug delivery and increases the lipophilicity of hydrophilic botanical components [3].Phytosomes are usually prepared by reacting one or two moles of polyphenolic plant components with phospholipids. T. There are many products on the market containing herbal medicine such as ginkgo biloba, milk thistle and tea tree. This review describes the latest definitions of the classification, its types, characteristics and features [4].This article discusses the physicochemical and pharmacological properties and structures of phospholipids [5].Phospholipids have dual solubility and act as emulsifiers. Phospholiposomal technology can serve as a bridge between new and traditional delivery systems [6]. Phospholipomas are a new drug delivery method based on phytochemistry. In addition to improving the processing of many plant compounds, they also have better absorption and higher bioavailability [7]. Plant ingredients have been used in medicine since ancient times due to their pharmacological effects [8].

***Index Terms*- Phytosomes, liposomes, bioavailability, new drug delivery systems (NDDS), phospholipids, plant ingredients**

I. INTRODUCTION :

New drug delivery technologies may increase bioavailability. Phospholipomas are produced by combining plants or their ingredients with phospholipids [1]. Phospholipomas refer to herbs packaged in vesicles and delivered in nano form. The phospholipid complex provides a layer-like envelope around the active ingredients of the drug, so that the main components of the plant are safe from damage caused by digestive rice and bacteria. Phospholipid complexes can be effectively absorbed from the hydrophilic environment of the cell membrane to the lipophilic environment and eventually reach the blood circulation. The current review shows the future and new technologies in the field of NDDS to get better results from herbs and herbs [2]Most bioactive compounds of plants are polar or water-soluble, but absorption problems limit the use of such compounds, ultimately reducing bioavailability [3].Phospholipid complexes are formed as a result of the interaction of phospholipids (natural or synthetic) with certain plants in the presence of suitable solvents, and due to their physical and chemical activities, plant complexes can be considered as a separate entity [4].

The phospholipid complex is a complex of lipid-containing molecules, a small cell-like structure composed of "phyto" (meaning plant) and "some" (meaning cell-like). The technology involves incorporating phospholipids into formulations to increase their absorption and bioavailability. Compared with simple herbs, plant extracts are easier to use and have a higher ability to cross the lipid-rich system and eventually reach the blood vessels [5].

II. HISTORY OF PHYTOSOME:

Bombardelli first created vegetata in Milan in 1991. They have been called "phytovesicles", "phytophospholipid complexes" and "phytosomes" in many publications. Phospholipids (phosphatidylcholine, phosphatidylserine, etc.) [1] Phospholipid complex, milk thistle, ginkgo, fruit, green tea, hawthorn, ginseng, etc. It is used in many plants including. Phospholipid complexes play an important role in health by giving phospholipids their respective functions. Phospholipid complexes show better pharmacokinetic and pharmacodynamic properties than traditional herbal medicines (1).

[6] Many studies are ongoing, and the most important findings show that phospholipid complex technology is a new technology that can increase the adsorption and bioavailability of plants while reducing the adsorption and bioavailability of plant extracts. Dosage is important. Mati and colleagues developed a quercetin phospholipid complex with potent antioxidant and anti-inflammatory properties that provides better treatment against tetrachloride-induced liver damage in rats. Recently, the plant has been found to have a better curative value in cancer than ordinary plant extract [2].

III.PROPERTIES OF PHYTOSOME :

1. Biological properties:
   a) Phytosomes increase the total bioavailability and active absorption of the active drug when used orally.
   b) Phospholipid complexes have better pharmacokinetic properties than herbal medicines [3].
   c) They are herbal products that are more effective than traditional herbal medicines [4].
2. Physiochemical properties :
   a) The size of the phospholipid complex varies from 50 nm to hundreds of µm.
   b) When the phospholipid complex is exposed to water, it turns into a micellar structure and forms a liposome-like structure.
   c) Most phospholipid complex substances are freely soluble in aprotic solvents, slightly soluble in oil and insoluble in water [1].
   d) The Phospholipid complex is a complex of natural phospholipids (such as bean phospholipids) and natural products. This complex is formed by reacting standardized herbal extracts in appropriate weight with stoichiometric amounts of phospholipids as substrates [4].

IV.ADVANTAGES:

a) Phospholipid complexes are more stable due to strong chemical bonds with lipids.
b) The Phospholipid complex increases skin absorption due to the lipid layer.
c) The vesicle system is passive and non-invasive [5].
d) It increases the absorption of herbal components, thus increasing bioavailability [9].
e) It allows drugs to reach various tissues.
f) Small doses can be taken due to better absorption of the active ingredients.
g) It is easy to structure and there is no problem in encapsulating the drug.
h) Phospholipid complexes are more effective than liposomes in skin care products.
i) Phospholipid complexes are useful in treatment.
j) It improves liver function by increasing the solubility of bile [5].
k) The product has a large market.
l) The production process of the plant body is simple [1].

V. STRUCTURE OF PHYTOSOME :

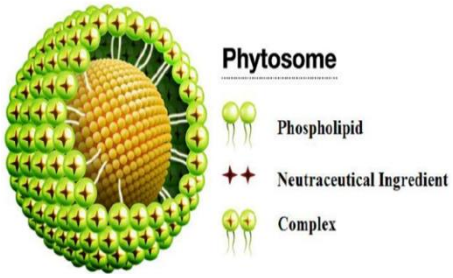

Figure 1: Structure of phytosome

VI. FORMULATION COMPONENTS:

Plant phospholipid complexes can be formed by reacting phospholipids with substances of plant origin. Four components are required for the production of herbal products.

1) Phospholipids

2) Plant materials

3) Solvents

4) The relationship between the products involved in the plant process is also

1) Phospholipids

Egg yolk and plant seeds are the most abundant sources of phospholipids. Phospholipids are produced commercially. Phospholipids are classified as glycerophospholipids or sphingomyelin based on their main chain structure. The main phospholipids used in the production of complexes with a hydrophilic head group and two hydrophobic hydrocarbon chains are phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl serine, phosphatidic acid, phosphatidyl inositol and phospholipid. The most frequently used phospholipid in the formation of phospholipid complexes is phosphatidylcholine. One of the advantages of using phosphatidylcholine is its moderate solubility in aqueous and lipid environments due to its amphipathic structure Element for the production of complexes with a hydrophilic head group and two hydrophobic hydrocarbon chains. Phospholipids are phosphatidyl choline, phosphatidyl, ethanol phosphatidyl ethanol. phosphatidic acid, phosphatidyl inositol and phospholipid glycerol. The most frequently used phospholipid in the formation of phospholipid complexes is phosphatidylcholine. One of the advantages of using phosphatidylcholine is its moderate solubility in aqueous and lipid environments due to its amphipathic nature.

2) Phyto-active constituents

Researchers often select botanical active substances based on significant in vitro rather than in vivo pharmacological effects. Flavonoids make up the majority of these compounds. Quercetin, catechins, and silibinin are water-soluble flavonoids found in plants that prefer the aqueous phase and cannot penetrate biofilms. Curcumin and routine are lipophilic flavonoid compounds that are insoluble in aqueous gastrointestinal fluid.

Phytosome complexes in the aqueous phase will increase the water solubility of lipophilic flavonoids and membrane permeability of hydrophilic flavonoids.

3) Solvents

To create plants, some scientists use different solvents as reactions. Aromatic hydrocarbons, halogen derivatives, methylene chloride, ethyl acetate, and cyclic ethers have been used as plant phospholipid complexes in the past, but they have been largely replaced by solvents such as ethanol. In fact, protic solvents such as ethanol and methanol have recently been successfully used to form phospholipid complexes. Polyphenols and phospholipids can interact with these solvents [23]. Many different types of solvents have been studied. Ethanol can be a useful and popular solvent because it emits less and causes less damage.

Supercritical fluids (usually CO2) are used as disinfectants to reduce the solubility of the solute in the solvent.

4) Stoichiometric ratio of active constituents and phospholipids

In general, plant phospholipid complexes are formed by reacting synthetic or natural phospholipids with active ingredients in a molar ratio of 0.5 to 2.0. In contrast, the stoichiometric ratio of 1:1 is considered the best way to create phytocomplexes because it allows a greater interaction between the two elements because there is the same amount of product using the substrate and phospholipids, making it more soluble .

VII. COMPARISON BETWEEN PHYTOSOME AND LIPOSOM :

Extensive studies on implanted liposomes have shown that implanted liposomes have better bioavailability, absorption, and recovery than liposomes. A comparison of phytosomes and liposomes and their structures is shown in Table 1 Figure. 2[6]

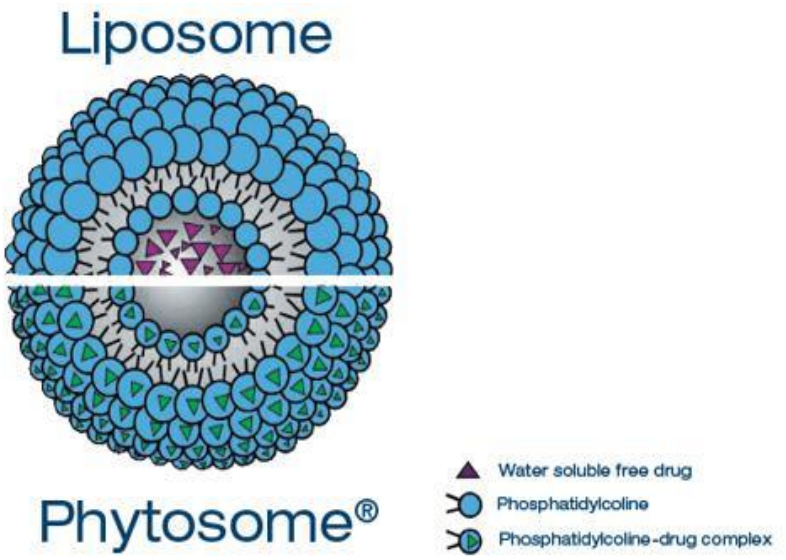

Figure 2: Comparison between liposome and phytosome

Table 1 Comparison between phytosomes and liposomes

Sr. No	Properties	Phytosome	Liposome
1	Bonding	Associated with few molecule (mainly with Phospholipid and polyphenol extract)	Number of molecules and even they are not connected well
2	Oral drug delivery	Best for oral delivery	connected well poor oral bioavailability.
3	Phospholipid ratio	Preferably 1:1, 1:2 ratio is preferred for its preparation.	Lipid ration is increased up to 10 times than the chief active constituents

VIII. DOSAGE FORMS :

Phospholipid complexes can be formulated for oral and topical application. Depending on the ability to increase the effectiveness and performance of bioactive compounds, formulations or dosage forms suitable for distribution in the plant body can be selected.

a) Tablets

Dry granulation is considered the best manufacturing process to obtain tablets with high quality, biopharmaceutical properties and appropriate equipment. On the other hand, wet granulation should be avoided due to the negative effects of water and heat (granulation/drying) on the stability of phospholipid complexes. For example: Leucoselect® Phytosome.

b) Soft gelatin capsules

Soft gelatin capsules are considered the best medicine for the production of plant-based complexes. The plant stem complex is dispersed in an oily vehicle to obtain a suspension for filling soft gelatin capsules. Vegetable or semi-synthetic oils can be used for this purpose. For example: Ginkgoselect Phytosome.

c) Hard capsules gelatin

Phytosome Complex can also be produced in hard gelatin capsules. Although the visibility of the liquid phytosome has been demonstrated, the capsule can be used (without pre-compression), which can be placed inside the capsule. Example: Ginkgoselect® Phytosome.

d) Topical dosage forms

Phytogenic complexes can produce cosmetics. The best method to incorporate phytosome complexes into emulsions is to disperse the phospholipid complexes in a small amount in the lipid phase and add them to the preformed emulsion at a low temperature (above 40 °C). Lipid is used in cosmetics. Examples: Glycyrrhetinic acid Phytosome® and Escin/ßSytosterol Phytosome[1].

IX. CONCLUSION :

Phospholipid Complex is an innovative, published version of the phospholipid system that is better absorbed than herbal supplements. Therefore, this article reviews the history, physical and chemical properties, quality, structure and comparison of phytosomes and liposomes. compound stability. Therefore, this article will be useful for students, new teachers, and Lerner et al. The history, nature and values of this exhibition are presented in a simple and understandable language.

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