

Phytosomes

The term “Phyto” means plant and “some” means cell. It is also mentioned as herbosomes.

The phytosome or Herbosome technique increases the hydrophilicity of highly lipophilic drug there by making it suitable for drug delivery and increases the lipophilicity of hydrophilic phytoconstituents adequately to cross biological membrane. The topical application of phytosomes for cosmetic purpose has already been proven. This review also contains a comparative account of liposomes and phytosomes along with recent advancements in the field of phytosome technology with a special concern to transdermal drug delivery. The poor oral bioavailability of polyphenolic compound can be enhanced through the incorporation of them into phospholipid based self-assembled delivery system, i.e. popularly known as phytosome. There are number of products available in the market that contains phytosomal drug delivery system such as Ginkgo biloba, Silybum marianum, and Camellia sinensis. 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

Phytosomes 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

Advantages

- Small dose is required, as absorption is increased manifold.
- Phytosomes possess better drug entrapment efficiency.
- Phosphatidylcholine is not merely a carrier; it is also having hepatoprotective activity and nutritional value.
- Due to formation of chemical bonds, phytosomes show better stability profile.

- Phytosomes can be used for systemic targeting of herbal drugs, as phytosome can easily transit from hydrophilic environment into the lipid friendly environment of the enterocyte cell membrane and from there to into the cell.
- Cosmetic and other topical use of phytoconstituents can be done by phytosome formulations

Properties of phytosomes

1. Physico-chemical properties: As previously discussed, phytosomes are prepared by reaction of stoichiometric amount of phospholipid with the standardized plant extract as substrate. The spectroscopic data reveals that the phospholipid- substrate interaction is due to the formation of hydrogen bond between the polar head (i.e., phosphate and ammonium group) and the polar functionalities of the substrate.

The size of phytosome varies from 50 nm to a few 100 μm .

Phytosomes when treated with water, they assume a micellar shape resembling liposome and Photon Correlation Spectroscopy (PCS) reveals these liposomal structures acquired by Phytosomes.

From the ^1H NMR and ^{13}C NMR data, it can be deduced that the fatty chain gives unchanged signals both in free phospholipid and in the complex, which indicates that long aliphatic chains are wrapped around the active principle, producing lipophilic envelope.

Regarding the solubility of phytosomes, the complexes are often freely soluble in aprotic solvents, moderately soluble in fats, insoluble in water and relatively unstable in alcohol. But the phytosomes of certain lipophilic phytoconstituents like curcumin has shown increased water solubility upon complexation with phospholipids which has been discussed later in this paper [7] [8].

2. Biological properties: Phytosomes are novel complexes which are better absorbed and utilized, hence they produce more bioavailability and better result than the conventional herbal extract or non-complexed extracts, which has been demonstrated by pharmacokinetic studies or by pharmacodynamic tests in experimental animals and in human subjects.

Phytosomes express their behavior in physical or biological system because of their physical size, membrane permeability, percentage entrapment, chemical composition, quantity and purity of the materials used.

The phytosomes should not be confused with liposomes where hydrophilic drug molecules are entrapped within a cavity or spaces between the membranes.

The liposomes may involve several hundred phospholipid molecules for this entrapment and are usually now being used for cosmetic purposes.

Instead, the phytosomes involves interaction of 1- 4 phospholipid molecules with the phytoconstituents which are chemically anchored to each other. Several researches have shown the phytosomes to be a better alternative for liposomes in terms of membrane permeability and stability

Applications

I. Phytosome are use in the handling of liver disease include alcoholic hepatic steatosis, drug induced liver damage and hepatitis.

II. Phytosomes are use in anti-inflammatory action, pharmaceutical and in beauty composition.

III. Phytosomes are used to treat acute and chronic liver disease of toxic metabolic or infective source or of degenerative environment.

IV. Phytosomes are used as brain stimulant, immunomodulator ,skin improver, antiwrinkle, anti-aging etc.

V. They are used as anticancer and antioxidant, eg- grape seed.

VI. They are used in hyperlipidemia, vein and skin disorder.

VII. They are used as cancer chemo preventive agent and use to care of benign prostate hyperplasia.

VIII. They are also used to treat hypertension.

Comparison of liposomes and phytosome

Like to phytosomes, a liposome is a combination of hydrophilic material and phosphatidylcholine in a specific ratio, with a water soluble substance is bounded by phosphatidylcholine molecule. In comparison, phytosomes is a combination of water soluble entity and phosphatidylcholine produced in the ratio of 1:1 or 2:1 molecular complex with chemical bonding between phytoconstituents and phosphatidylcholine. Phytosome have proved to be efficient in topical and skin care products than liposomes