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A REVIEW ON HERBOSOME

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ABSTRACT

Novel drug delivery system is a novel approach to drug delivery that addresses the limitations of the traditional drug delivery systems. The objective of this review is to focus on the application of herbosome technology along with its preparation, various properties, and characterization. It is a novel technique in herbal drug technology that removes the limitations of traditional drug delivery systems and enhances the bioavailability of herbal extracts. They are produced by a process whereby the standardized plant extract or its constituents are bound to phospholipids, mainly phosphatidylcholine producing a lipid compatible molecular complex. This article overviews about herbosome technology, recent advance, their application for various standardized herbal extracts and aims to provide complete scientific information, characterization about herbosomes as a promising drug delivery system.

KEYWORDS: Herbosomes, Novel drug delivery, Phosphatidylcholine.

INTRODUCTION

Novel drug delivery systems not only reduce the repeated administration to overcome non-compliance, but also help to increase the therapeutic value by reducing toxicity and increasing the bioavailability and so on. Recently, pharmaceutical scientists have shifted their focus to designing a drug delivery system for herbal medicines using a scientific approach the novel drug delivery technology is applied in herbal medicine; it may help in increasing the efficacy and reducing the side effects of various herbal compounds and herbs. This is the basic idea behind incorporating novel method of drug delivery in herbal medicines.

In topical drug delivery, the skin is one of the main and accessible organs on the human body. Stratum corneum forms a major penetration barrier to penetrate the drugs into and through the skin. However, this layer makes selective towards the delivery system. A key aspect of topical drug delivery is to make skin as a target organ for diagnosis and treatment.[1]

Herbosomes

Herbosome is the novel emerging technique applied to phyto-pharmaceuticals for the enhancement of bioavailability of herbal extract for medicinal applications. The goal of this review study is that Herbosome have improved pharmacokinetics and pharmacological parameter, which in result can advantageously be used in treatment of various acute diseases as more amount of constituent present at the site of action.

The term "Herbo" means plant while "some" means cell-like. Most of the biologically active constituents of plants are polar or water soluble molecules. However, water soluble phytoconstituents (flavonoids, tannins, glycosides) are poorly absorbed either due to their large molecular size which cannot absorb by passive diffusion or due to their poor lipid solubility, severely limiting their ability to pass across the lipid rich biological membrane, resulting poor bioavailability when taken orally or applied topically.[2] Also isolation and purification of individual components from whole herbal extract lead to partial or total loss of therapeutic activity, the natural synergy become lost which is due to chemically related constituents in herbal extract. The effectiveness of any herbal product (or medication) is dependent upon delivering an effective level of the active compounds.

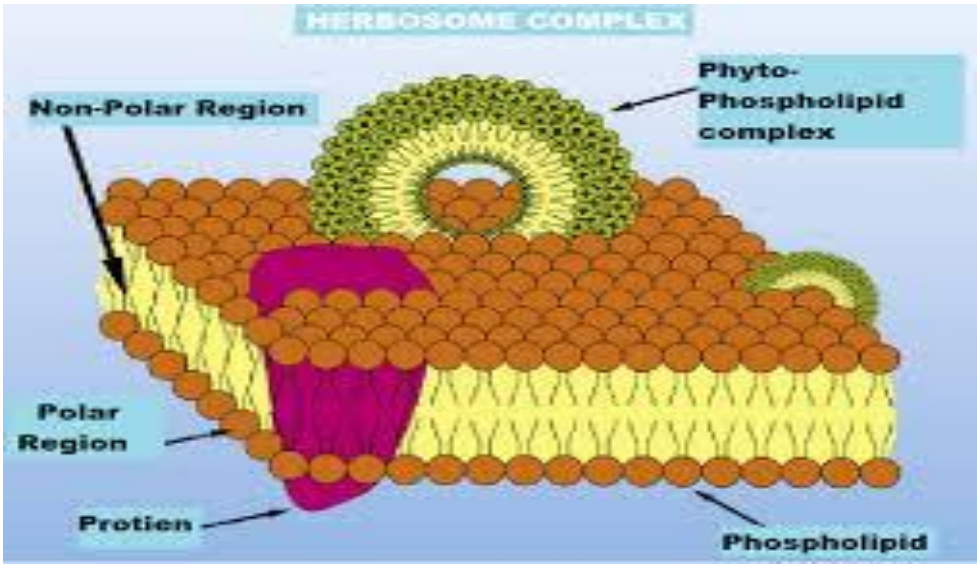

Fig. 1: Mechanism of herbosome loaded complex.

Herbosomes are complex between a natural phytoconstituents and natural phospholipids, like soy phospholipids mostly phosphatidylcholine. These complex results from the reaction of stoichiometric amounts of phospholipids with the phytoconstituents in an aprotic solvent. The ideal process to incorporate the herbosome complex in emulsion is to disperse the phospholipidic complex in a small amount of the lipidic phase and add it to the already created emulsion at low temperatures (not higher than 40 °C).[3] Herbosomes can accommodates the active principle that is anchored to the polar head of the phospholipids, which finally becomes an integral part of the membrane.

Herbosomesare advanced form of herbal drugs which are better absorbed, utilized and which finally leads to better results than conventional dosage form. The increased bioavailability has been demonstrated by the pharmacokinetic studies as well as by pharmacokinetic tests in experimental animals and human subjects.

Formulation of herbosome

Phytosome complexes are often developed each orally and locally. so as to get the most effective performances of this technological innovation each in terms of formulating manageable and increased bioavailability (as acceptable disintegration and dissolution time of oral forms, for instance).

Soft gelatin capsules[4]

The phytosome are often spread in oily vehicles (vegetable or semi-synthetic oil) to get suspension to be stuffed in soft gelatin capsules. Soft gelatin capsules represent a perfect answer to formulate herbosome complexes. The Herbosome composition are often spread in oily vehicles to get suspensions to be stuffed in soft gelatin capsules. Vegetable or semi-synthetic oils are often using by this purpose. Indena mentioned a granulometry of 100% <200 μm to best perform capsule production. According to Indena's knowledge, not all the herbosome complexes behave within the same manner once spread in oily vehicles and once the oily suspension is stuffed within the soft gelatin capsules; for this reasons preliminary practicableness trials ought to be performed to pick out the foremost appropriate vehicle.

- Garlic soft gel capsules 500 mg are accessible within the market and given by oral route.
- Curcumine soft gelatin 500 mg capsules are given by oral route.

Hard gelatin capsules[5]

The herbosome composition are often developed in laborious gelatin capsules yet an direct volumetric filling method (without precompression) are often applied, if the apparently small density of the herbosome composition looks to limit the utmost quantity of powder that may be stuffed into a capsule (usually less than 300 mg for a size 0 capsule).With a piston amp capsule filling method, however, it is attainable to extend the number of powder which might be stuffed in an capsule, however pre compression would possibly have an effect on the disintegration time. Indena mentioned the cautionary monitor the connected parameters throughout product/ method development. A preliminary dry granulation method is recommended outline the most effective producing process

- Ashwagandha laborious gelatin capsules 500 mg are given by oral route.
- Neem hard gelatin capsules 250 mg are given by oral route.

Tablets[6]

Dry granulation represents the perfect producing method to get tablets with higher unitary doses and with appropriate technological and biopharmaceutical properties. However, thanks to the restricted flow ability, potential gumminess and low apparent density of the Phytosome. complex, an direct compression method are often applied just for low unitary doses; note that whenever an direct compression method is applied, the herbosome composition ought to be diluted with 60-70% of excipients to optimize its technological properties and to get tablets with acceptable technological and biopharmaceutical characteristics. On the another hand, wet granulation ought to be avoided thanks to the negative result of water and warmness (granulation/ drying) on the constancy of the lipoid complex.

- Carica papaya Phytosomal tablets 500 mg are given by oral route.
- Shatavari pill 250 mg are given by oral route.
- Neem tablet 300 mg are given by oral route.

Topical dosage forms[7]

The herbosome composition are often developed locally yet the perfect method to include the herbosome composition in emulsion is to disperse the phospholipidic composition in an less quantity of the lipidic part and add it to the already created emulsion at low temperatures (not over 40°C). The herbosome complexes are dispersible within the main lipidic solvents used in topical formulations. just in case of formulations containing a restricted quantity of lipids,

the herbosome complicated may additionally by spread into the watery part, and once more further to the ultimate formulation at temperature less than 40°C.numerous kinds of phytosome are applied locally like Curcuma longa physomes, Mitomycine phytosome ashwagandha Phytosomes ginger Phytosomes.

Methods of herbosome preparation

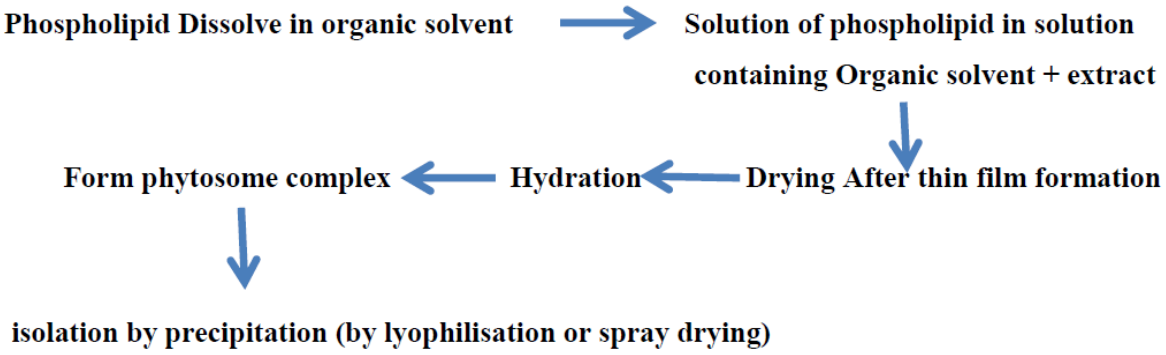

Fig. 2: Method of preparation of herbosomes.

Anti-Solvent precipitation technique

The particular quantity of plant extract and lipid were taken into a 100 ml spherical bottom flask and refluxed with 20 ml of methylene chloride at a temperature not prodigious 60°C for 2 h. The mixture is focused to 5-10 ml. Hexane (20 ml) was added carefully Hexane with continuous stirring to become the precipitate that was filtered and picked up and keep in desiccators long. The dried precipitate is crushed during a mortar and sieved through #100 meshes pulverized complicated was placed in an amber coloured glass bottle and keep at temperature.

Rotary evaporation technique

The specific amount of plant material and phospholipid were dissolved in 30 ml of tetrahydrofuran in a rotary round bottom flask followed by stirring for 3 hours* at a temperature not exceeding 40°C. Thin film of the sample was obtained to which n-hexane was added and continuously stirred using a magnetic stirrer. The precipitate obtained was collected, placed in an amber colored glass bottle and stored at room temperature.

Solvent evaporation technique

The specific quantity of herbal material and phospholipids were taken into a 100 ml spherical bottom flask and refluxed with 20 ml of dissolvent at a temperature 50-60°C for 2h. The mixture is focused to 5-10 ml to get the precipitate that was filtered and picked up. The dried

precipitate Herbosome complicated was placed in an amber coloured glass bottle and keep at temperature.

Ethanol-Injection technique

In this technique, the drug-lipid complicated is dissolved in an organic solvent. This mixture is then slowly injected into a heated aqueous compound agent, leading to the formation of vesicles. The state of amphiphiles depends on concentration. once the concentration is a smaller amount, amphiphiles introduce a chemical compound state however because the concentration is accumulated, style of structures could also be fashioned, that is, round, cylindrical, disc, cubic, or polygonal shape.[8]

Characterisation of herbosome

Physical attributes

The following are the characterization techniques used for Phytosomes in characterizing its physical attributes.

Visualization

Visualization of phytosomes can be achieved using transmission electron microscopy (TEM) provides the details about the internal composition and can show many characteristics of the phytosomes, such as morphology, crystallization, stress or even magnetic domains. Scanning electron microscopy (SEM) focuses on the phytosomes surface and its composition provides morphological details.

Particle size and zeta potential

The particle size and zeta potential can be determined by dynamic light scattering (DLS) using a computerized inspection system and photon correlation spectroscopy (PCS).

Entrapment efficiency

The entrapment efficiency, capability of the drug to be entrapped in phytosomes can be measured by the ultracentrifugation technique. It gives an idea about the % drug that is successfully entrapped into the phytosomes.

Transition temperature

The transition temperature of the vesicular lipid systems can be determined by differential scanning calorimetry.

Surface tension activity measurement

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

Vesicle stability

The stability of vesicles can be determined by assessing the size and structure of the vesicles over time. The mean size is measured by DLS and structural changes are monitored by TEM.

Drug content

The amount of drug can be quantified by a modified high performance liquid chromatographic method or by a suitable spectroscopic method.

Spectroscopic evaluation

The spectroscopic evaluations are widely employed in order to confirm the formation of complex between phytoconstituents and the phospholipids moiety as well as to study the corresponding interaction between the two.

^{1}H-NMR

The complex formation between the active phytoconstituents and the phosphatidylcholine molecule can be estimated by this method.

^{13}C-NMR

In the ^{13}C-NMR of the phytoconstituents and the stoichiometric complex with the phosphatidylcholine when recorded the phytoconstituents carbons were invisible. The signals corresponding to the glycerol and choline portion are broadened and some are shifted, while most of the resonance of the fatty acid chains retains their original sharp line shape.

FTIR

The formation of the complex can be confirmed by IR spectroscopy, comparing the spectrum of the complex with the spectrum of the individual components and their mechanical mixtures. FTIR spectroscopy is also a useful tool for the control of the stability of phytosomes when micro-dispersed in water or when incorporated in very simple cosmetic gels. From a practical point of view, the stability can be confirmed by comparing the spectrum of the complex in solid form (herbosomes) with the spectrum of its microdispersion in water after lyophilization, at different times.

In vitro and in vivo evaluations

Models of in vitro and in vivo evaluations are selected on the basis of the expected therapeutic activity of the biologically active phytoconstituents present in the herbosomes.[9,10]

CONCLUSION

Herbosomes are an advanced form of herbal extract that are absorbed better than conventional herbal extract. Herbosome is the novel emerging technique applied to phyto-pharmaceuticals for the enhancement of bioavailability of herbal extract for medicinal applications. The formulation methodology for phytosome is simple and can be easily upgraded to a commercial scale. Also, phytosomes are superior to liposomes due to much better absorption and stability profile. After screening and selection of herbal extracts, one can develop Phytosomal drug delivery systems for various drug categories like antiacne, antiageing and anti-inflammatory activities, etc. Herbosome offers a great future by providing permission in the design of oral and topical drug delivery systems.

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