

Phytosomal Nanotechnology Platform for the Topical Delivery of Bioactive Phytochemicals

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Abstract: Review of Phytosome of Herbal drug deals in Novel Drug Delivery System because of its easy bioavailability, less side effect and cost effectiveness. Much herbal medication can be use in the form of Phytosome which is better in absorption. Skin disorders, skin ageing and skin pigmentation and diseases may treat through phytosome drug delivery. Phytosome is cell like structure complexes with Phosphatidycholine and can be prepared by many other methods but mostly prepared by 'Solvent Evaporation Method'. This article shows Preparation, approaches of novel drug delivery and evaluation standards for Phytosomes. Phytosomes are the advanced formulations for herbal constituents, as the phytosome quickly absorbed they show better results. There is vast use of Liquorice (mulethi) as a traditional medicine in cosmetic products to treat the skin disorders. In this article there is an overview about chemical constituents and pharmacological actions of Glycyrrhiza glabra linn. (Family – Fabaceae). it is also known as Yashti Madhu.

Keywords: Phytosome, Novel Drug delivery system, skin disorder, Liquorice

1. Introduction

Phytosome can be simply described by these two terms, first is "Phyto" i. e. Plant and second is "Some" i. e. Structure like cell.

Phytosome prepared by combining Polyphenolic phytoconstituents with phosphatidycholine.

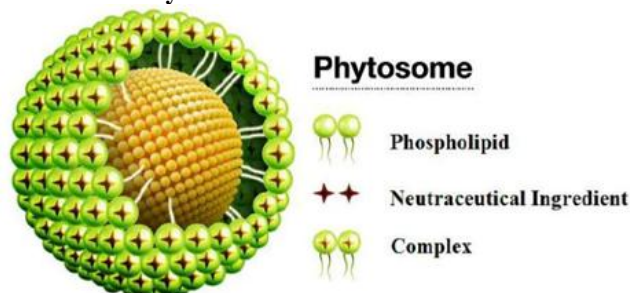
The aim to design phytosome due to its better absorption and thus produce better bioavailability.

Liquorice has vast medicinal use in the treatment of skin disorder, depigmentation and use as antifungal, anti-inflammatory, antioxidant, anti ageing.

For use in cosmetic industry, Glycyrrhiza glabra found as an anti ageing, antioxidant and skin depigmentation agent which is which can be incorporated in cosmetic products for topical use but after removal the flavouring constituent from it.

Glycyrrhiza glabra contains phenolic compounds (flavonoids) which are effective to protect biological system against oxidative tensity.

Structure of Phytosome:-



Advantage of Phytosome-

- There is improvement in absorption so the dose frequency is reduced.
- In the preparation of phytosome, phosphatidycholine is used, which also act as hepatoprotective.
- Phospholipid contains much type of nutritional benefits.
- In skincare products phytosome is superior than liposome.
- Phytosome have high entrapment efficiency, they properly permeate to the skin.
- They are simple to manufacture in relation to other preparation and there is no requirement of complicated technical investment.

Disadvantage of Phytosome-

- Phytoconstituents are easily abolished from the phytosomes.
- There is stability problem in phytosome.

2. Method of preparation of phytosome

1) Solvent evaporation method

The solvent evaporation methods involve integration of the phytoconstituents and phosphatidycholine in a flask containing organic solvent. This reaction mixture is kept at an optimum temperature usually 40°C for specific interval of 1 hr to achieve maximum drug entrapment within the phytosomes formed. Thin film phytosomes are separated by 100 mesh sieves and stored in desiccators for overnight.

2) Mechanical Dispersion method

In the experiments, the lipids dissolved in organic solvent are brought be in contact with aqueous phase containing the drug. The next removal of the organic solvent under reduced pressure results in the formation of Phyto phospholipid complex.

3) Salting out technique

An important method of phytosome preparation that done by dissolving both Phosphatidycholine and the plant extract during a suitable organic solvent then n-hexane was added until the extract Phospholipid complex precipitation occurs.

4) Lyophilization Methods

In lyophilization technique Diosmin was dissolved in Dimethyl Sulphoxide. The resulting solution (2.5% weight/volume) was added to Soyphosphatidycholine dissolved in t-butyl alcohol (1.5% weight/volume) followed by stirring for 3 hours on a magnetic stirrer until complex formation. The complex was then isolated by lyophilization.

Table 1

S. N.	Commercial Products	Active Constituent	Pharmaceutical Use
1.	Green tea Phytosome	epigallocatechin	Antioxidant effect improved health and well being
2.	Grape seed Phytosome	Procyanidins	Natural Antioxidant protection
3.	Milk thistle Phytosome	silybin	Antioxidant and stimulate the formation of new liver cell
4.	Ginseng Phytosome	ginsenosides	Provide adaptogenic function and resistance to stress, Nutraceutical
5.	Silybin Phytosome	Silybin	Food product, antioxidant for liver and skin
6.	Centella Phytosome	terpenes	Treat Vein and skin Disorder
7.	Ginselect Phytosome	Panax ginseng	Skin tightner, tonic
8.	Bilberry Phytosome	anthocyanosides	Potent antioxidants, reduce abnormal blood vessel
9.	Olive oil Phytosome	polyphenols	Anti inflammatory, Anti hyperlipidemic
10.	Palmetto berries Phytosome	Fatty acid, sterols	Non cancerous prostate enlargement

Application of Phytosome:-

- 1) Phytosome enhances the Bioavailability of drug.
- 2) Delivery of large drug eg. Peptides and proteins can be easy.
- 3) Phytosome have safe composition of drug.
- 4) They are 'Hepato-Protective'.
- 5) Approved for cosmetic and pharmaceutical applications.
- 6) Phytosomes have Low-risk profile.
- 7) They also have high market attraction.
- 8) Liquorice used as phytosomal form then they show more skin benefit in skin eruption.
- 9) Liquorice contains flavonoids (licochalcone, glabridine, lococoumarin) which act as antioxidant on skin.

References

- [1] **Sarita Karole, Girendra Kumar Gautam, Shailesh Gupta (2019)**, Preparation and evaluation of phytosomes containing ethanolic extract of leaves of *Bombax ceiba* for hepatoprotective activity, The Pharma Innovative Journal, ISSN (E) 2277-7695 ISSN (P) 2349-8242
- [2] **Mei Lu, Qiuju Qiu (2018)**, Phyto-phospholipid complexes (phytosomes): A novel strategy to improve the bioavailability of active constituent, Asian Journal of Pharmaceutical Sciences, ISSN-265-274
- [3] **Patel Amit, Tanwar Y. S., Suman Rakesh, Patel poojan (2013)**, Phytosome: Phytolipid Drug Delivery System for Improving Bioavailability of Herbal Drug, Journal of Pharmaceutical Sciences and Bioscientific Research, ISSN-2271-3681
- [4] **Ashwini S Dhase, Shweta S Saboo (2015)** Preparation and Evaluation of Phytosomes Containing Methanolic Extract of Leaves of *Aegle Marmelos* (Bael), International Journal of PharmTech Research, ISSN: 0974-4304
- [5] **M. Sravanthi, J. Shiva Krishna (2013)**, Phytosomes: a novel drug delivery for herbal extracts, International Journal of Pharmaceutical Sciences & Research, ISSN: 0975-8232
- [6] **Pallav Kaushik Deshpande, Anupam Kumar Pathak, Ragini Gothwal, (2014)** Phytosomes: A Novel Drug Delivery System for Phytoconstituents, journal on new biological reports, ISSN: 2319 – 1104
- [7] **Nitesh S Chauhan, Gowtham Rajan, B. Gopalakrishna**, Phytosomes: Potential phyto-phospholipid carriers for herbal drug delivery, Journal of Pharmacy Research, ISSN: 0974-6943
- [8] **Joseph A. Kareparamban, Pravin H Nikam, Aruna P Jadhav**, phytosome: a novel revolution in herbal drugs, international journal of research in pharmacy and chemistry, ISSN: 2231 2781
- [9] **Om M. Bagade, Arti Khade, Reshma Tathe, Madhuri Dhamale, Mangal Sable**, phytosome: a novel drug delivery system in the middle of improved bioavailability, international journal of pharmaceuticals & drug analysis, ISSN: 2348-8948
- [10] **Rajesh Akki, K. Navya Sri, K. L. Govardhani**, Phytosomes: a novel drug delivery for herbal extracts, Research Journal of life sciences and bioinformatics pharmaceutical and chemical sciences, ISSN: 2454-6348
- [11] **Waghmare Sagar Saudagar, GiramPadamja Sidram**, Development and characterization of Terminalia Arjuna phospholipid complex and its tablet formulation, international journal of life science and pharma research
- [12] **Upase Amar U.1, Bhusnure Omprakash G.**, A review on Phytosome loaded with novel herbal drug and their formulation, standardization and applications, Journal of Drug therapeutics, ISSN: 765-769
- [13] **Devender Sharma, Ankita A. Bhujbale (2018)**, Phytosomes is a Novel Drug Delivery System based herbal formulation: An Review, Pharma Tutor, ISSN: 2347-7881
- [14] **Waleed S. Alharbi, Fahad A. Almughem, (2021)**, Phytosomes as an Emerging Nanotechnology Platform for the Topical Delivery of Bioactive Phytochemicals, Pharmaceutics, ISSN 1309 1475
- [15] **Sanjay Saha, Anupam Sarma**, Phytosome: A Brief Overview, Scholars Academic Journal of Pharmacy (SAJP), ISSN: 2320-4206
- [16] **Rhatih Eka Sasongko, Silvia Surini, Fadlina Chany Saputri**, Formulation and Characterization of Bitter Melon Extract (*Momordica charantia*) Loaded

Phytosomes, A Multifaceted Journal in the field of Natural Products and Pharmacognosy, ISSN 1235-1241

- [17] **Shyam Baboo Prasad, Sonam Bhatia**, Phytosome: Phytoconstituent based lipid derived drug delivery system, Journal of Chemical and Pharmaceutical Research, ISSN: 0975-7384
- [18] **Navneet Nagpal, Manisha Arora, Gaurav Swami**, Designing of a phytosome dosage form with Tecomella undulata as a novel drug delivery for better utilization, Pak. J. Pharm, ISSN 1231-1235
- [19] **Swathi Soman, R. K. Sharma, Varsha Sharma, (2020)**, Phytosomes-A Novel Approach for Herbal Drug Delivery, Journal of Animal Research, 479-485.
- [20] **Yasmiwar Susilawati, Anis Yohana Chaerunisa, Hesti Purwaningsih, (2021)** Phytosome drug delivery system for natural cosmeceutical compounds: Whitening agent and skin antioxidant agent, Journal of Advanced Pharmaceutical Technology & Research.