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# Novel Herbal Drug Delivery System

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**Abstract**

There are several types of novel herbal drug delivery system for example phytosome, liposome, niosomes, proniosome, transfer osomes, ethosomes, nanoparticles microspheres etc. novel approach to drug delivery that drug delivery system is a addresses the limitations of the conventional drug delivery systems if the novel drug delivery system is applied to the herbal medicines ,it could enhance the bioavailabilty, solubility, efficacy, it enhances the stability of drugs, avoids the toxicity , gives protection to the chemical and physical degradation of drug. This is the basic concept behind incorporating novel drug delivery methods into herbal medicines. For example, liposomes act as a potential phytosome, liposome, niosomes, drugs.

## Introduction

Preparations of plants or plant parts are generally utilized in medication since old times. In today's world phytomedicines is widespread in most of the world's population. Herbal drugs are becoming more popular in this present era of world as it is applied to cure diseases enhance the therapeutic effect of drug and reduce the toxicity and side effects of drugs. Novel drug delivery system the name "novel" it indicates the novelty, new form, in this type of system it delivers the drug at predetermined rate and at the appropriate site of action, sustained release, controlled release is achieved 1.The nano carriers should fulfill the two important requirements First is, delivering the drug at predetermined rate over the period of treatment. And second is it should open the active entity of herbal drugs to the desired site of action[2]. The nano carriers for herbal drugs have a possible future for enhancement and dealing with the problems related with herbal medicines. For the enhancement of bioavailability of drug.

## Advantages of herbal drug posses following

Low risk of side effects Mostly herbal drugs are well tolerated by the patient, having fewer unintended consequences and fewer side effects than traditional medicine, and may be safer to use. Effectiveness Herbal drugs are more effective for long-standing health complaints that don't respond well to traditional medicine. One example is the herbs and alternative remedies used to treat arthritis. Vioxx, a well-known prescription drug used to treat arthritis, was recalled due to increased risk of cardiovascular complications. Herbal treatments for arthritis, on the other handle, have lesser side effects. Such treatments include dietary changes like adding simple herbs, eliminating vegetables from the nightshade family and reducing white sugar consumption. Lower cost Cost of herbal drugs is much less than prescription medications. Research, testing, and marketing add considerably to the cost of prescription medicines. Herbs tend to be inexpensive compared to drugs.

## Limitations of herbal drugs Herbal drugs possess following limitation

Not suitable for many diseases Modern medicine treats sudden and serious illnesses and accidents much more effectively than herbal or alternative treatments. An herbalist would not be able to treat serious trauma, such as a broken leg, nor would he be able to heal appendicitis or a heart attack as effectively as a conventional doctor using modern diagnostic tests, surgery, and drugs.

1. Lack of dosage instructions Self-treatment with herbal drugs may consist of many risk factors. Moreover, with no proper direction of doses may lead to overdose.
2. Poison risk associated with wild herbs Consumption of herbal drugs without correct identification of plant use of wrong part of plant may lead to poisoning. Lack of regulation Herbal products are not strictly regulated, consumers may buy inferior quality herbs. The quality of herbal products may vary among batches, brands or manufacturers. This can make it much more difficult to prescribe the proper dose of an herb

## Niosomes

Niosomes are multi-lamellar vesicles formed from nonionic Surfactants cholesterol They are made up of both hydrophobic and hydrophilic moieties, and thus can accommodate drug molecules with a wide range of solubility. Niosome have ability to reduce systemic toxicity by encapsulation of treatment agents and of such agents from the body by slow drug release. Niosomes are similar to liposomes in structure which is having a bilayer It entraps both hydrophobic and lipophilic drugs in aqueous or organic layer. The main difference between the liposome and niosome is about the structure In niosome structure the layer is made up of the non-ionic surfactant and liposome layer is made up of phospholipids.

## Advantages of niosomes

ADVANTAGES OF NIOSOMES

: • Niosomes provide targeted drug delivery system

. • Enhances the bioavailability and skin penetration

. • Improves the therapeutic effect of drugs

. • No special storage and handling of surfactants used in niosomal formulations are required.

• It can be formulated as parenteral, oral, topical routes

. • In niosome water-based suspension is used which offers the huge patient compliance than the oily dosage forms.[8

***Method of preparation of Niosomes***

1. Hand shaking method forms vesicles with greater diameter (0.35-13 nm) compared to the ether injection method (50-1,000 nm). Small-sized niosomes can be produced by Reverse Phase Evaporation (REV) method. Microfluidisation method gives greater uniformity and small-sized vesicles**.**

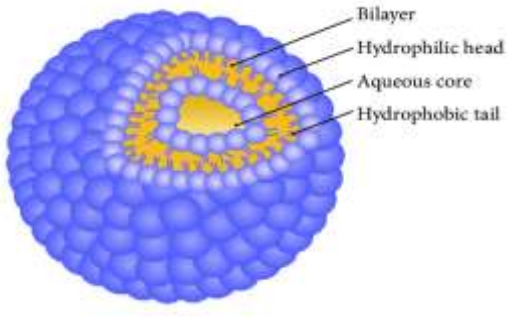
***New method of preparation of niosomes***

2 Formation of Niosome by the Proniosome Method. Proniosomes, also called dry niosomes, are dry-form formulations of the non-ionic surfactant vesicles which can be converted into niosomes after hydration in a short time, and are now widely used in the formulation of niosomes due to their good stability

***How are niosomes made?***

Niosome structures are made on the admixture of surfactant and cholesterol with following hydration in water. The bilayer in niosomes is prepared for a nonionic surfactant with its hydrophilic ends exposed on the outside and inside of the vesicle, while the hydrophobic chains express each other within the bilayer

***Structure of niosomes***




Niosomes are hydrated vesicular systems of nonionic surfactants with phospholipid or cholesterol and deliver drugs to target sites. The lamellar structures of these vesicular systems are fabricated of amphiphilic molecules and surrounded by an aqueous compartment

**Excipients use to formation of niosomes**

| Sl. No. | Nonionic surfactants | Examples |
|---|---|---|
| 1. | **Alkyl ethers** | |
| | a. Alkyl glycerol ethers | Hexadecyldiglycerol ether (C16G2) |
| | b. Polyoxyethylene glycol alkyl ethers (Brij) | Brij 30, Brij 52, Brij 72, Brij 76, Brij 78 |
| 2. | **Alkyl esters** | |
| | a. Sorbitan fatty acid esters (Spans) | Span 20, Span 40, Span 60, Span 80, Span 65,Span 85. |
| | b. Polyoxyethylenesorbitan fatty acid esters (Tweens) | Tween 20, Tween 40, Tween 60, Tween 80,Tween 65, Tween 85 |
| 3. | **Alkyl amides** | |
| | a. Glycosides | C-Glycoside derivative surfactant |
| | b. Alkyl polyglucosides | Octyl-decylpolyglucoside (OrCG110), decylpolyglucoside (OrNS10) |
| 4. | **Fatty alcohols or fatty acids** | |
| | a. Fatty alcohols | Stearyl alcohol, cetyl alcohol, myristyl alcohols |
| | b. Fatty acids | Stearic acid, palmitic acid, myristic acid |
| 5. | **Block copolymer** | |
| | a. Pluronic | Pluronic L64, Pluronic 105 |
| 6. | **Lipidic components** | |
| | Cholesterol and l-α-Soya phosphatidyl choline | |
| 7. | **Charged molecule** | |
| | a. Negative charge | Diacetyl phosphate, phosphatidic acid, lipoamino acid, dihexadecyl phosphate |
| | b. Positive charge | Stearylamine, stearylpyridinium chloride, cetylpyridinium chloride |

- ***Liposome classification based on structural features.***

1. MLV - Multilamellar large vesicles
2. OLV - Oligolamellar vesicles
3. UV - Unilamellar vesicles
4. SUV- Small unilamellar vesicles
5. MUV - sized unilamellar vesicles
6. LUV - Large unilamellar vesicles
7. GUV - Giant unilamellar vesicles
8. MVV -Multivesicular vesicles

- ***Liposome classification based on method of liposome preparation.***

1. REV -Single or oligolamellar vesicle made by reverse phase evaporation method.
2. MLV / REV -Multilamellar vesicles made by reverse phase evaporation method.
3. SPLV -Stable plurilamellar vesicles.
4. FAT-MLV Frozen and thawed MLV
5. VET- Vesicles prepared by extrusion method.
6. FUV-Vesicles prepared by fusion

7. FPV -Vesicles prepared by French press
8. DRV- Dehydration- rehydration ves

## Conclusion

Herbal medications have been widely employed all over the globe since ancient times and have been aacknowledge by doctors and patients for their better therapeutic value as they cause fewer adverse effects as compared with modern medications. The drugs of Ayurvedic origin can be utilized in a more upright course with enhanced efficacy by incorporating modern dosage forms. An extensive research is going on in the area of novel ldrugdelivery and targeting for plant actives and extracts. How-ever, research in this area is still at the exploratory stage.Many problems in the research, production and applicationneed to be solved. In addition, more attention should be paid the research on the carrier materials in order to developmore suitable carriers which can reduce the toxicity of drugs,enhance their activity and improve the overall quality of the agents.

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