

# Novel herbal drug delivery systems

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**Abstract** -There are several types of novel herbal drug delivery system for example phytosome, liposome, niosomes, proniosome, transferosomes, 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

Novel drug delivery system is advantages in delivery the herbal drug at the site of action which minimise the toxic effect with the increase of bioavailability.

In novel drug delivery technology control of distribution of drug is achieved by incorporating the drug in carrier system. Or in changing the structure of the drug at the molecular level.

Preparation of plant or plant part are generally utilise in medication she is old time.

In today's world phytomedicine is widespread in most of the world's population. The nano carrier for herbal drug have a possible future for enhancement and dealing with the problem related with herbal medicine. For the investment of bioavailability of drug

Advantages of herbal drug posses following

1. Low risk of side effect mostly herbal drug are well tolerated by the patient.
2. Enhance solubility and increase bioavailability.
3. Herbal drugs are more effective for long standing health complaint that don't respond well to traditional medicine.
4. Lower cost and more effective.
5. Lack of regulation.
6. Longer duration of treatment.

7. Vioxx, a well known prescription drug used to treat arthritis, was recall due to increase risk of cardiovascular complications

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. Not suitable for many disease

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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

- 1) Niosomes provide targeted drug delivery system .
- 2) Enhances the bioavailability and skin penetration .
- 3) Improves the therapeutic effect of drugs
- 4) No special storage and handling of surfactants used in niosomal formulations are required.
- 5) It can be formulated as parenteral, oral, topical routes
- 6) In niosome water-based suspension is used which offers the huge patient compliance than the oily dosage form.

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.

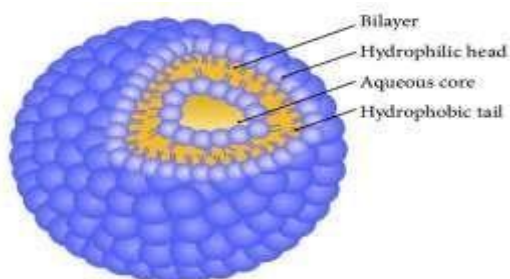
New method of preparation of niosomes

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.	<b>Alkyl ethers</b>	
	a. Alkyl glycerol ethers	Hexadecylglycerol ether (C16G2)
	b. Polyoxyethylene glycol alkyl ethers (Brij)	Brij 30, Brij 52, Brij 72, Brij 76, Brij 78
2.	<b>Alkyl esters</b>	
	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.	<b>Alkyl amides</b>	
	a. Glycosides	C-Glycoside derivative surfactant
	b. Alkyl polyglucosides	Octyl-decylpolyglucoside (OrCG110), decylpolyglucoside (OrNS10)
4.	<b>Fatty alcohols or fatty acids</b>	
	a. Fatty alcohols	Stearyl alcohol, cetyl alcohol, myristyl alcohols
	b. Fatty acids	Stearic acid, palmitic acid, myristic acid
5.	<b>Block copolymer</b>	
	a. Pluronic	Pluronic L64, Pluronic 105
6.	<b>Lipid components</b>	
		Cholesterol and 1- $\alpha$ -Soya phosphatidyl choline
7.	<b>Charged molecule</b>	
	a. Negative charge	Diacetyl phosphate, phosphatidic acid, liposmino acid, dibexadecyl 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 acknowledged 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 drug delivery and targeting for plant actives and extracts. However, research in this area is still at the exploratory stage. Many problems in the research, production and application need to be solved. In addition, more attention should be paid to the research on the carrier materials in order to develop more suitable carriers which can reduce the toxicity of drugs, enhance their activity and improve the overall quality of the agents.

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