Ufosomes as Topical Drug Delivery System: Structural Components and Preparation Techniques

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Introduction to Ufosomes

Ufosomes are **vesicular drug delivery systems** composed mainly of **unsaturated fatty acids** and their salts. They form closed, spherical vesicles in an **alkaline pH** and are especially useful for **topical and transdermal drug delivery** due to their ability to enhance skin penetration.

They are considered an alternative to liposomes and niosomes.

Structural Components of Ufosomes

1. Unsaturated Fatty Acids

•Primary building blocks of ufosomes : Examples: Oleic acid , Linoleic acid , Provide flexibility and permeability to the vesicle membrane

2. Fatty Acid Salts (Soaps)

•Formed by neutralizing fatty acids with alkali , Help in vesicle formation and stability

•Examples: Sodium oleate ,Potassium oleate

3. Aqueous Phase

•Usually **alkaline buffer** (pH 7–9) ,Essential for vesicle formation ,Maintains ionization of fatty acids

4. Drug Substance : Can be: Hydrophilic (entrapped in aqueous core) , Lipophilic (embedded in bilayer)

•Common drugs: Anti-inflammatory agents , Antifungal drugs , Local anesthetics

5. Stabilizers (Optional)

Prevent aggregation and leakage Examples: Cholesterol (occasionally used) , Antioxidants

Preparation Techniques of Ufosomes

1. Thin Film Hydration Method

Most commonly used method

Steps:

1.Dissolve fatty acid and drug in an organic solvent

2.Evaporate solvent using rotary evaporator to form thin film

3.Hydrate film with alkaline buffer

4.Agitate to form vesicles

5.Sonication or extrusion to reduce vesicle size

Advantages:

- Simple
- Produces uniform vesicles

2. Sonication Method

Steps:

1.Prepare ufosome dispersion

2.Sonicate using probe or bath sonicator

3.Reduce vesicle size to nanoscale

Advantages:

•Produces small vesicles

•Improves skin penetration

Disadvantage:

•Possible drug degradation due to heat

Advantages of Ufosomes in Topical Delivery

1. Enhanced skin penetration
2. Biocompatible and biodegradable
3. Suitable for both hydrophilic and lipophilic drugs
4. Simple and cost-effective preparation
5. Reduced systemic side effects

THE END