International journal of basic and applied research

www.pragatipublication.com

ISSN 2249-3352 (P) 2278-0505 (E)

A REVIEW ON COMPARISON OF ETHOSOMAL GEL AND TOPICAL GEL

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INTRODUCTION:

ANATOMY OF SKIN:-

Skin is the largest organ in the body. .Skin takes on different thickness,color,and texture all over your body.It consist of three layers

1. Epidermis
2. Dermis
3. Hypodermis

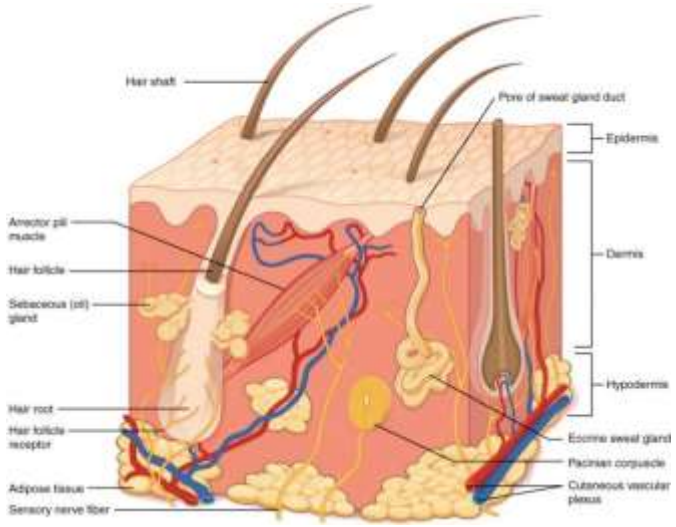

Fig.1:Structure of Skin

1. Epidermis :-

- The epidermis is the thin outer layer of the skin. It consists of 3 types of cells.

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i. **Squamous cell:-**The outermost layer is continuously shed is called the stratum corneum

ii. **Basal cells:-**Basal cells are found just under the squamous cells, at the base of the epidermis.

iii. **Melanocytes cell:-**Melanocytes are also found at the base of the epidermis and make melanin. This gives the skin its color.

2. **Dermis:-**

- The dermis is the middle layer of the skin.
- The dermis is held together by a protein called collagen. This layer gives skin flexibility and strength. The dermis also contains pain and touch receptors.

3. Hypodermis:-

- The subcutaneous fat layer is the deepest layer of skin. It consists of a network of collagen and fat cells. It helps conserve the body's heat and protects the body from injury by acting as a shock absorber.

ETHOSOMAL GEL :-

Ethanol acts as penetration enchancer through the skin .The mechanism of it's penetration enhancing is well known as ethosomal gel . Ethanol penetrates into intercellular lipids and increases the fluidity of cell membrane lipids and decreases the density of lipid multilayer of cell membrane

1. Ethosomes are ethanolic liposomes
2. Ethosomes are can be defined as non-invasive delivery carriers that enable drugs to reach deep into the skin layers.
3. Ethosomes are soft vesicles made of phospholipids ,ethanol and water
4. The size range of ethosomes may vary from lens of nanometer [nm].

EXAMPLES:-

* Ethanol

* Isopropyl alcohol

* Cholestrol

* 6-carboxy fluorescence

* Carbopol D934.

Methods for preparation of Ethosomes :-

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They are four Methods:-

- Hot Method
- cold Method
- classic Method
- Thin-film hydration technique

1.Hot Method:-

- In this Method phospholipid is dispersed in water by heating in a water bath at 40°c until a colloidal Solution is obtained.
- In a separate vessel ethanol and propylene glycol are mixed and heated at 40°c.
- Once both mixtures reach 40°c, the Organic phase is added to aqueous one.
- The drug is dissolved in water or ethanol depending on it's hydrophilic / hydrophobic Properties.
- The vesicles Size of an ethosomal formulation can be decreased to the desired Extent using probe sonication (or) Extrusion method.

2. Cold Method:-

- This is the most common method utilized the preparation of ethasomal formulation.
- Phospholipids, drug and other lipid materials are dissolved in ethanol in a covered vessel at room temperature by vigorous stirring.
- Propylene glycol (x) other polyol is added during stirring.
- This mixture is heated at 30°t in a water bath.
- The water heated at 30°c in a separate vessel is added to mixture, which is then stirred for 5min in a covered vessel.
- The vesicle size of Ethosomal formulation can be decreased to a desired extend using extension method.
- Finally, the formulation is stored under refrigeration.

3.Classic Method :-

- The phospholipid & drug are dissolved in Ethanol, and heated at 30°c in water bath.
- Double distilled water is added in fine stream to the lipid mixture, with constant stirring at 700 rpm, is closed vessel .
- The resulting vehicle suspension is homogenized by passing through a polycarbonate membrane using a hand extrude for 3 cycles

4. **Thin-film hydration technique:-**

- The lipids are dissolved using organic solvent “Round Bottom flask” and the organic solvent is Evaporated above the lipid transition using rotatory Evaporator.

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- The thin film formed around the inner walls. of the round bottom flask will be hydrated using othanolic mixture and dispersed with a sonicator to obtain a suspension of Ethosomes.

Merits of Ethosomal Gel :-

- Delivery of large molecules (peptides, protein molecule) is possible.
- Increase in permeation of the drug through skin for transdermal drug delivery.
- It contains non-toxic raw material in formulation.
- Ethosomal drug delivery system can be applied widely in pharmaceutical, veterinary, Cosmetic fields.
- Low risk profile - the technology has no large scale drug development risk, as the toxicological profiles of the ethosomes components are well documented in the Scientific literature
- Highly marketed attractiveness for products with Proprietary technology.
- The Ethosomes system is passive, non-passive & available for immediate commercialization.

Demerits of Ethosomal Gel :-

- Ethosomes with poor shells may clump together and leads to precipitation.
- Adhesive may not adhere well to all types of skin.
- May not be economical.
- Transfer of ethosomes from organic to aqueous layer leads to loss of product.
- The molecular size of the drug should be reasonable that it should be absorbed percutaneously.
- Skin irritation or dermatitis due to excipients and enhances the drug delivery Systems.
- Ethosomal administration is not a means to achieve rapid bolus type of doug import/ rather usually designed to offer slow.
- Poor practical yield.

Application of Ethosomal Gel:-

- Delivery of Antiviral drugs.

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ISSN 2249-3352 (P) 2278-0505 (E)

- Topical delivery of DNA.
- It is used as transdermal delivery of Hormones..
- It is used as Anti-parkinsonism agent.
- It is used as Transcellular delivery.
- It is used as Anti- Arthritis drugs.
- It is used as Antibiotics
- It is delivery of problematic drug molecules.
- It is used as Antigen loaded drugs.
- It is widely used in cosmoceuticals.
- It is delivery of NSAIDS.
- It is used as Anti-allergic\
- It is used as. Anti-acne effect
- Ethosomal gel is used as skin irritation.

TOPICAL GEL:-

Topical gels are semi-solid systems in which a liquid phase is constrained within a three dimensional polymeric matrix of natural or synthetic gum in which high degree of physical or chemical crosslinking has been established.

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Topical delivery is an attractive route for local and systemic treatment.

1. Topical preparation s gives it's action directly at the site of actions.
2. The delivery of drugs on to skin is recognized as an effective means of theraphy for local dermatologic diseases.
3. A gel is composed in two component,cross-linked three dimensional matrix consisting of structural materials like interspread by an adequate.
4. It can penetrate deep into the skin.

EXAMPLES:-

* Diclofenac sodium

* Nicotine

* Loratadine

* Ofloxacin

* Ciplofloxacin

Method of preparation of Topical :-

They are three methods

(i) Fusion Method

(ii) Cold Method

(iii) Dispersion method.

1.Fusion Method :-

- In this method various waxy materials empolyed as gelling agents, drug was added when waxy materials melted by fusion. Stirred slowly until uniform gel formed.

2. Cold Method :-

- Water was cooled at 10°c and placed in the container.
- Gelling agent was slowly added and agitated until solution is complete maintain temperature below at 10°c.
- Drug was added in solution from slowly with gentle mixing.

3. Dispersion Method :-

- Gelling agent was dispersed in water with string at 1200rpm for 30min.

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- Drug was dissolved in Non-aqueous solvent with preservative this solution was added in above gel with continous stirring.
- Drug was mixedwith gel by prepared.

Merits of Topical Gel :-

- To avoid gastrointestinal drug absorption diffculties caused by gastrointestinal pH and Enzymatic activity and drug interaction with food and drinks.
- Economic
- Non-invasive and have patient compliance.
- Less greasy and can be easily removed from the skin.
- Avoids the first-pass effect, possibly avoiding the deactivation by digestive and liver enzymes.
- Provides extended therapy with a application, improving compliance.
- Reduction of dogs as compare to oral dosage forms.
- Drug therapy may be terminated rapidly by removal of the application from the Skin Surface.

Demerits of Topical Gel:-

- Poor permeability of few drugs through Skin.
- Drugs who is having the larger particle Size can't be get easily absorbed through the layer of skin.
- Possibility of allergic reactions.
- They can be used only for these drugs who requires the need of very small plasma concentration for action
- The path of that drugs are not suitable for those drugs that irritate or sensitize the skin.
- They can be time-consuming to apply.
- At times, the regimen can be complicated.
- The applications may also be messy uncomfortable.

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Applications of Topical Gel :-

- It is used as excipient, lubricant & filler for tablet & pills
- It is greasy/ untouch to touch therefore used as lubricant as protective.
- It is in the form of dusting powder.
- It is applied on the skin for its soothing adsorbent and protective properties.
- Mild astringent, and protective for skin,
- It is used. as Anti-septic.
- which provides local anesthetic and antipuritic.
- It is used as Astringent & Antimicrobial.
- It is used to protect from UV radiations in various sun creams & Sunscreen.

CONCLUSION:-

Ethosomes are soft, malleable vesicles and potential carrier for transportation of drugs. Ethosomes are characterized by simplicity in their preparation, safety and efficacy and can be tailored for enhanced skin permeation of active drugs. Ethosomes have been found to be much more efficient at delivering drug to the skin, than either liposomes or hydroalcoholic solution. Ethosomes have been tested to encapsulate hydrophilic drugs, cationic drugs, proteins and peptides. Ethosomal carrier opens new challenges and opportunities for the development of novel improved therapies.

ACKNOWLEDGEMENT:-

The Successful accomplishment of this Article would not have been possible but by the timely help and guidance rendered by many people. I would like to take this opportunity to place it in record. Though it's not possible to name all of them, I would like to mention few of them. My first salutation goes to Almighty God and my Parents for being ever so kind and courteous. It gives me an immense pleasure to acknowledge a debt of gratitude to my guide Mrs. Ayesha Siddiqua, M.Pharm, Assistant Professor, Bharat Institute of Technology for her constant encouragement, suggestions and supervision.

International journal of basic and applied research

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ISSN 2249-3352 (P) 2278-0505 (E)

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