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A REVIEW ON TOPICAL GEL

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ABSTRACT

Topical gels or formulations have many advantages as compared to other conventional dosage form. Topical gels are less toxic and more effective than other dosage form. Topical gels are best choice for treat local infections and skin problems because of it directly apply on the skin or in the site. Topical gels provide action direct to the site of action. Topical gels exclude the GI irritation and metabolism of drug by which the bioavailability of drug is greater. Drug-Drug interaction and Food drug interaction is also not possible in the case of topical gels. Gels have better penetrating power because gel consists two phase. In this review a detailed study about gel, its preparation, characteristics and evaluation parameter was done.

Keywords :- Topical gel, ideal characteristics of gel, and evaluation parameter.

INTRODUCTION

Topical gels are semi solid homogenous preparation used to cure and treat topical diseases. Gels are more hydrophilic in nature so the rate of released drug or active ingredient was fast. A gel consist of two component, three dimensional cross linked material which contain proportionally large amount of liquid medium to form adequate rigid network which immobilized the liquid continuous phase.[3,4] Inorganic particles and organic macromolecules both are used to form a structural network of gel. In chemical gel the particles are associated with permanent covalent bonding while physical topical gels are associated by weaker and reversible secondary intermolecular forces like hydrogen bonding, electrostatic interactions, hydrophobic interaction and Vander Waals forces.[1,2]

IDEAL PROPERTIES OF TOPICAL GEL [5]

- The gel should be clear and homogenous.
- The gel should be easily broken when shear or force is applied during shaking the container.
- The gel should be inert in nature.
- The gel should be not sticky.
- The gel should be never interacting with other formulation component.
- The gel should be stable.
- It should not be irate the skin or any part where the gel is applied.

- The viscosity is optimum.
- It should have anti- microbial activity.

IDEAL CHARACTERISTICS OF GELS.[6]

Swelling:- The gelling agent used to prepare gel are capable for swell the liquid when liquid medium comes to its contact. The swelling property of gel depends on gelling agent and its shows the strength and bonding of particle in the gel.

Syneresis:- Most of the gels released some water or liquid during standing and after days of storing the phenomenon of releasing fluids from gel is termed as syneresis. This show that the gel not has sufficient amount of gelling agent or the concentration of gelling agent decreases. It also shows that the formulation is thermodynamically unstable. The gel should be syneresis free.

Structure:- The gel rigidity is depend on the gelling agent. The selection of gelling agent is most important part of the formulation. The gelling agent is responsible for viscosity (resistance to flow) networking and bonding between particles and medium used in formulation.

pH:- The pH of gel is to be isotonic. The fluctuation in the pH of gel may cause the skin irritation.

Spreadability:- The spreading power of gel should be excellent**.** It indicates the area covered by gel.

METHOD FOR PREPARATION OF GEL[7]

There are 3 methods for preparation of gels.

1. Fusion method:- In this method the vehicles, gelling agents, additives and drug are blended at high temperature to until a semi solid texture was not formed.
2. Cold method:- In this method all the component exclude drug or active pharmaceutical ingredient is heated and blended simultaneously and then lower the temperature of formulation, then add drug and again blending was started until the gel was not formed.
3. Dispersion method:- In this method the gelling agent is stirred with water until the gelling agent is swell up and then drug is dissolved in medium and incorporated into it. Add buffer solution to adjust the pH of the gel if necessary.

GELLING AGENT:- Gelling agents are the polymers that are used to structural network or provide texture to the gels. Gelling agents are classified as follows:-

Natural:- Gelatin, Xanthine, Cassia Tora, collagen, pectin and Guar gum etc.

Synthetic:- Carbopol 934, Carbopol 940, Polaxamers and Polyvinyl Alcohol etc.

Semi synthetic:- Hydroxypropyl methyl cellulose, Carboxyl methyl Cellulose and Hyroxylethyl Cellulose.

ADDITIVES USED IN GEL FORMULATION

Preservative:- Preservatives are used to make the gel long lasting and prevent them to spoil **.**E.g., Methyl Paraben and Propyl Paraben etc.

Drug solubilizer:- Drug solubilizer is used in the case of drug having poor solubility. Some drugs are poorly soluble in medium so drug solubilizer helps to dissolve the drug in the medium. E.g., Triethyl-o-amine and PVP (Polyvinylpyrolidine) etc.

Stabilizers:- Some gels containing heavy metals and agents which is stabilized by chelating agent, such as E.D.T.A.(Ethlylene diamine tetra acetic acid).

EVALUATION PARAEMETERS OF TOPICAL GEL

Appearance and homogeneity

Physical appearance and homogeneity were evaluated by visual inspection.

pH of the Gel

The pH of the gel was measured by digital pH meter. 1 gm gel is dissolved in medium and inspect with pH meter.

Viscosity

The viscosity of the gel was measured by the Brookfield Viscometer.

Spreadability

0.5 g of gel was applied within a circle of 2 cm diameter pre-marked on a glass plate, over which a second glass plate was placed. A weight about 500 g was placed to rest on the upper glass plate for 10 minutes. The increase in the diameter due to gel spreading was noted.

Extradurability

To measure extradurability a shut collapsible tube containing gel was squeezed immovably at the creased end. At the point when the top was evacuated, gel expelled until the weight dispersed. Weight in grams required to expel a 0.5 cm ribbon of the gel in 10 sec was resolved. The normal expulsion pressure in g was reported.

Skin Irritation test

The animal model swiss albino mice strain was used for skin irritation test and Guniea pig (400-500gm) of either sex are also used. The hairs are removed by the skin removal cream and then clean the skin with spirit, 3 mice are used in which normal saline, blank gel and formulation were applied and check the irritation in animals.

Stability Studies

The stability study of the gel was done as per ICH guidelines the gel was store at 30^0C± 2^0C/ 60% ± 5% RH and 40^0C± 2^0C/ 75% ± 5% RH. The formulation were analysed in the change in physical appearance, pH, spread ability and Viscosity.

In vitro Diffusion studies:- Franz diffusion cell are used for the study of dissolution release of topical gel.0.5g of gel sample was taken in membrane and the dissolution release were carried out at 37 ± 1^0 by using phosphate buffer having pH 7.4(250ml) as the dissolution medium. Withdrawn the 5ml sample periodically at 1, 2, 3, 4, 5, 6, 7 and 8 h and each sample is replaced by fresh buffer solution in equal amount and then analyze the sample in spectrophotometer and take phosphate buffer as blank reagent.

Drug Content:- To determine the drug content of gel, take 1gm of gel dissolve in 100ml suitable medium and filter it. Then the filtrate is examined under spectrophotometer, absorption was measured and the drug content is carried out by regression linear analysis of calibration curve.

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