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Review Article

Emulgel: A Novel Topical Drug Delivery System

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A B S T R A C T

Emulgel, a combination of gel and emulsion, is a relatively new and innovative topical medication delivery method with a lot of potential applications in dermatology. An O/W or W/O emulsion is created using gel formulation and specific oils based on their solubility and appropriate emulsifier.Lotions, creams, ointments, and gels are examples of topical treatments that are an essential component of dermatological therapy.Not many notable side effects are present. Emulgel is a very new and creative topical medicine delivery system that combines gel and emulsion and has several potential uses in dermatology. Using gel formulation, particular oils chosen for their solubility, and the right emulsifier, an O/W or W/O emulsion is produced.The present review discusses the method of preparation of emulgel, its permeability across the skin as well as the factors affecting absorption. The evaluation parameters and some marketed formulation also discusses.

Keyword: Topical Drug Delivery, Microemulsion, Gel, Hydrophobic, Emulgel.

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INTRODUCTION:

Topically administered drugs are delivered to specific areas of the body via ocular, rectal, vaginal, or topical methods[1]. The fundamental advantage of a topical administration technique is that it avoids first pass metabolism[2].Clinical research suggests that topical gels are the safest and most effective treatment choice for skin-related disorders, and that they are used topically to lessen associated adverse effects when compared to other traditional dosages form.The topical gel improves skin absorption and thereby enhances bioavailability[3]. Topically administered medications are delivered to specific parts of the body via ophthalmic, rectal, vaginal, or topical routes[4].The primary benefit of a topical delivery approach is that it eliminates first pass metabolism[5]. Many traditional semisolid dosage forms, including creams, gels, and lotions, were found to have sticky qualities, a poor spreading coefficient, and stability issues. To address these issues, a novel, stable topical drug delivery technology can be devised to ensure the successful delivery of hydrophobic medications. In recent years, there has been a surge of interest in emulgel as a topical medicine delivery technique[6].

By penetrating the underlying layers of skin or mucous membranes, topical medicines have localized effects at the application site. It offers the freedom to administer medication to a targeted location more successfully[8]. Large volumes of aqueous or hydroalcoholic liquid are trapped in a complex of colloidal solid particles to generate gels, a relatively novel class of dosage forms. When compared to conventional ointments and creams, gel formulations typically offer faster medication release[9].

The dermis, which is the middle layer of skin, and the epidermis, which is the top layer, cooperate to shield the body from dangerous external elements when skin health is maintained[10].As per U.S.P. definitions, a gel is a semisolid mixture of big organic molecules or small inorganic particles that are interpenetrated and surrounded by liquid[11] .Emulgel is a term used to describe emulsions, either oil-in-water or water-in-oil, that are gelled through mixing with a gelling

agent[12]. The administration of medications via the skin with these gels based on microemulsions enhances the drug's local and systemic distribution through various methods[13]. Emulsions have a particular class to them and remove from the skin with ease. They are also quite good at penetrating the skin[14].Emulsions are frequently employed as delivery systems for a variety of hydrophilic and hydrophobic medications in emulgel formulation[15]. Increased medication transport over the stratum corneum barrier and reduced drug degradation over an extended period of time lead to improved bioavailability[14]. For localized and regional skin conditions, semisolid formulations such as creams, ointments, and gels are frequently utilized[16].

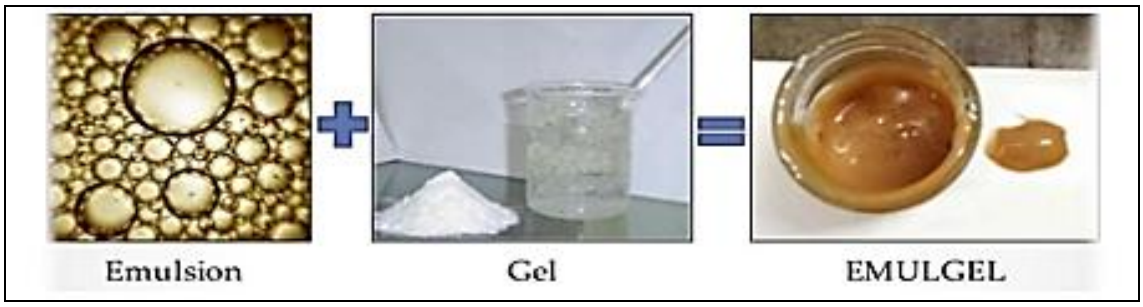

Figure 1: Schematic Representation of Emulgel Formation[7]

EMULGEL:[16-21]

Since emulgel is a relatively new sector in topical medication delivery with few commercialized products to date, it is both interesting and hard to focus on this area. It is important to understand the benefits of emulsion and gel before using either for topical medication administration. Emulsions are systems of regulated release that have two immiscible phases, one of which is distributed into another. Emulgel are translucent, biocompatible, thixotropic, spreadable, easily removable, emollient, and non-staining. They are also greaseless and visually acceptable. Their lengthy shelf-life and high cutaneous penetration are further advantages. Because Emulgel has the qualities of both a gel and an emulsion, it functions as a dual control release system. One type of biphasic semisolid formulation is emulgel. These days, controlled delivery applications are being deployed with them. Because Emulgel has both aqueous and non-aqueous phases, it can deliver drug moieties that are both lipophilic and hydrophilic. It is applied to the skin appropriately because it isn't greasy like other topical formulations like ointments, creams, etc., which are thick and need a lot of rubbing. It is widely acknowledged that the effectiveness of a topical drug delivery. Because Emulgel comprises both aqueous and non-aqueous phases, it can deliver medicines that are lipophilic or hydrophilic. Their application as a control release formulation date back to recent years. These biphasic systems are more stable and have a greater capacity for drug loading.

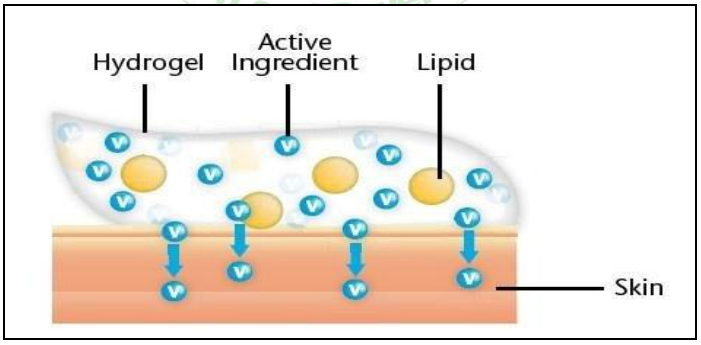

Figure 2: Structure of Emulgel[22]

Types of Emulgel:

A.Macroemulsion Gel - Emulgel containing droplets of emulsion larger than 400 nm in size. They are physically undetectable, the individual droplets are readily visible when viewed under a microscope. Although surface-active substances can assist stabilize macroemulsions, they are thermodynamically unstable.[20] The macro emulsion can be either O/W or W/O, depending on the emulsification process and emulsifier type.[23]

B.Microemulsion Gel - Microemulsions are optically transparent and thermodynamically stable. The diameter of this microemulsion, which consists of monodispersed spherical droplets, ranges from 20 to 200 nm.[23] It is composed of water, surfactant, co-surfactant, and oil in certain proportions. Extremely low interfacial tension, a wide interfacial region, and the capacity to dissolve both aqueous and oil-soluble substances are some of the distinctive characteristics that microemulsions may possess. By reducing the diffusion barrier in the stratum corneum, the

components of the microemulsion may facilitate a higher rate of drug penetration[20]. Additionally, microemulsion-based gel increases drug accumulation in the skin for effective action by preventing drug absorption in the bloodstream[21].

C.Nanoemulsion Gel - It is referred to as nanoemulgel when nano emulsion is mixed with gel. With a droplet size of less than 100 nm, an interfacial coating of surfactant and co-surfactant molecules stabilizes oil and water dispersions, making nanoemulsions transparent and translucent while maintaining thermodynamic stability.TheNanoemulgel is the term used when the emulsion is combined with gel. Comparing Nanoemulsion to more conventional formulations like emulsions and gels, several medicines exhibit greater transdermal penetration. In vitro as well as in vivo, the nanoemulsion exhibits improved transdermal and dermal transport potential[20].

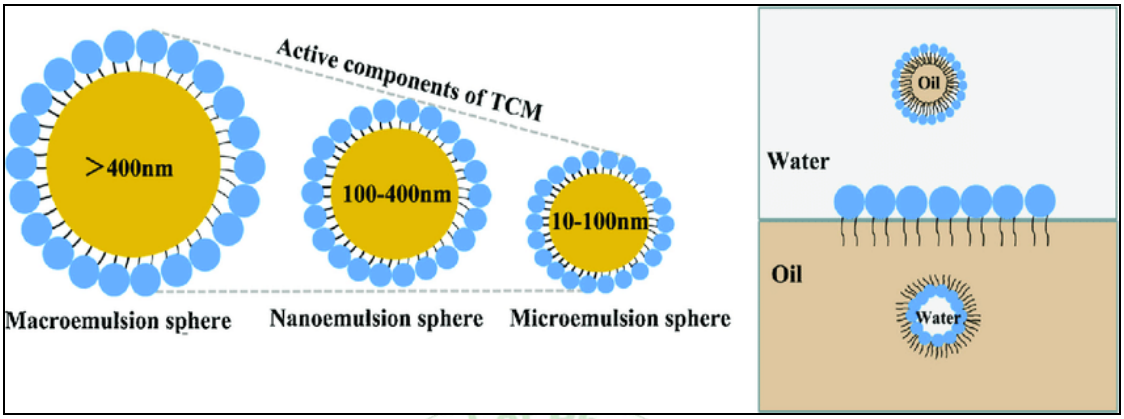

Figure-3: Types of Emulgels [24]

Advantages of Emulgel:[16,19,25-27]

- Enhanced acceptability among patients.
- Give specific medication distribution.
- Simple way to end the therapy.
- Increase bioavailability such that, in comparison to other treatments, low doses can still be effective.
- Superior loading capacity compared to traditional semi-solid preparation.
- Increased capacity for loading.
- Feasibility of production and inexpensive preparation.
- Controlled release.
- Boost Patient Adherence.
- Drugs that are hydrophobic are included.
- Steer clear of the first pass metabolism.
- Preventing gastric incongruity.
- More tailored to a particular location.

Disadvantages of Emulgel:[19-21,28,29]

- Dermatitis results in skin inflammation.
- An allergic response could occur.
- Certain drugs have little skin permeability.
- It is difficult for medications with larger particle sizes to penetrate the skin.
- Certain pharmaceuticals exhibit minimal skin permeability.
- The occurrence of bubbles while emulgel is being formed.
- It is not appropriate to use medications that irritate or sensitize the skin.

Ideal Properties of Emulgel:[30,31]

- The gel needs to be uniformly transparent.
- When shear or force is applied while shaking the container, the gel should break easily.
- The gel needs to possess inert properties.
- The gel should not be sticky.
- There should never be any interaction between the gel and other formulation elements.
- The gel needs to be steady.
- The skin or any area on which the gel is administered shouldn't be irritated.

CLASSIFICATIONOF TDDS:[32-35]

A. **Solid preparation:** Topical Powders, Ointments, and Poultices.

B. **Semi solid preparation:** Ointments, gels, pastes, creams, and poultice.

C. **Liquid preparation:** Creams, poultices, gels, pastes, and ointments

D. **Miscellaneous preparation:** Drug delivery methods applied topically, gauze and tapes & aerosols.

DRUG DELIVERY SYSTEM ACROSS SKIN:[35-37]

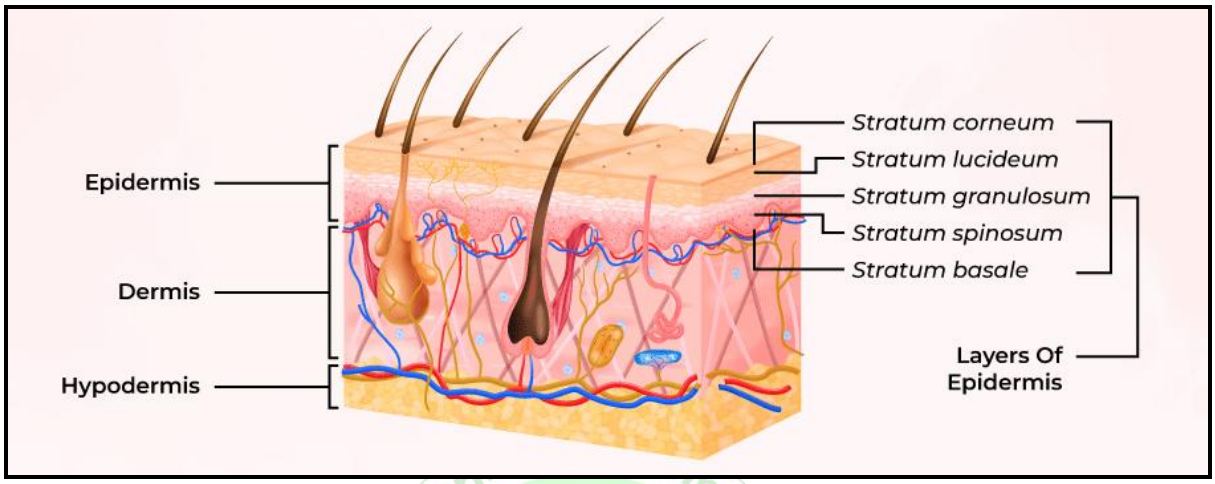

Figure-4: Structure of Skin[75]

Two of the most significant layers of the skin are the dermis and epidermis. The subcutaneous layer of the skin is filled with blood vessels. Drug absorption through the skin occurs primarily through three mechanisms: follicular, transcellular, and intercellular. The second most common delivery mode is the pilosebaceous pathway. Typically, penetration occurs through the intercellular matrix; however, for highly polar compounds, the transcellular channel can offer a quicker solution. The horny layer's keratinized corneocytes and mostly non-polar lipid intercellular cement have been found to be important components in preserving an efficient drug barrier when the skin is healthy and well-preserved. For many years, medications such as painkillers and antibiotics have been delivered to an affected area of the body through the use of creams and gels that are applied topically. These include topical creams for skin infections, gels and creams for vaginal yeast infections, and creams to relieve arthritis pain, to name a few. The skin can now absorb additional medications thanks to newer technologies. The entire body can be treated with these, not just the afflicted areas.

Factors to be considered when choosing a topical preparation [39]

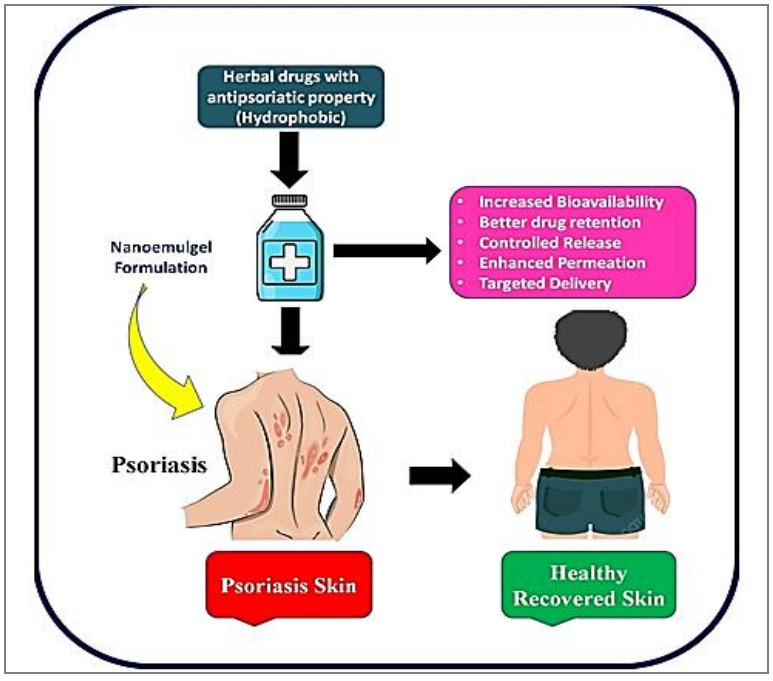

Figure-5: Diagrammatic representation showing applicability of emulgel formulation for phototherapy[40]

1. Impact of the Car to boost efficacy, for example, an occlusive vehicle increases the active ingredient's penetration. Cooling, drying, emollient, and protecting effects can be attributed to the vehicle itself.
2. Align the lesions with the appropriate type of preparation. For instance, if you have an intense case of weepy dermatitis, stay away from oily creams.
3. Fit the site's requirements for the kind of preparation. For places with hair, use a gel or lotion. Inflammation or possible hypersensitivity. In general, gels cause irritation, but ointments and w/o creams do not. If allergies are a concern, ointments don't include emulsifiers or preservatives.

FACTOR AFFECTING TOPICAL ABSORPTION OF DRUG:[39,41,42]

Physiological Factors

- Skin thickness.
- Lipid content.
- Density of hair follicles.
- Density of sweat glands.
- Skin pH.
- Blood flow.
- Hydration of skin.
- Inflammation of skin
- Total skin area in contact with vehicle

Physiochemical Factors:

- Partition coefficient.
- Molecular weight.
- Degree of ionization.
- Effect of vehicles.

FORMULATION OF EMULGELS:

Emulgels contain several excipients that aid in their formulation and improve their properties. The key excipients used in emulgelinclude:

Emulsifiers: [19,25,43]

Assist in emulsifying the phases of water and immiscible oil. Sorbitan esters, glyceryl esters, cetostearyl alcohol, and other common emulsifiers are examples. The O/W or W/O emulsion that an emulsifier will create is determined by the HLB value. Emulsification during manufacturing and emulsion stability beyond the product's shelf life both depend on the presence of emulsifying agents. It takes trial and error and experience to choose the right emulsifying agent and concentration. Tween 20 was utilized in the development of Emulgel as an emulsifier in its aqueous phase and span 20 in its oily phase.

Vehicle:[21]

Uses: Give the medication to the targeted area. Maintain a therapeutic concentration in the intended tissue long enough to provide a pharmacological effect. Release the medication to allow it to easily travel to the site of action.

a) Water-based substance this creates the emulsion's aqueous phase.

b) Ordinary agents, such as alcohol and water, are utilized.

c) Lipids these agents are from the phase of oil. Mineral oils are commonly used in combination with soft or hard paraffins or alone for externally applied emulsions.

Properties of Vehicle-

- Apply the medication to the skin evenly and efficiently.
- Release the medication to enable unhindered migration to the site of action.
- Get the medication to the intended location.
- Maintain the desired medication level at a therapeutic level.
- Barrier: Generally speaking, not much topical medication passes through the stratum corneum.
- The absorption rate and extent are contingent upon the properties of the vehicle, as well as the active agent itself.

Thickeners:[43]

Emulgels should be given viscosity and a gel-like consistency. Typical thickeners include Xanthan gum, carbomer, and hydroxypropyl cellulose. Whether a fluid, soft solid, or hard solid emulgel is produced depends on the kind and concentration of thickener used.

Emulsifiers:[19,25]

Selecting the right emulsifying agents depends not only on their capacity to emulsify, but also on how they will be administered and, ultimately, how hazardous they are. An HLB number is assigned to each surfactant, which indicates the relative amounts of the hydrophilic and lipophilic components of the molecule. Low values signify lipophilic or non-polar qualities, while high numbers show a surfactant primarily displaying hydrophilic or polar qualities. Emulsion stability over the product's shelf life and real emulsification during manufacture both depend on the presence of emulsifying agents.Selecting the right emulsifying agents depends not only on their capacity to emulsify, but also on how they will be administered and, ultimately, how hazardous they are. An HLB number is assigned to each surfactant, which indicates the relative amounts of the hydrophilic and lipophilic components of the molecule. Low values signify lipophilic or non-polar qualities, while high numbers show a surfactant primarily displaying hydrophilic or polar qualities. Emulsion stability over the product's shelf life and real emulsification during manufacture both depend on the presence of emulsifying agents.

Gelling agents:[44]

These are the agents used to increase the consistency of any dosage form that can also be used as thickening agent.

Preservatives:[21]

Used to preserve the emulgel from the microbes. E.g.: Propyl paraben, methyl paraben.

Permeation Enhancers:[25,45],

These are substances that interact and partition into the components of the skin to produce a brief, reversible increase in skin permeability. Drug delivery vehicles frequently contain penetration-enhancing chemicals that temporarily disrupt the skin barrier, fluidize the lipid channels between

coenocytes, change how the drug is partitioned into skin structures, or improve skin delivery in other ways in order to promote absorption of the drug. Such as 5% menthol and 8% clove oil.

Properties of penetration enhancers:

- They ought to be free of allergens, irritants, and toxins. In an ideal world, they would act quickly and have predictable, repeatable effects in terms of both activity and duration.
- They shouldn't bind to receptor sites or have any pharmacological action in the body.
- The penetration enhancers ought to function unidirectionally, meaning they should permit the entry of therapeutic compounds into the body while averting the extrusion of endogenous material.
- The penetration enhancers ought to be suitable for incorporation into various topical formulations, meaning they should work well with both medications and excipients.
- Additionally, they ought to have a suitable skin "feel" and be aesthetically pleasing.

Aqueous Material:[25]

This forms the aqueous phase of emulsion. The commonly used agents are water, alcohol etc.

Oils:[46]

The emulsion's oily phase contains these agents. Mineral oils are commonly utilized for topically administered emulsions due to their occlusive and sensory properties, as well as their use as the drug's vehicle alone or in combination with soft or hard paraffin. Fish liver oils and nonbiodegradable mineral oils are commonly utilized in oral preparations because they have local laxative action.

METHOD OF PREPARATION OF EMULGEL:[36,47-51]

Emulgel is prepared by mixing emulsion in a gel base. It involves three steps:

Step 1: Emulsion preparation:

a) Oil phase preparation: Propylene glycol is dissolved in light liquid paraffin to create the oil phase of the emulsion.

b) Aqueous phase preparation: The medication was dissolved in ethanol to create the aqueous phase.

After heating the oil and aqueous phases independently to 75°C, the oil phase was gradually introduced to the aqueous phase while being constantly stirred until it cooled to room temperature.

Step 2: Gel preparation:

Polymers like carbapol 934 were dissolved in filtered water while being continuously stirred to create the gel base.

The pH and amoderate speed are adjusted to 2–6 with triethanolamine (TEA).

Step 3: Formulation of Emulgel:

The emulsion is combined with the gel foundation while being gently stirred.

EVALUATIONPARAMETERS:

Physical examination:[52,53]

The emulgel's pH, homogeneity, color, consistency, and appearance are evaluated by visual examination. A pH meter measures the pH value using a 1% water solution of the emulgel.

Determination of pH:[53,54]

The pH of the emulgel is measured using a pH meter. A topical product works well with the skin. Knowing the product's pH helps ensure it is compatible with the skin.

Determination of viscosity:[55,56]

The viscosity of the emulgel is measured using a suitable viscometer. We can study how temperature and pressure affect the viscosity by changing the shear rate and storage temperature. This helps us understand how the product's consistency changes when stored at different temperatures and how it behaves when applied with different amounts of force.

Extrudability:[57,58]

Extrudability is an essential property of topical gel formulations, and it can be evaluated by determining the force required to extrude the gel from a tube.To assess the extrudability of a gel formulation, a gentle finger pressure is applied to the tube, and the percentage of gel that is extruded is measured. The extrudability of the gel formulations can evaluated in accordance with the protocol. Compared to sodium CMC gel, Carbopol and HPMC gels found to have superior extrudability.

Film Weight:[59]

The film weight is determined by filling a petri dish with a precisely measured one-gram sample of the gel. The sample is then permitted to dry completely. Once dry, the resulting film is accurately weighed using a high-precision electronic balance.

Rheological Studies:[60,61]

The viscosity of the prepared batches is accurately measured utilizing a Brookfield Viscometer equipped with a spindle 07. Prior to measurement, the formulation under evaluation is carefully poured into a beaker and allowed to settle for 30 minutes at the designated assay temperature. Subsequently, the spindle is lowered perpendicularly into the center of the emulgel, ensuring optimal measurement conditions.

In vitro Drug Release Study:[62,63]

The Franz Diffusion Cell is employed to investigate and compare the in vitro release characteristics of various formulations, utilizing inert membranes that serve as simplified models of human skin. These membranes possess a porous substructure composed of a hydrophobic matrix, rendering them suitable for this purpose. Although the permeability of these membranes to pharmaceuticals is higher than that of human skin, the data generated nonetheless provide valuable insights into the relative permeabilities of different formulations.

To conduct the experiment, synthetic membrane pieces are immersed in a 0.2 M potassium dihydrogen phosphate buffer for 24 hours, after thatcarefully mount it in a Franz-type diffusion cell.Ensure that the membrane is securely positioned and free of any air bubbles.On the donor side of the diffusion cell, apply 200 mg of the sample, ensuring that it completely covers the membrane. Submerge the entire assembly in a water bath maintained at 32°C. Ensure that the assembly is vigorously stirred throughout the experiment to maintain uniform conditions.At predetermined intervals, carefully remove 2 mL samples from the receiver compartment. Replace each sample with an equivalent volume of fresh buffer to maintain the experiment's integrity.Perform spectrophotometric analysis on all collected samples to determine the content of drug release at a specific wavelength.

Skin irritation Test:[38,53]

The skin irritation test, commonly referred to as the patch test, is a critical evaluation tool designed to assess the potential of an emulgel to cause skin irritation or cutaneous reactions.Laboratory animals, typically rats, mice, or rabbits, are prepared for the test by shaving a specific area of their skin. The exposed skin area is then treated with the emulgel product, and any adverse skin changes are carefully observed and recorded.The product is considered to have a high potential for causing skin irritation if, after a predetermined period, the treated skin area exhibits signs of irritation, such as redness, inflammation, or other adverse reactions.

Ex-vivo Drug Release Study:[32,64,65]

Obtain a skin sample from a Wistar male rat and carefully slice it, ensuring the dorsal side faces upwards.Clamp the skin slice to one end of the hollow glass tube of the modified diffusion cell, securing it firmly in place.Evenly apply a uniform layer of Emulgel to the membrane, ensuring complete coverage.Prepare a pH 5.5 phosphate buffer to serve as the dissolving medium for the drug release study.Assemble the diffusion cell by bringing the receptor compartment and donor compartment into contact. Allow the system to equilibrate before initiating the drug release study.

Swelling index:[66]

Place 1 gram of the emulgel on a porous piece of aluminum foil, ensuring even distribution.Store the emulgel sample in a 50 ml beaker containing 10 ml of 0.1 N sodium hydroxide (NaOH) solution. At various time intervals, carefully remove the emulgel sample from the beaker and place it in a dry area for a short period.Weigh the swelled emulgel sample (wt) and record the value. Calculate the swelling index using the following formula:

Swelling Index (SW %) = [(wt - wo) / wo] x 100

Where,

Wt = Weight of swollen emulgel after time t,

Wo = Initial weight of emulgel at zero time

(SW) % = Percent swelling Index.

Kinetics Modeling: [67]

To evaluate the drug release kinetics, data from ex-vivo permeation tests are fitted into various mathematical models, including:

1. Zero-order model

2. First-order model

3. Higuchi model

The goodness of fit for each model is evaluated based on the coefficient of determination (R2). The model with the highest R2 value, closest to 1, indicates the best fit and is considered the optimal model for describing the drug release kinetics.

Stability study:[68]

Fill 5g aluminum collapsible tubes with the emulgel formulation, ensuring that the tubes are properly sealed.

Storage Conditions

Place the filled tubes in stability chambers maintained at the following conditions:

1. Refrigerated conditions: 5°C

2. Ambient conditions: 25°C/60% relative humidity (RH)

3. Elevated temperature conditions: 30°C/65% RH

Duration of Study

Store the emulgel samples under the specified conditions for a period of one month.

MARKETED EMULGEL FORMULATION:

Table 1: Marketed emulgel formulation for different brands:

Sr.No	Brand Name	Active Ingredient	Manufacture	Reference
1.	Diclobar emulgel	Diclofenac diethyl amine	Barakat Pharma	69
2.	Avindo Gel	Azithromycin	Cosme Pharmaceuticals	70
3.	Emulgel	Miconazole nitrate.	Medical union	36
4.	Derma Feet	Urea	Herbitas	38
5.	Voltaren emulgel	Diclofenac diethyl ammonium	Novartis Pharma	69
6.	Volini Gel	Diclofenac Diethylamine	Ranbaxy Laboratories	70
7.	Miconaz-H-emulgel	Miconazole nitrate	Medical union	71
8.	Excex gel	Adapalene, Clindamycin	Zee laboratories	70
9.	Levorag emulgel	Hibiscus, licorice	THD Ltd.	69

10.	Nadicin cream	Nadifloxacin	Psychoremedies	70
11.	Diclomax emulgel	Diclofenac sodium	Torrent Pharma	36
12.	Benzolait emulgel	Benzoyl Peroxide &Biguanide	Roydermal	70
13.	Cataflam Emulgel	Diclofenac Potassium	Novartis	70
14.	Acent gel	Capsaicin, Aceclofenac	Intra labs India Pvt Ltd	70
15.	Lupigyl gel	Metronidazole	Lupin Pharma	38
16.	Lupin Pharma	Octinoxate, Kojicacid,	Micro Gratia Pharma	70
17.	Zortene gel	Tezarotene	Elder Pharmaceuticals	70
18.	Adwiflam Emulgel	Diclofenac diethylamine	Saja Pharmaceuticals	38
19.	Cloben gel	Neomycin, Clotrimazole.	Indoco Remedies	70
20.	Isufen Emulgel	Ibuprofen	Beit jala Pharmaceutical	70
21.	Nucoxia Emulgel	Etoricoxib	Zydus Candila Healthcare LTD	70

Table 2: Current Evaluationin Development of emulgel:

Drug	Aim	Uses	Reference
Amphotericin B	Evaluation of the in vivo leishmanicidal activity of amphotericin B emulgel: An alternative for the treatment of skin leishmaniasis	Leishmaniasis therapy	6
Nimorazole	Nimorazole, a radiosensitizing drug, was prepared and evaluated in a topical emulgel	Antimicrobial activity	36
Amlodipine besylate	Preparation of amlodipine besylate emulgel for transdermal administration and its	Transdermal delivery	6
Terpinen-4-ol	Terpinen-4-ol released and permeation profiles as a function of emulgel rheological behaviour and microstructure	Leishmaniasis Therapy	36
Lacidipine	Novel non-ionic surfactant proniosomes for transdermal delivery of lacidipine: optimization using 23 factorial design and in vivo evaluation in rabbits	Antihypertensive	6
Pinhao starch	Pinhao starch and coat extract as new natural cosmetic ingredients: Topical formulation stability and sensory analysis	Antioxidant activity	6
Betamethasone dipropionate	Development of a topical ointment of betamethasone dipropionate loaded nanostructured lipid carrier	For the treatment of atopic dermatitis	6
Metronidazole and ciprofloxacin	Groundnut oil-based emulsion gels for passive and iontophoretic delivery of therapeutics	Passive and iontophoretic delivery of therapeutics	6
Acyclovir and Ketoconazole	Acyclovir and ketoconazole are delivered topically.	Cutaneous symptoms of viral and fungal infections	36
Piroxicam	Novel non-ionic surfactant proniosomes for lacidipine transdermal delivery: optimization with a 23 factorial design and in vivo testing in rabbits	Pain Relief	36

FUTURE PROSPECTIVE: [72-74,76]

The most frequent issues encountered during the creation of any new formulation are from personal shortcomings and issues. Many medications are hydrophobic, which makes it difficult to distribute them to the biological system. Different drug delivery methods applied topically, such as ointments, creams, and lotions, have good emollient properties yet slow down drug release because of oleaginous bases. Medicines are released more quickly from gels than from other topical methods because gels give the medicines an aqueous environment. Drugs that are hydrophobic can be mixed into an oily basis and applied topically with an emulgel. Emulgel advantages over other topical medication delivery methods are all these, which make them more valuable and effective. These characteristics will be used in the future to deliver more topical drugs like Emulgel.

CONCLUSION:

Emulgel has emerged as a promising topical drug delivery system for hydrophobic drugs. Emulgels have a larger water content, which facilitates easier drug migration via a basically liquid vehicle and greater drug disintegration. To change a conventional emulsion into an emulgel, the gelling

agent is therefore present in the water phase. Emulgels have gained popularity recently because they improve patient compliance. Given its advantages in terms of extrusion, adhesion, viscosity, and spreadability.Emulgel will be a viable option for both loading hydrophobic medicines into water soluble gel bases and as a topical drug administration strategy. Emulgel can be stable for a period of one month when stored at different temperatures and humidity levels.

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