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Emulgel: A Boon for Dermatological Diseases

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Abstract

Emulgel is one such topical drug delivery system that incorporates properties of both gel and emulsion and shows dual release control system. The main objective behind emulgel is delivery of hydrophobic drug via skin so that a hydrophobic moiety can enjoy the unique properties of gels. There are so many common dermatological diseases prevalent in our society like acne, psoriasis, etc and most can be treated by a hydrophobic moiety that face a vast challenge for its efficient delivery through skin, so there is need to overcome this disadvantage of hydrophobic moiety that is done through Emulgel Formulation. Emulgels provide better stability, better loading capacity and controlled release of drug with short half-life. Currently many drugs of antimicrobial, antiviral as well as non-steroidal anti-inflammatory category are studied for their topical delivery through Emulgel formulation and few are marketed as well. Due to various dermatological advantages offered by the emulgel formulation it acts as a boon in derma care and cosmetology field as well as in increasing patient compliance.

Keywords: *Emulgel, Hydrophobic drugs, Topical delivery, derma care, Dermatological Diseases*

Introduction

For decades human skin has offered a novel site for administration of various drugs for both systematic and local application. Many kind of drugs are employed in medical practice for their action upon the skin and mucous membrane. Most of these substances are used for their local pharmacological effects [1]. However stratum corneum that forms the outermost layer of human skin acts as a barrier to most of the drugs and is permeable only to small lipophillic molecules [2]. Topical drug delivery is referred to as a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical routes. Skin is one of the most readily accessible organs on human body for topical administration and is main route of topical drug delivery system [3]. Topical drug delivery system has several advantages such as ability to deliver drug more selectively to a specific site, avoidance of gastro-intestinal incompatibility& metabolic degradation associated with oral administration Moreover topical deliveries provide an increased bioavailability by avoiding first pass metabolism by liver and a consistent delivery for extended period[4]. USP defines gels as the semisolid system consisting of dispersion made up of either small inorganic particle or large organic molecule enclosing and interpenetrated by liquid. Gels are also said to be the three dimensional polymeric matrices compromising a small amount of solid dispersed in large amount of liquid still having a solid like appearance. Gels as topical drug delivery system possess a no. of advantages like ease of application, less greasy and easily removed [5]. But despite of all these advantages gels have limitation in delivery of hydrophobic drugs.To overcome this disadvantage a novelty is incorporated in gel formulation by introduction of emulgels. Emulgels are the combination of emulsion and gels. Main aim of emulgel drug delivery is delivery of hydrophobic drugs so that hydrophobic drugs can also enjoy various advantages of gel formulation [6].Although not only emulgel but various other methods are also available for the topical delivery of hydrophobic drugs. Nano emulsions [7],Microemulsions [8], Proniosomal gels [9] are few techniques used for topical delivery of hydrophobic drugs. In topical drug delivery system drug diffuses out of the delivery system, reaches to the site of action and gets absorbed by the skin. Emulgels are emulsions, either of the oil-in-water or water-in-oil type, which are gelled by mixing with a gelling agent. Gels are polymeric matrices with three dimensional structures and emulsion in itself act as a controlled system where entrapped drug particles diffuse out and slowly pass into the skin [4]. Thus emulgels are a combination of both emulsion and gels and act as a dual control release system for hydrophobic drugs. One of the problems encountered with the topical drug administration is skin penetration due to high concentration of active pharmaceutical moiety [2]. By

acting as a controlled formulation emulgels provide a defence against skin irritation [2].

Structure and Function of Skin [10]:

Skin is consist of three main part: Epidermis (Outer layer) Dermis(Beneath the Epidermis) The skin is supported by a layer of fatty tissue, sometimes known as the hypodermis. This fatty area helps to act as a cushion to protect the body and is also important for insulation.

The epidermis

The epidermis (outer layer) contains no blood vessels and is divided into five layers. Cells move from the base of the epeidermis up to the surface, changing shape and structure as they go. The epidermis is made up of stratified squamous epithelium or hardened cells which play a role in the skin's protective function. This is referred to as the stratum corneum. Epidermal cells line the hair follicles, sebaceous glands and sweat glands.

The dermis

The main function of the dermis is to provide physical support and nutrients to the epidermis. The two layers identified within the dermis are the papillary layer and the reticular layer. Key substances found in the dermis include elastin, fibrillin and collagen (which helps give support and protection), all of which will decrease with age.
The dermis also contains nerve endings, sweat glands, sebaceous glands, hair follicles and blood vessels. The papillary dermis contains smaller blood vessels which supply oxygen, elastic fibres and nutrients to the lower epidermis.

Penetration of drug through human skin

The skin is the largest organ of the body, with a total area of about 20 square feet. The skin protects us from microbes and the elements, helps regulate body temperature, and permits the sensations of touch, heat, and cold [2].
Skin has three layers [11]:

- Waterproof barrier and creates our skin tone.
- The dermis, beneath the epidermis, contains tough connective tissue, hair follicles, and sweat glands.
- The deeper subcutaneous tissue (hypodermis) is made of fat and connective tissue.

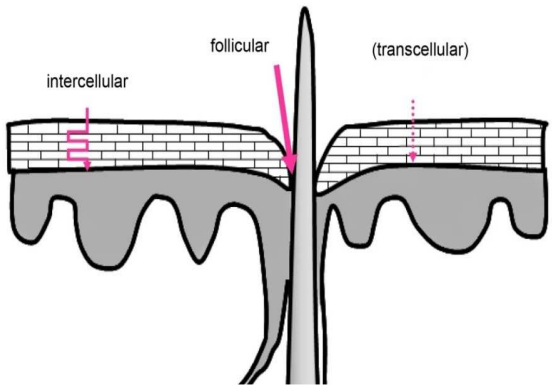

Fig 1: Schematic drawing showing the skin surface interrupted by a follicular orifice and demonstrating the three possible penetration pathways for topically applied substances through the skin barrier [11]

Penetration pathways

There are three penetration pathways available for topically applied drugs [12]:

- Intercellular
- Follicular
- Transcellular

Intercellular: It is defined as the transport of drugs through junction between the epithelial cells [12].

Intracellular: It is defined as passage of drugs across the epithelial cells [13].

Follicular: Here the hair follicle acts as a pathway for penetration of topically applied drugs [12].

Dermatological Diseases:

Dermatological diseases are very common in tropical world as well as other parts of world. They may be caused due to Various fungus, bacteria's viruses etc. Fungal infections are common in tropical countries and can have an important impact on public health. Lobomycosis is a common fungal infection in the tropical rain forest of South America, and paracoccidioidomycosis (South American blastomycosis) is a widespread and sometimes severe illness. *Penicilliosis marneffei* is an opportunistic infection of AIDS patients in Southeast Asia. Chromoblastomycosis and mycetomas are causes of morbidity around the world. Sporotrichosis is a worldwide subcutaneous mycosis with a high incidence in tropical countries

and is an important illness in immunocompromised patients. Rhinosporidiosis was classed as a fungal infection but is now considered a protistan parasite that belongs to the class Mesomycetozoea[14].

The most common Topical Dermatological Diseases are one of the followings:

1. **Acne:** Acne is disorder of skin sebaceous gland and result in clogged pores and lessions commonly called pimples or jits. The main cause is high hormone level. common OTC medication for acne are: Benzyl peroxide, salicylic acid etc. Prescription topical medications are: erythromycin, clindamycin.[15,16].

2. **Psoriasis:** It is fundamentally an inflammatory skin condition with reactive abnormal epidermal differentiation and hyperproliferation affecting 2-3 % of world˝s population. Pathophysiology of the disease includes mainly the activation and migration of T cells to the dermis triggering the release of cytokines (tumor necrosis factor-alpha TNF-alpha, in particular) which lead to the inflammation and the rapid production of skin cells. The possible factors and triggers causing psoriasis include emotional stress, skin injury, systemic infections, certain medications and intestinal upsets Topical treatments are usually the first to be tried when fighting psoriasis that include (emollients, dithranol, tar, deltanoids, corticoids, tacrolimus etc.[17]

3. **Tenia Pedis:** Tinea pedis (athlete's foot) is one of the most common superficial fungal infection of the skin in all regions of the world. Mycotic infections of the foot are common in adult males and uncommon in women and children. Topical antifungal agents are generally adequate in tinea pedis infection. Fungicidal drugs (as terbinafine, butenafine and naftifine) are often preferred over fungistatic drugs for the treatment of tinea pedis infection because its course can be as simple as one application daily for one week treating with high cure rate.[18]

4. **Atopic Dermatitis**: It is a familial, chronic inflammatory skin disease that commonly presents during early infancy and childhood but can persist or start in adulthood. Atopic dermatitis (AD) is often the first manifestation of allergic disease. Most patients with AD will also have another atopic disorder, such as allergic rhinitis, asthma, or food allergy. Therefore the evaluation and management of AD are an integral part of an allergist/immunologist's training and practice. First line treatment include Skin hydration, and topical corticosteriods.[19].

5. **Onychomycosis**: Yellow-brown patches near the lateral border of the nail. Beneath the masses of soft horny debris accumulate & the nail plate gradually becomes thickened, broken & irregularly distorted. Most of the infections are caused by Trichophyton rubrum, T. inerdigitale. [20]

6. **Tinea Unguis(Ringworm):** Characterized by nail thickening, deformity and eventually results in nail plate loss.[21]

7. **Atopic Eczema:** Atopic eczema is the commonest inflammatory skin disease of childhood. Itching, skin damage, redness, sores, sleeploss are various characteristics of eczema. Topical corticosteriods, topical calcinurin inhibitors, various emollients are used in its treatment.[22]

EMULGEL: Emulsion + Gel

Emulgels having advantage of both gels and emulsion act as a controlled drug delivery system for topically applied drugs. They are emulsion of either oil in water type or water in oil type which are gelled by mixing with a gelling agent. Gels have mucoadhessive property that prolongs the contact period of medication over the skin. Both o/w and w/o type of emulsion are used in topical preparation as water washable preparation and emollients for dry skin respectively. However if the emulsion becomes less thixotropic in nature i.e. less viscous on shearing, the process of penetration becomes easy. In order to improve emulsion stability and ability to penetrate stratum corneum it is jellified in a gel base and the resulting formulation is known as Emulgels [4]. Gels in dermatological formulation have advantage of ease of application and removal and provide better stability as compare to cream and ointements[5]. From the four classes of BCS classification of drugs class II drugs show poor solubility and high permeability. It is obvious that for class II drugs having low ability to dissolve is a more important limitation to their overall rate and extent of absorption then their ability to permeate through the membrane. Therefore, when one is concerned with topical delivery of poorly water-soluble drug Emulgels may serve as better option. Emulsified gel has proven a stable one and better vehicle for hydrophobic or poorly water-soluble drugs [4].

Advantages [23,24,25]:

1. **As topical agent:** Most of the topical dermatological formulation such as creams and ointments have disadvantage of less spreading coefficient, sticky nature and needs rubbing during application. These limitations are overcome in gel formulation but despite of various advantage gels have major limitation in delivery of hydrophobic

drugs. Thus emulgels have proved a boon in delivery of hydrophobic drugs topically and providing them advantages of gel formulation.

2. **Stability:** Various other topical preparation show less stability than emulgels. As creams show phase inversion, ointments show rancidity due to oily base and powders are hygroscopic in nature.

3. **Better than other vesicular approaches:** Various other vesicular approaches for topical preparation like niosomes , liposomes due to vesicular structures result in leakage and due to small size in lesser entrapment efficiency, thus have poor loading capacity. Whereas gels due to their vast polymeric three dimensional structure show better loading capacity.

4. **Easy production:**Production of emulgels is easy and done in short steps and no specialized instruments are needed thus low cost is needed for its formulation.

5. **Controlled release:**Emulgels act as a dual control preparation and thus is good for release of drugs with short half life.

6. **No intensive sonication**: While production of vesicular molecules likes liposomes, niosomes needed sonication that may result in drug degradation and leakage. This is not required in emulgels formulation.

7. **Patient compliance**: Emulgels improve patient compliance as they can be self applied and medication can be terminated whenever required.

8. **Other benefits**:Emulgels avoid first pass metabolism and provide site specific drug delivery.

Disadvantages [25]:

Emulgels drug delivery show various advantages but also suffer from few disadvantage like:

1. Drugs with large particle size do not absorb through skin easily.
2. Some drugs show poor permeability through skin
3. Bubble formation may occur during formulation of emulgel.

Various ingredients of Emulgel formulation [4, 13, 23, 26]:

1. **Aqueous material:** This forms aqueous phase of the emulsion. Generally water, alcohol are used.

2. **Oils:** They form the oily phase of the emulsion. Most commonly used oils are mineral oils either alone or in combination with soft and hard paraffin. Non biodegradable mineral oil and castor oils can be used which provide local laxative effects. Oils extracted from different types of plant with various medicinal values can be employed in emulgel formulation. Onesuch oil of medical importance is of Geranium. Geranium is used tostaunch bleeding, healing of wounds, ulcers and skin disorder and intreatment of diarrhea, dysentery and colic. The oil has insecticidal andanti-bacterial properties. Shahin et al. (2011) carried one such of the research work using jojoba oil as oil phase for Emulgel out. They prepared antifungal Emulgel of clotrimazole using jojoba oil as oil phase. Reason of selecting jojoba oil as oil phase was that it might help to reduce inflammation commonly associated with fungal infections. Moreover, it was found effective in combating inflammation in several experimental animal models.

3. **Emulsifiers:** Emulsifiers are used to control stability and emulsification process. Emulsions are thermodynamically unstable system however stability can be increased by using appropriate emulsifying agent.Nonionic surfactants such as spans, tweens have HLB values greater than 8 and are used in the formulation of o/w emulsions whereas mineral oils such as liquid paraffin have HLB values less than 8 & therefore are employed in the formulation of water in oil emulsions. Joshi baibhav et al (2012) has prepared clarithromycin emugel using tween 80 and span 80 as emulsifying agents. However, these surfactants posses problem of toxicity which can be replaced by using biosurfactant[4]. Biosurfactants are produced by microbes and have short fatty acid tail and polar head groups. They are sticky to both hydrophilic and hydrophobic molecules. They have lower toxicity, high biodegradability and are environment friendly. Better foaming properties and stability at extreme p_h and temperature is reported[4].Biosurfactants are produced by microbes and have short fatty acid tail and polar head groups. They are sticky to both hydrophilic and hydrophobic molecules. They have lower toxicity, high biodegradability and are environment friendly. Better foaming properties and stability at extreme p_h and temperature is reported. Various biosurfactant used in medical field are rhamnolipid obtained from Pseudomonas aeruginosa, surfactin obtained from microbial strains of Bacillus subtilis[27].

4. **Gelling agent:** These are used to increase consistency of dosage forms and provide gelled behaviour. It has been found that there exist an inverse relationship between concentration of gelling agent and extent of drug released [4]. HPMC based emulgelshows better drug release than Carbopol based emugel. Various gelling agent used are Carbopol 934, HPMC 2910, HPMC K4M etc.

5. **Permeation enhancers:** These agents increase the permeability of skin for drug penetration by various mechanisms like disruption of highly odered structure of stratum corneum lipids or interacting with intracellular proteins or altering the portioning behivour of drugs into the skin structures. Various penetration enhancers used in emulgel formulation are oleic acid[28], clove oil [29], lecithine, eucalyptous oil, menthol[24] in various concentrations. RachitKhullar et al (2011) prepared mefenamic acid emulgel using various concentration of clove oil as penetration enhancer. Formulation with highest concentration of clove oil reportedly showed better drug release than other formulation.

Incorporation of Hydrophobic drugs into Emulgelformulation [13, 23, 24, and 25]:

Gels show a major limitation during incorporation of hydrophobic drugs as solubility act as a barrier and release of drug from formulation is not good. However, emulgels solve this problem by easy incorporation of hydrophobic drugs into gel base as follows:

Incorporation of Hydrophobic drug into oil phase

▼

Oily globules are dispersed into aqueous phase

▼

This result in o/w emulsion

▼

This emulsion is mixed into gel base

Study of Emulgel formulation:

- **Physical appearance [24]:** Emulgels were tested for their visual appearance, homogeneity, consistency, grittiness and phase separation.

- **Drug content measurement[23]:**This was measured using UV spectrophotometer. Take 1gm of emulgel. Mix it in suitable solvent. Filter it to obtain clear solution. Determine its absorbance using UV spectrophotometer.

Drug Content = (Concentration × Dilution Factor × Volume taken) × Conversion Factor

- **Rheological study [29]:** The viscosity of the formulated batches was determined using a cone and plate viscometer with spindle 7 (Brookfield Engineering Laboratories). The assembly was connected to a thermostatically controlled circulating water bath maintained at 25°C. The formulation whose viscosity was to be determined was added to a beaker covered with thermostatic jacket. Spindle was allowed to move freely into the emulgel and the reading was noted.

- **Spreading coefficient [29]:** Spreading coefficient was determined by apparatus suggested by Mutimer. It consists of a wooden block, which is attached to a pulley at one end. Spreading coefficient was measured on the basis of 'Slip' and 'Drag' Characteristics of emulgels. A ground glass slide was fixed on the wooden block. An excess of emulgel (about 2 g) under study was placed on this ground slide. The emulgel preparation was then sandwiched between this slide and second glass slide having same dimension as that of the fixed ground slide. The second glass slide is provided with the hook. Weight of 500 mg was placed on the top of the two slides for 5 min to expel air and to provide a uniform film of the emulgel between the two slides. Measured quantity of weight was placed in the pan attached to the pulley with the help of hook. The time (in s) required by the top slide to cover a distance of 5 cm was noted. A shorter interval indicates better spreading coefficient.

- **Extrudability test (tube test)[28]:** Extrudability test is based upon the determination of weight required to extrude 0.5 cm ribbon of Emulgel in 10 sec from lacquered collapsible aluminumtube. The test was performed in triplicate and the average values were calculated. The extrudability was then calculated by using the following formula.

Extrudability = Weight applied to extrude Emulgel from tube (in gm) / Area (in Cm^2)

- **Skin irritation test (Patch Test)[30]:** The preparation is applied on the properly shaven skin of rat and its adverse effect like change in colour, change in skin morphology should be checked up to 24 hours. The total set of 8 rats can be used of the study. If no irritation occurs the test is passed. If the skin irritation symptom occurs in more than 2 rats the study should be repeated.

- **Globule size and zeta potential [31]:** Globule Size and Zeta Potential of emulsions were determined by Zetatrac. Zetatrac determines Zeta Potential by measuring the response of charged particles to an electric field.

- **Bioadhesive strength measurement [19]:** The apparatus consist of two arm balance. Both the ends are tied to glass plates using strings. One side contains two glass plates. Other side contains single glass platefor keeping weight. The right and left pans were balanced byadding extra weight on the left hand pan. The balance waskept in this position for 5 min.Accurately weighed 1 g of emulgel was placed between

these two slides containing hairless fresh rat skin pieces, andextra weight from the left pan was removed to sandwich thetwo pieces of glass and some pressure was applied to removethe presence of air. The balance was kept in this position for5 min. Weight was added slowly at 200 mg/min to the left handpan until the two glass slides got detached from each other.The weight (gram force) required to detach the emulgel fromthe glass surface gave the measure of bioadhessive strength. The bioadhessive strength is calculated byusing following:

Biodhessive strength = Weight required (in gm) / Area ($cm^{2)}$

- **Stability studies[30]:** The Emulgels were packed in aluminium collapsible tubes and subjected to stability studies at 5° C, 25° C/ 60% RH, 30° C/65% RH, and 40° C/75% RH for a period of 3 months. Samples were withdrawn at 15-day time intervals and evaluated for physical appearance, pH, rheological properties, drug content, and drug release profiles.

- ***In vitro* drug release study [28]:** The *in vitro* drug release studies of the Emulgel were carried out in modified Diffusion cell using Dialysis membrane. The membrane was soaked in phosphate buffer pH 5.5 for9-12 h was clamped carefully to one end of the hollow glass tube of dialysis cell (2.cm diameter; 4-16 cm2 area). Then Emulgel was spread uniformly on the dialysis membrane. 50 ml of phosphate buffer was taken in a beaker, which was used as receptor compartment. The donor compartment was kept in contact with receptor compartment. This whole assembly was kept on a magnetic stirrer and the solution on the receptor side was stirred continuously using a magnetic bead and temperature of the cell was maintained at 37°C. A similar blank set was run simultaneously as a control. Sample (5 ml) was withdrawn at suitable time intervals and replaced with equal amounts of fresh dissolution media. The Samples were analyzed spectrophotometrically and the cumulative percent drug release was calculated.

- ***Ex-vivo* permeation studies [32]:** Male rats weighing 105-120 gm free from any visible sign of disease were selected. Using a depilatory preparation hair was removed from the skin and the cleared area was washed thoroughly with distilled water. Abdominal skin of full thickness was excised from the rat. This was mounted on the donor compartment. The emulgel was placed over it and the permeation study was carried out in the similar manner as that with artificial membrane.

- **Swelling index[23]:** To determine the swelling index of prepared topical emulgel, 1 gm of gel is taken on porous aluminum foil and then placed separately in a 50 ml beaker containing 10 ml 0.1 N NaOH. Then samples were removed from beakers at different time intervals and put it on dry place for some time after it reweighed. Swelling index is calculated as follows:

Swelling Index (SW) % = [(Wt – Wo) / Wo] × 100. Where, (SW) % = Equilibrium Percent swelling

Wt = Weight of swollen emulgel after time t,
Wo = Original weight of emulgel at zerotime

Future prospective of Emulgel as Topical drug delivery:

Emulgels are the current trend in delivery of hydrophobic drugs topically. Most of the drugs available today are hydrophobic in nature and problem arises due to their solubility and thus poor bioavailability during topical administration. Despite of various advantages emulgels face problem of bubble formation during its formulation and stratum corneum is permeable to small molecules so concerning these facts we can incorporate microsponge that are are highly porous microsized particles with unique ability to entrap pharmaceutical ingredient [33] into an emulgel base.Characteristics such as better loading capacity than other vesicular system, less sticky nature and better spreading of emulgel formulation promise them as a better available option for dermatological use. Various herbal oils with medicinal properties can also be incorporated into the emulgel formulation that may act as synergistic approach for treating a disease. Emulgels as offering various dermatological advantages can be a better alternative for delivery of sun shielding agents by formulating sunscreen in emulgel base. One such research was carried by M.Vettor et al who studied the uv filter distribution and release in skin layer of octyl-methoxycinnamate loaded poly(D,L-lactide) nanoparticles in emulsion gel base[34] but till date no such sunscreen based on emulsion gel base is prepared or studied. So this can offer a great field for study in emulgel evolution field. Microsizing and Nanosizing the particles of emulsion and then dispersing them into gel base can further be studied and these may cause enhancement of topical release of drugs with poor penetration ability. Addition of different penetration enhancers of natural as well as synthetic origin can be further explored for increasing topical penetrability of drugs through emulgel base. Buccal emulgels can also be made by incorporating mucoadhessive polymers and can provide relief in oral infections.

Table 1: Various marketed Emulgel formulation:
Various marketed emulgel formulation are available nowadays such as:

Product name	Drug	Manufacturer	Use
Voltarol1.16% emulgel[35]	Diethylammonium{-o-[2,6 dichlorophenyl)- amino]-phenyl}-acetate	Novartis	Antiinflamatory
DiclomaxEmulgel[4]	Diclofenac sodium	Torentpharma	Antiinflamatory
Miconaz-H-emulgel[36]	Miconazole nitrate, Hydrocortisone	Medical union Pharmaceuticals	Topical corticosteroid and antifungal

Table 2: Current elevation in development of Emulgel for various drugs used in dermatological disease treatment

DRUG	AIM	USE
Terbinafine Hydrochloride[37]	Formulation, Development and *In-vitro* Evaluation of Terbinafine Hydrochloride Emulgel for Topical Fungal Infection	Fungal infection
Ketoprofen[38]	KetoprofenEmulgel: Preparation, Characterization, and Pharmacodynamic Evaluation	Anti-inflammatory
Mefenamic acid[29]	Formulation and evaluation of mefenamic acid emulgel for topical delivery	Anti- inflamatory
Chlorphenesin[39]	Optimization of ChlorphenesinEmulgel Formulation	Anti-fungal
Piroxicam[31]	Formulation Design & Development of Piroxicam Emulgel	Anti-inflamatory
Diclofenac[32]	Development and optimization of novel diclofenacemulgel for topical drug delivery	Anti-inflamatory
Commiphoramukul + Psoraleacorilyfolia[40]	Formulation design and evaluation of herbal antipsoriatic herbal emulgel	Antipsoriatic
Clotrimazole[41]	Preparation and Evaluation of Physical and, Rheological Properties of ClotrimazoleEmulgel	Antifungal
Clarithromycin[28]	Development and Characterization of Clarithromycin Emulgel for topical delivery	Broad spectrum antibiotic
Efavirenz[42]	optimization and invitro evaluation of efavirenzemulgel	non nucleoside reverse transcriptase inhibitor used in oral infection in HIV
Ketoconazole[43]	Development and characterization of ketoconazole emulgel fortopical drug delivery	Antifungal
Ciprofloxacin[44]	Formulation and In-Vitro Evaluation of CiprofloxacinLoaded Topical Emulgel	Antimicrobial

Conclusion

Considering the various advantages and disadvantages of various dermatological topical preparation it is concluded that emulgels serve as the better alternative of the present available marketed topical formulation for delivery of hydrophobic drugs. Emulgels show good spreadability, ease of application better loading capacity and good patient compliance. Emulgels have property of both emulsion and gels and thus can be used for controlling release rate of drugs with

short half- life. They provide stability to the emulsion by providing it a gel base. Incorporation of various active pharmaceutical ingreadient into emulgels is used in treatment of various diseases like fungal infection, as topical antiinflamatory infection, psoriasis etc. Most of the drugs available and available for topical use are hydrophobic in nature and can be easily incorporated into the emulgels and show stability and better drug release. Currently very few marketed emulgel formulation are available in market however it offers a vast field for development and research.however regarding various advantages and future prospective emulgels offer a wide utility in derma care. Due to lack of excessive oily bases and excipients it shows better drug release and thus could be formulation of choice in various dermatological diseases.

"Cite this article"

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