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Research Article

FORMULATION AND EVALUATION OF DIACEREIN CREAM

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ABSTRACT

Besides delivering drug to the body, a drug delivery system aim to improve patient compliance, and dispersible are no exception. The dosage forms available for the delivery of topical agents include ointments, pastes, creams, lotions, gels, and powders. Depending upon the site of application and therapeutic need, each topical dosage form offers unique characteristics. Creams are often preferred over the other topical preparations because less irritating and easier to apply. The cooling effect due to evaporation of water gives soothing effect at the inflamed area. The present investigation concerns the developments of formulation and evaluation of Diacerein cream which are designed to enhance the onset of action. The cream is formulated by two-phase system. The oil phase is melted at 90% and then transferred into the heated aqueous phase. The mixture is stirred by stirrer at 200rpm. As the temperature decreases the cream get formed. The cream is formed by using the fusion technique. The formulation was found to be a best one which gives accurate result. The % of drug content of diacerein was found to be 98.54. The pH was found to be 4.5.Colour was found to be Yellowish semisolid cream. The viscosity was found to be 32727cps, the spreadibility was found to be 9.12, the extrudability was found to be 94.20%.The result shown per stability study after three months, it gives the accurate and satisfactory result.

Keywords: Diacerein, Liquid Paraffin, CetoStrearyl Alcohol, White bees wax.

INTRODUCTION

Topical drug delivery system:

Over the last decades the treatment of illness have been accomplished by administrating drugs to human body via various roots namely oral, sublingual ,rectal ,parental ,topical ,inhalation etc.

Topical delivery can be defined as the application of a drug containing formulation to the skin to directly treat cutaneous disorder or the cutaneous manifestations of a general disease (eg:- psoriasis) with the intent of containing the pharmacological or the effect of drug to the surface of the skin or within the skin semi-solid formulations in all their diversity dominate the system for topical delivery , but foams, spray , medicated powders, solutions and even medicated adhesive systems are in use

Advantages:[1-7]

- Avoidance of first pass metabolism
- Convenient and easy to apply
- Avoid of risk and
- Inconveniences of intravenous therapy and of the varied conditions of absorption like pH changes presence of enzymes gastric emptying time etc.
- Achievement of efficacy with lower total daily dosage of drug by continuous drug input
- Avoid fluctuation of drug levels inter-and intra patent variations

Disadvantages:[8-10]

- Skin irritation of contact dermatitis may occur due to the drug and / excipients
- Poor permeability of some drugs through the skin
- Possibility of allergic reactions
- Can be used only for drugs which require very small plasma concentration for action
- Enzyme in epidermis may denature the drugs
- Drugs of larger particle size not easy to absorb through the skin

Physiology of the skin:[11-14]

The skin has several layers. The over laying outer layer is called epidermis; the layer bellow epidermis is called dermis. The dermis contains a network of blood vessels, hair follicle, sweat gland &sebaceous gland. Beneath the dermis is subcutaneous fatty tissues .Bulbs of hair project into these fatty tissues.

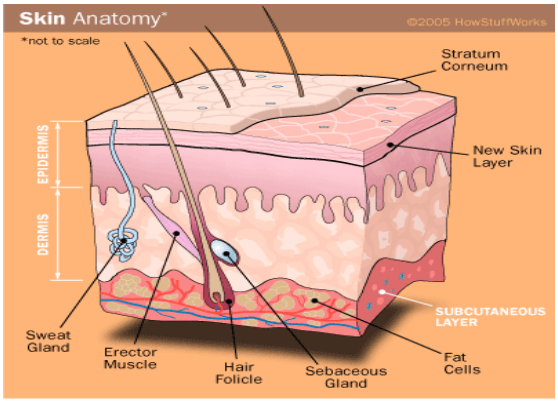

Fig.1: Cross section of Human skin

The layers of epidermis are:

1. Stratum germinativum (growing layer)
2. Malpighion layer (pigment layer)
3. Stratum spimnosum (granular layer)
4. Stratum lucidum
5. Stratum corneum (horny layer).

Absorption through skin:[16-18]

Two principal absorption routes are identified:

Transepidermal absorption:

It is now generally believed that the trans epidermal pathway is principally responsible for diffusion across the skin. The resistance encountered along this pathway arises in the stratum corneum. Permeation by the transepidermal route first involves partitioning into the stratum corneum.

Diffusion then takes place across this tissue. The current opular belief is that must substances diffuse across the stratum corneum via the intercellular lipoid route. This is a tortuous pathway of limited fractional volume and even more limited productive fractional area in the plane of diffusion. However, there appears to be another microscopic path through the stratum corneum for extremely polar compounds and icons. Otherwise, these would not permeate at rates that are measurable considering their o/w distributing tendencies. When a permeating drug exits at the stratum corneum, it enters the wet cell mass of the epidermis and

since the epidermis has no direct blood supply, drug is forced to diffuse across it to reach the vasculature immediately space for icons and polar non electrolyte molecules to diffusionally squeeze through. Thus, permeation requires frequent crossings of cell membranes, each crossing being a thermodynamically prohibitive event for such water-soluble species extremely lipophilic molecules on the other hand, are thermodynamically constrained from dissolving in the watery regime of the cell (cytoplasm). Thus the viable tissue is rate determining when non polar compounds are involved. Passage through the dermal region represents a final hurdle to systemic entry.

This is so regardless of whether permeation is transepidermal or by a shunt route. Permeation through the dermis is through the interlocking channels of the ground substance. Diffusion through the dermis is facile and without molecules since gaps between the collagen fibers are far too wide to filter large molecules. Since the viable epidermis and dermis lack measure physicochemical distinction, they are generally considered as a single shield of diffusion, except when penetrates of extreme polarity are involved, as the epidermis offers measurable resistance to such species.

Transfollicular (Shunt pathway) absorption:

The skin's appendages offer only secondary avenues for permeation. Sebaceous and eccrine glands are the only appendages, which are seriously considered as shunts by passing the stratum corneam since these are distributed over the entire body, though eccrine glands are numerous, their orifices are tiny and add up to a miniscule fraction of the body's surface. Moreover, they are either evacuated or so profusely active that molecule cannot diffuse inwardly against the glands output. For these reasons, they are not considered as a serious route for percutaneous absorption.

However, the follicular route remains an important avenue for percutaneous absorption since the opening of the follicular pore, where the hair shaft exists the skin, is relatively large and sebum aids in diffusion of penetrates. Partitioning into sebum, followed by diffusion through the sebum to the depths of the epidermis is the envisioned mechanism of permeation by this route. Vasculature sub serving the hair follicle located in the dermis is the likely point of systemic entry. Absorption across a membrane, the current or flux is and the terms of matter or molecules rather than electrons, and the driving force is a concentration gradient (technically, a chemical potential gradient) rather than a voltage drop. A membranes act as a "diffusion resistor". Resistance is proportional to thickness (h), inversely proportional to the diffusive mobility of matter within the membrane or to the diffusion

Coefficient (D), inversely proportional to the fractional area of a route where there is more than one (F), and inversely proportional to the carrying capacity of a phase.

R = h/FDK
R = Resistance of diffusion resistor
F = Fractional area
H = Thickness, D = Diffusivity, K = Relative capacity

Basic principle of permeation:

In the initial transient diffusion stage, drugs molecules may penetrate the skin aling the hair follicles or sweat ducts and then be absorbed through the follicular epithelium and sebaceous glands. When a steady state has been reached diffusion through stratum corneam becomes the dominated pathway.

The membrane-limited flux (J) under steady condition is described by expression

$$J = \frac{DAK_{o/w}\, r\, C}{h}$$

Kinetics of permeation: [16-18]

Knowledge of skin permeation is cital to the successful development formulation. Permeation of a drug involves the following steps,

Sorption by stratum corcum,

Penetration of drug though viable epidermis,

Uptake of the drug by the capillary network in the dermal papillary layer.

This permeation can be possible only if the drug possesses certain physicochemical. The rate of permeation across the skin (dQ/dt) is given by:

$$\frac{dQ}{dt} = P_s (C_d - C_r)$$

Where C_d and C_r are, the concentrations of skin penetrate in the donor compartment (e.g., on the surface of stratum corneum) and in the receptor compartment (e.g., body) respectively. Ps is the overall permeability coefficient of the skin tissues to the penetrate. This permeability coefficient is given by the relationship:

$$P_s = \frac{K_s D_{ss}}{H_s}$$

Where K_s is the partition coefficient for the interfacial partitioning of the penetrate molecule form a solution medium on to the stratum corneum, D_{ss} is the apparent diffusivity for the steady state diffusion of the penetrate molecule through a thickness of skin tissues and h_s is the overall thickness of skin tissues. As k_s, D_{ss} and h_s are constant under given conditions, the permeability coefficient (P_s) for skins penetrate can be considered to be constant.

From equation (1) it is clear that a constant rate of drug permeation can be obtain when $C_d >> C_r$ i.e., the drug concentration at the surface of the stratum corneam (C_d) is consistently and substantially greater than the drug concentration in the body (C_r). The equation (1) becomes:

And the rate of skin permeation (dQ/dt) is constant provide the magnitude of C_d remains fairly constant throughout the course of skin permeation. For keeping C_d constant, the drug should be released from the device at a rate (R_r) that is either constant or greater than the rate of skin Uptake (Ra) i.e., $R_r >> R_a$.

Factor affecting topical permeation:

Physicochemical properties of drug substances

- Partition coefficient
- pH-condition
- Drug solubility
- Concentration
- Particle size
- Polymorphism
- Molecular weight

Penetration enhancer: [19-26]

Percutaneous absorption can be enhancing in two ways either by chemical enhancer or by physical method.

Chemical penetration enhancer: By definition, a chemical skin penetration enhancer increase skin permeability by reversibly damaging or by altering the physicochemical nature of the stratum corneam to reduce its diffusion resistance. Among the alterations are increased hydration of stratum corneam and / or a change in the structure of the lipids and lipoproteins in the intercellular channels through solvent action or denaturation. These may conveniently be classified under the following main heading:

Solvents: These compounds increase penetration possibly by swelling the polar pathway and/or by fluidizing lipids. Examples include water, alcohols, methanol and ethanol; alkyl methyl sulfoxide, dimethyl sulfoxide, alkly homologs of methyl sulfoxide, dimethyl acetamide and dimethylformamide; pyrrolidones- 2 – pyrrolidone, N-methyl, 2-pyrrolidone; laurocapram (Azone), mieellancous solvents- propylene glycol, glycerol, silicone fluids, isopropyl palmitate.

Surfactant: These compounds are proposed to enhance polar pathway transport, especially of hydrophilic drug. The ability of the

surfactant to alter penetration is a function of polar head group and the hydrocarbon chain length. Commonly used surfactants are as follow

Anionic surfactant: It can penetrant and interact strong with skin. Examples include are Dioctyl sulphosuccinate, Sodium lauryl sulphate, Decodecylmethyl sulphoxide etc.

Cationic surfactant: Cationic surfactants are reportedly more irritating than anionic surfactants and they have not been widely studied as skin permeation enhancer.

Nonionic surfactant: Noionic surfactants have last potential for irritation. Example includes are Pluronic F127, Pluronic F68 etc.

Bile salts: Sodium taurocholate, Sodiu deoxycholate, and Sodium tauroglycocholate.

Binary system: These apparently open the heterogeneous multilaminatated pathway as well as the continuous pathways. Examples include are Prolylene glycol – oleic acid and 1,4-butane diol-linoleic acid.

Miscellaneous Chemicals*:* These includes urea, N,N-dimethyl-m-toluamode, calcium thioglycolate etc.

Physical method of topical drug delivery:

Intophorosis: Intophorosis is a process or a technique involving the transport of ionic or charged molecules into a tissue by the passage of direct or periodic electric current through an electrode solution containing the ionic molecules to be delivered using an appropriate electrode polarity.

Electroporation: The process involves the application of transient high voltage electrical pulse to cause rapid dissociation of the stratum corneam through which large and small peptides, oligonucleotides and other drugs can pass in significant amounts. Electro portion or elecro-permeambrane voltage. The change in the membrane involves structural arrangement and conductance leading to temporary loss of semi-permeability of cell membranes suggesting formation of pores.

Sonophoresis: Sonophoresis involves the usage of the frequency ultrasound waves. The ultrasound application has resulted in permeation of low frequency ultrasound was shown to increase the permeability of human skin to many drugs including high molecular weight protein by several orders of magnitude.

Ponophoresis: The movement of drugs through living intact skin and into soft tissues under the ultrasound perturbation is called phonophoresis. The technique involves placing an ultrasound-coupling agent on the skin over to be treated and massaging the area with an ultrasound source.

Vesicular concept: Drug enclosed vesicle made from phospholipids and nonionic surfactants are used for liposome, noisome and transfer some. The lipid vesicle serve as a rate limiting membrane barrier for system absorption of drug, non-toxic penetration enhancers for drug, organic solvents for solubilization of poorly soluble drugs and can incorporate both hydrophilic and lipophillic drugs.

Micro fabricated micro needles technology: This technology employed micron-sized needles made silicon. These micro needles after insertion into skin create conduits for transfer of drug through the stratum corneum. The drug after crossing stratum corneum diffuses rapidly through the stratum corneum. The drug after crossing stratum corneum diffuses rapidly through deeper tissues and taken up by capillaries for systemic administration.

Cream

Definition:

Creams consist of medicaments dissolved or suspended in water removable or emollient bases. Creams are classified as water-in-oil or oil- in water therefore, combining immiscible compounds is possible by mechanical agitation or heat. The wet gum, dry gum, bottle, ad beaker methods are employed. More recently, the term has been restricted to products consisting of oil-in-water emulsions or aqueous microcrystalline dispersions of long chain fatty acids or alcohols that are water washable and more cosmetically and aesthetically acceptable

Types:

Most commonly available creams classified on the basis of their function.

- Cleansing & cold cream or lotion
- Vanishing & Foundation cream
- Night & massage cream
- Hand & body cream
- All purpose cream
- Moisturizing cream

AIM AND OBJECTIVE

The aim of the present investigation is to formulate and evaluate of Topical composition of diacerein cream in a suitable semi solid dosage form for the treatment of skin disease (psoriasis).

Reason for the Selection of the Cream Dosage Form:

In the treatment of acne, the vehicle (cream, gel, lotion or solution) may be as important as the active agent. Creams are appropriate for patients with sensitive or dry skin who require a nonirritating, nondrying formulation. Patient with dry skin may complain of a "dry" feel with gels. So the people are performing deal with cream. *Patients who have dry skin may be more comfortable with creams, which have a Oily effect.* Topical application of the cream at the affected site, offer potential advantage of delivery of drug; directly to the site of the action. Cream, work best in patients with dry skin. Diacerein is used to treat psoriasis. It is used for psoriasis that did not get better after treatment with other medicines.

METERIALS AND METHOD

List of Instruments

Table 1: List of materials used in preparation of formulation

Instruments	Purpose
Mettler wt. balance	API / Excipients Weighing
Electronic wt. balance	API / Excipients Weighing
Stirrer	For uniform mixing/ dissolution/ dispersion of drug.
Homogenizer	For uniform mixing / dispersion
pH meter	Adjustment of pH
Brookfield Viscometer	To determine consistency of the cream
Remi centrifuge	To centrifuge the formulation
Sonicator	To increase the solubility of drug
UV spectroscopy	Absorbents concentration and standard curve
HPLC	For proper identification of Active ingredients.

Table No.2: List of materials used in preparation of formulation

Material	Manufactures/ Suppliers
Diacerein	Choral Labs Ltd.
Liquid Paraffin	Bindale chemicals
CetoStrearyl Alcohol	Croda chemicals
Methyl paraben	Clariant (Nipasol)
Propylparaben	Clariant (Nipasol)
Glycerin	Colorcon Asia Pvt. Ltd. Goa
Propylene glycol	Merck
White bees wax	Noveon Inc.
Sodium meta bi sulphate	Glenmark
Benzyl Alcohol	Loba Chemicals
Lavendar oil	Loba Chemicals

Formulation development of diacerein cream

Procedure for preparation of diacerein

Melt the white bees wax in a china dish and add liquid paraffin to heat it to a temperature of 70◦C Dissolve the methyl paraben in water and increases the temperature of aqueous solution to 70◦C. Formerly we prepare oily part with propylene glycol and glycerol. Propylene glycol used as solvent for dissolving drug (diacerein). Add aqueous part in the oily part and stir it continuously when a creamy emulsion is formed cool it and slowly add perfume at room temperature. Sodium Meta bi sulphate used for pH adjustment to the cream.

Table 3: Formula for formulation FA-FC

Sr. No	Ingredients	Formulation -1	Formulation -2	Formulation -3
		%	%	%
1	Diacerein	8.3332	8.3332	8.3332
2	White bees wax	3.2003	3.2093	3.2071
3	Liquid paraffin	6.6687	6.6927	6.6668
4	Glycerin	13.3352	13.3211	13.3458
5	CetoStrearyl Alcohol	9.9000	10	10.1
6	Methyl paraben	0.6632	0.6530	0.6782
7	Propylene glycol	32.9850	33.3250	34.1000
8	Sodium metabi sulphate	6.6767	6.6667	6.7000
9	Lavender oil	0.045	0.048	0.035
10	Purified water	22.752	22.752	22.752
	Total weight	60gm	60gm	60gm

EVALUTION OF DIACEREIN CREAM

Determination of pH:

The pH of the creams, were found immersing pH meter to a depth o.5 cm in a beaker containing cream. The determinations were carried out in triplicate and the average of three reading is recorded. The Results were shown in Table no.4

Determination of Physical appearance:

The colour is observed visually. The cream having yellowish colour. The cream is observed against dark background. The average of three reading is recorded. The Results were shown in Table no.5

Determination of Viscosity:

The viscosity of formulated cream bases was determined. The viscosity determinations were carried out on Brook-field viscometer using spindle number S-06 and the determinations were carried out in triplicate and the average of three reading is recorded. The Results were shown in Table no.6

Determination of Spreadibility:

The parallel plate method is the most widely used method for determining and quantifying the spreadibility of semisolid preparations. The advantages of the method are simplicity and relative lack of expense. Also, the assemblies can be designed and fabricated according to individual requirements to type of data required. On other hand, the method is less precise and sensitive, and the data it generates must be manually interpreted and presented. Later, Vennat et al. validated the spreading diameter measurements of creams on the basis of cellulose derivatives and established the linearity of spreading diameter measurements. The linear relationship between viscosity and spreading diameter was independent of the derivative. The spreading capacity of the cream formulations was measured 48 h after preparation by measuring the spreading diameter of 1 g of the cream between two 20X20 cm glass plates after 1 min. the mass of the upper plate was standardized at 125 g. panigrahi et al. used a Similar apparatus to assess the spreadibility of creams.

The following equation was used for the purpose:

$$S = m \times \frac{L}{T}$$

Where:
S, is the spreadibility of cream formulations
M, is the weight (g) tied on the upper plate,
L, is the length cm) of the glass plates, and
T, is the time taken for plates to slide the entire length.

Procedure: two glass slide of 20 x 20 cm were selected. The cream formulation whose spreadibility had to be determined were placed over one of the slides. The other side was placed upon the top of the cream such that the cream was sandwiched between the two slides in an area occupied by a distance of 60 cm along 100g weight was placed upon the upper slide so that the cream between the two slides was pressed uniformly to form a thin layer. The weight was removed and the fixed to a stand without slightest disturbance and in such way that only the upper slide without slights disturbance and in such a way only the upper slide to side off freely, to the force of weight tied to it. A 20g weight was tid to upper side carefully. The time taken for the upper slide to travel the distance of 6cm and separate away from the lower slide under the certain of weight was noted. The determinations were carried out in triplicate and the average of three reading recorded. The Results were shown in Table no.7

Determination of extrudability:

It is a useful empirical test to the measure he forces to extrude the material from a tube. Since the packing of creams have gained a considerable importance in delivery of desired quantity of cream from jar of extrusion of cream collapsible tube, therefore measurement of extrudability becomes an important criteria for creams.

Procedure: the cream formulation were filled in standard caped collapsible lami-tube and sealed. The tube was weighted recorded. The tube was placed between two glass slides and was clamped.

A 500g weight was placed over the glass slide and then glass slides and was clamped. A 500g weight was placed over the glass slide and then cap was opened. The amount of cream extruded were collected and weighted. The % of cream extruded was calculated; and grades were allotted (++++ excellent, +++ good, ++ fair, +poor). The Results were shown in Table no.8

Drug content uniformity:

Drug content uniformity were performed according to the USP requirement for the cream formulation uniformity for content check Assay method by UV in the filled tube sample was taken from upper, middle and end portion and analysised by UV Spectrophotometer. The Results were shown in Table no.9

Preparation of standard solution:

An accurately weighed 5 mg of diacerein was dissolved in 10 ml of dimethyl formamide (DMF) in a 50 ml volumetric flask and the volume was adjusted up to the mark with distilled water to obtain a stock solution of 100 µg/ml. The solution was filtered through Whatman filter paper No. 41. Aliquots of 0.1 to1 ml portions of standard solution were transferred to a series of 10 ml volumetric flasks and volume in each flask were adjusted to 10 ml with distilled water to obtain a concentration of range of 1-10 µg/ml. One of the solutions was scanned in UV range using DMF: distilled water (1:4) as a blank and λmax was found to be 258.5 nm. The absorbance of solutions was measured at 258.5 nm against blank and calibration curve of diacerein was constructed.

Preparation of sample solution:

Twenty capsules of diacerein were emptied and powder was weighed. Amount equivalent to 5 mg was transferred to 50 ml volumetric flask, dissolved in 10 ml of DMF and made up the volume with distilled water to obtain a concentration of 100 µg/ml. The solution was filtered through Whatman filter paper No. 41 and filtrate was diluted to obtain concentration in between linearity range. The absorbance of sample solution was measured and amount of diacerein was determined by referring to the calibration curve. Recovery studies were carried out at 50, 100 and 150% level by adding a known quantity of pure drug to the reanalyzed formulation and the proposed method was followed. From the amount of drug found, percentage recovery was calculated. The above concentration solutions were scanned between 238&505 nm by using UV spectrophotometer and DMF was used as blank solution.

Spectroscopy analysis

Calculation:

Label claim

Test abs Std Weigh 2 100 10 100
---x---x---x---x---x---
Std abs 100 10 test we. 2 100

$$\text{Percentage Purity} = \frac{\text{Test content}}{\text{Label claim}} \times 100$$

The Results were shown in Table no.10

Stability studies of diacerein topical cream

It is the responsibility of the manufacturers' to see that medicine reaches the consumer in an active form. So the stability of pharmaceutical is an important criteria.

Stability of medicinal products may be defined as the capacity of a particular formulation in a specific container to remain within its physical, chemical, microbial, therapeutic and toxicological specification, i.e. stability of drug is its ability to resists detoriation.90%of labeled potency is generally recognized as the minimum acceptable potency level.

Detoriation of drug may take several forms arising from changes in physical, chemical and microbiological properties. The changes may affect the therapeutic value of preparation or increase its toxicity.

Accelerated stability testing:

Since the period of stability testing can be as long as two years, it is time consuming and expensive. Therefore it is essential to devise a method that will help rapid prediction or long-term stability of drug.

The accelerated stability testing is defined as the validated method by which the product stability may be predicted by storage of the product under conditions that accelerate the change in defined and predictable manner.

The stability studies of formulated cream were carried out 40/75(^{0}C/RH) and at room temperature for one month. The effects of temperature, humidity and time on the physical characteristics of the creams were for assessing the stability of the prepared formulations.

The stability studies were carried out when the room temperature was 20 to 25^{0}C The Results were shown in Table no.11

RESULTS AND DISCUSSION

1. P^H:

Table 4: Determination of pH

Sr. No	Batch No.	pH
1.	FA	4.21
2.	FB	4.5
3.	FC	4.1

2. Color:

Table 5: Determination of Physical appearance

Sr. No	Batch No.	Colour
1.	F1	Yellowish semisolid cream
2.	F2	Yellowish semisolid cream
3.	F3	Yellowish semisolid cream

3. Viscosity:

Table 6: Determination of Viscosity

Sr. No	Batch No.	Spindle No. 1	Run Time	RPM	Temperature	Viscosity in cps
1.	F1	Spindle No. 6	30Sec.	1rpm	25.1C	32598
2.	F2	Spindle No.6	30Sec.	1rpm	25.1C	32727
3.	F3	Spindle No.6	30Sec.	1rpm	25.1C	30475

4. Spreadibility:

Table 7: Determination of Spreadibility

Sr. No.	Batch no.	Load apply	Distance in cm	Spreadibility g.cm/sec.
1.	F1	15 gm	0.675	9.15
2.	F2	15 gm	0.760	9.12
3.	F3	15 gm	0.720	9.16

5. Tube extrudability:

Table 8: Determination of Extrudability

S.No.	Batch No.	Load apply	Cream out in cm	%Extrudability
1.	F1	15 gm	13.8	93.33
2.	F2	15 gm	14.2	94.20
3.	F3	15 gm	13.9	93.75

6. Drug content:

Table 9: Determination of drug content

Final formula	Sample	% Assay	% Average
F2	Top	97.92	
F2	Middle	99.3	98.54
F2	Bottom	98.7	

Table 10: Assay of Diacerein Cream by UV Spectroscopy

Batch No	Absorbance (238&505nm)	% purity
F1	3.1658&0.2635	95.94
F2	3.2631&0.2688	97.92
F3	3.1654&0.2457	94.80
Marketed product	3.1981& 0.2593	96.22

Stability studies

Table 11: Accelerated Stability Stiudies

Parameters	Initial	After one month 40/75(°C/RH)
Appearance	Yellowish colour	Yellowish colour
Feel on Application	Smooth	Smooth
Ph	4.5	4.4
Viscosity	32727	32457
Assay (%)	97.92	97.75

Assay of diacerein cream by u.v spectroscopy

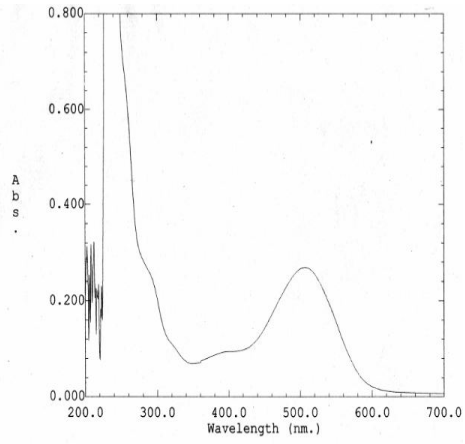

Fig. 2

CONCLUSION

The prepared cream formulations were subjected to stability study as per ICH guidelines for the period of one month. The stability evaluation data were mentioned.. The physic-chemical characteristics and % assay of drug in both the formulations were found to be satisfactory from the result it is clearly evident that the physic-chemical parameters like appearance, pH, specific gravity and initial % assay of drug in both the formulations were found to be satisfactory. The prepared formulations were subjected to stability study as per ICH guidelines for the period of one month.

The physic-chemical parameters and % assay of drug in formulations were found to be satisfactory. In the present work the Diacerein cream were prepared selecting different stiffener, Emulsifier, Antioxidant & pH modifier. The evaluation test pH, colour, spreadibility, tube extrubility & % drug content test were prepared and evaluated. The optimized formulation **F2** is the best formula which gives accurate result. The % drug content of Diacerein was found to be 97.92% .The pH was 4.5 colour was yellowish semisolid cream, viscosity was 32,727 cps, Spreadibility was 9.12 and tube extrubility was 93.8.It was concluded that the Diacerein cream can be formulated by fusion method, for the treatment of Psoriasis disease which minimizes the White colour of the patches.

BIBLIOGRAPHY

1. Surver,C. AND Davis,F.A.,Bioaviaability and Bipoequivalence,In Water, K.A..(Ed.),Dermatological and Transdermal Formulation,Marcel Dekker, INC. New York, 119,2002,pp .403,323,326,327,403.
2. Stan-posthumd J.J.,Vink J.,Lecessies,Brujin J.A.,Et.al.,Topical Tretinoin Under Oocclusion on a Typical Navei,1998,548.
3. Ansel H.C.,Allen L.V.,Pharmaceutical doage forms and Drug Delivery System,7th edition,Lippiincott Williams and Wilkens,Baltimore,2000,244-2464,249-251,253-255,264-265.
4. NayakS.H.,,YeoleP.G.,The Indian Pharmacist, Vol.III, No.27, Sept.2004, 7-14.
5. Jain N.K., Pharma Times, Vol-II No.14 May 2000, 21.
6. Misra A.N., Controlled and Novel Drug Delivery, CBS Publishers and Distributors, New Dehli, 1997, 107-109.
7. Nandu S., Et.al. Ind.J.Pharm.Sci. Vol.60.No.4. 1998, 185-188.
8. Mishr B., Et.al. Ind.J.Exp.Biol, 1990,28,1001.
9. Kumari P.,Shankar c.and Mishra B.,The Indian Pharmacist,Vol III,No.24,June 2004,7-16.
10. Lee V.H.L., and Robinson J.r., Introduction of skin J.Pharm.Sci.1979,68,673.
11. Banker G.B.S., Rodes C.T.,Modern Pharmaqcist,2nd edition,Vol.40,Marcel Dekker,New York,1979,263-273,283,286-287,299-311.
12. Lemberger A.P., A Hand Book of Non Prescription Drug, American Pharmaceutical Association, Washington, 1973,161.
13. Wilkes G.L., Brown I.A. and Wilauer R.H., Ingredients used for semisolid dosage form,, Aug.1973,453.
14. Rushmer R.F., Buettner K.J.K., Short J.M., Odland, Science, 1966,154,343.
15. Mithal B.M., and Saha R.N.,A Hand Book of Cosmetics,1st edition,Vallaabh Prakashan Delhi,2003,11-17,21-22,37-38,61-89,90-93,177,214-215.
16. Jain N.K., Controlled and Novel Drug Delivery, 1st edition, CBS Publishers and Distributors, Delhi, 1997, 100-106.
17. Storm J.E., Collier S.W., Stewart S., Metabolisam of Xenobiotics During Percutaneous Penetration: Role of Absorption Rate and Cutaneous Enzyme Activity, Fundam.Appl.Toxicol, 1990, 132-41.
18. Bankar G.S., Chalmers R.K., Pharmaceutics and Pharmacy Practice, 1st edition,Lippiincott Company,1982,28-294.
19. Vyas S.and Khar R.K., Controlled Drug Delivery-Concept and Advances, Vallabh Prakashan, 2002, 418-422.
20. Kaur I.P., Smith L.I., Percutaneous Absorption-Penetration Enhancers, 1998, 34-33.
21. Shah V.P., Williams R.L., Skin Penetration Enhancement Clinical Pharmacological and Regulatory Considerations, 1993, 27-35.
22. Osborne D.W., Henke J.J., Skin Penetration Enhancers Cited in the Technical Literature, Pharm.Tech. 1997, 21, 50-66.
23. Stilwell G.K., Electrical Stimulation and Iontophoresis in Krussen F.H., Saunders Company, 1971, 14.
24. Sloan J.B., and Soltani K., Introduction to dermatological Products 1986, 30-72.
25. Prausnitz M.R. and Bose V.G., Electroporation: In Percutaneous Penetration Enhacers, CRC Press, Bocaraton.1995, 393-405.
26. Shyamala B., Kumari L.P., and Harish C.G., Ind.J.Pharm.Sci. 64(4), July-Aug 2005, 475-476.
27. Block L.H., Remington-The Science and Practice of Pharmacy, I volume,21st edition, Lippincott Williams and Wilkins, 2006, 875-877.
28. 28.Ghosh T.K.,Banga A.K., Pharm Technol,1993,62,68.Sloan K.B.,Bodor N.,Int J.Pharm,1982,299.
29. Bottger W.M., Et.al. J.Pharmacokinetic Biopharma, 1997, 23, 24.
30. Sloan K.B., Bodor N., Study of Pharmacokinetic Parameters, 1982, 299.
31. Amin P.D., Tayade P.T. and Dhavse V.V., Estern Pharmacist, 1998,486, 127.
32. 32.Saeftone M.F., Giannaccini B.,Savigni P.and Wirth A., Pharm.Pharmacol,1980,32,519.
33. Chrai S.S and Robinson J.R., Introduction to Pharmacokinetic Parameters,Vol-III 1974,63,1219.
34. Kibbe H.A., Hand Book of Pharmaceutical Excipients,3rd edition,Pharmaceutical Press London,2000,41.
35. Tamilvanan S., Ind.J.Pharm.Edu, 38(02), Apr-June 2004, 73-80.
36. Myers D., Surfactant Science and Technology, VCH Publishers, 1992, 209-247.
37. Eccleston G.M., Encyclopedia of pharmaceutical Technology,9th Vol.Marcel Dekker,New York,1992,375-421.
38. Matillha, Antioxidants, Annu.Rev.Biochem. 1947, 177-192.
39. Walfg,The Discovery of the Antioxidant Function of Vitamin E,J.Nutr.135(3),2005,358-366.