FORMULATION AND EVALUATION OF DIACEREIN CREAM

KOTTA KRANTHI KUMAR*, K.SASIKANTH1, M.SABAREESH2, N.DORABABU4

Narasaraopeta Institute of Pharmaceutical Sciences*, Nova College of Pharmacy jrd1, Safa College of Pharmacy3, Santhiram College of Pharmacy*, India. Email: kranthipumarkotta@gmail.com

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, parenteral, 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.

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 lipidoid 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
event for such water-soluble species extremely lipophilic molecules
membranes, each crossing being a thermodynamically prohibitive
through. Thus, permeation requires frequent crossings of cell
and polar non electrolyte molecules to diffusionally squeeze

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 corneum
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
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 along 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 corneum becomes the dominated pathway.
The membrane-limited flux (J) under steady condition is described by expression

\[ J = \frac{DAK_{eq}}{h} \]

\[ J = \frac{DAK_{eq}}{h} \]

Kinetics of permeation: 16-18
Knowledge of skin permeation is vital to the successful development
formulation. Permeation of a drug involves the following steps,
Sorption by stratum corneum,

Penetration of drug through 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. \( P_s \) is the overall
permeability coefficient of the skin tissues to the penetrate. This permeability coefficient is given by the relationship:

\[ K_s D_{ss} \]

\[ P_s = \frac{K_s D_{ss}}{H_s} \]

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. \( K_s, D_{ss}, \) 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 corneum \( (C_d) \) 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 \( (R_a) \) 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
corneum to reduce its diffusion resistance. Among the alterations
are increased hydration of stratum corneum 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, alky homologs of methyl sulfoxide,
dimethyl acetamide and dimethylformamide; pyrrolidones- 2 -
pyrrolidone, N-methyl, 2-pyrrolidone; laurocapram (Azone),
miniscule 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
Manufactures/employed micron sized needles made silicon. These micro needles are 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:**

- 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 the 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, non-drying 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.

**Materials and Method**

**List of Instruments**

<table>
<thead>
<tr>
<th>Table 1: List of materials used in preparation of formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instruments</strong></td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>Mettler wt. balance</td>
</tr>
<tr>
<td>Electronic wt. balance</td>
</tr>
<tr>
<td>Stirrer</td>
</tr>
<tr>
<td>Homogenizer</td>
</tr>
<tr>
<td>pH meter</td>
</tr>
<tr>
<td>Brookfield Viscometer</td>
</tr>
<tr>
<td>Remi centrifuge</td>
</tr>
<tr>
<td>Sonicator</td>
</tr>
<tr>
<td>UV spectroscopy</td>
</tr>
<tr>
<td>HPLC</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Material</th>
<th>Manufacturers / Suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diacerein</td>
<td>Choral Labs Ltd.</td>
</tr>
<tr>
<td>Liquid Paraffin</td>
<td>Bindale chemicals</td>
</tr>
<tr>
<td>Cetyl Stearyl Alcohol</td>
<td>Croda chemicals</td>
</tr>
<tr>
<td>Methyl paraben</td>
<td>Clariant (Nipasol)</td>
</tr>
<tr>
<td>Propyl paraben</td>
<td>Clariant (Nipasol)</td>
</tr>
<tr>
<td>Glycerin</td>
<td>Colorcon Asia Pvt. Ltd. Goa</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>Merck</td>
</tr>
<tr>
<td>White bees wax</td>
<td>Noveon Inc.</td>
</tr>
<tr>
<td>Sodium meti bisulphate</td>
<td>Glenmark</td>
</tr>
<tr>
<td>Benzyl Alcohol</td>
<td>Loba Chemicals</td>
</tr>
<tr>
<td>Lavendar oil</td>
<td>Loba Chemicals</td>
</tr>
</tbody>
</table>
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. Formally, 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 Metabisulphate used for pH adjustment to the cream.

Propylene glycol used as solvent for dissolving drug (diacerein). Add water and increases the temperature of aqueous solution to 70°C. Heat it to a temperature of 70°C. 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.

**Ingredients**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Ingredients</th>
<th>Formulation FA-FC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diacerein</td>
<td>8.3332</td>
</tr>
<tr>
<td>2</td>
<td>White bees wax</td>
<td>3.2003</td>
</tr>
<tr>
<td>3</td>
<td>Liquid paraffin</td>
<td>6.6687</td>
</tr>
<tr>
<td>4</td>
<td>Glycerin</td>
<td>13.3352</td>
</tr>
<tr>
<td>5</td>
<td>CetoStreryl Alcohol</td>
<td>9.9000</td>
</tr>
<tr>
<td>6</td>
<td>Methyl paraben</td>
<td>0.6632</td>
</tr>
<tr>
<td>7</td>
<td>Propylene glycol</td>
<td>32.9850</td>
</tr>
<tr>
<td>8</td>
<td>Sodium metabisulphate</td>
<td>6.6767</td>
</tr>
<tr>
<td>9</td>
<td>Lavender oil</td>
<td>0.045</td>
</tr>
<tr>
<td>10</td>
<td>Purified water</td>
<td>22.752</td>
</tr>
<tr>
<td></td>
<td>Total weight</td>
<td>60gm</td>
</tr>
</tbody>
</table>

**Table 3: Formula for formulation FA-FC**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.332</td>
</tr>
<tr>
<td>2</td>
<td>3.200</td>
</tr>
<tr>
<td>3</td>
<td>6.668</td>
</tr>
<tr>
<td>4</td>
<td>13.335</td>
</tr>
<tr>
<td>5</td>
<td>9.900</td>
</tr>
<tr>
<td>6</td>
<td>0.663</td>
</tr>
<tr>
<td>7</td>
<td>32.985</td>
</tr>
<tr>
<td>8</td>
<td>6.676</td>
</tr>
<tr>
<td>9</td>
<td>0.045</td>
</tr>
<tr>
<td>10</td>
<td>22.752</td>
</tr>
</tbody>
</table>

**EVALUATION OF DIACEREIN CREAM**

**Determination of pH:**

The pH of the creams, were found immersing pH meter to a depth of 0.5 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 Brookfield 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 spreadability 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 spreadability of creams.

The following equation was used for the purpose:

\[ S = \frac{m \times x}{T} \]

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 spreadability 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 slightest 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 tied on upper side carefully. The time taken for the upper slide to travel the distance of 6 cm 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 capped 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 analysed 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 to 1 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 3max 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

<table>
<thead>
<tr>
<th>Test abs</th>
<th>Std Weigh</th>
<th>2</th>
<th>10</th>
<th>10</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std abs</td>
<td>100</td>
<td>10</td>
<td>test we</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Percentage Purity = x 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 deterioration.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 at 40/75(°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°C. The Results were shown in Table no.11

RESULTS AND DISCUSSION

1. pH:

Table 4: Determination of pH

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Batch No</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FA</td>
<td>4.21</td>
</tr>
<tr>
<td>2.</td>
<td>FB</td>
<td>4.5</td>
</tr>
<tr>
<td>3.</td>
<td>FC</td>
<td>4.1</td>
</tr>
</tbody>
</table>

2. Color:

Table 5: Determination of Physical appearance

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Batch No</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>F1</td>
<td>Yellowish semisolid cream</td>
</tr>
<tr>
<td>2.</td>
<td>F2</td>
<td>Yellowish semisolid cream</td>
</tr>
<tr>
<td>3.</td>
<td>F3</td>
<td>Yellowish semisolid cream</td>
</tr>
</tbody>
</table>

3. Viscosity:

Table 6: Determination of Viscosity

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Batch No</th>
<th>Spindle No. 1</th>
<th>Run Time</th>
<th>RPM</th>
<th>Temperature</th>
<th>Viscosity in cps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>F1</td>
<td>Spindle No. 6</td>
<td>30Sec</td>
<td>1rp</td>
<td>25.1C</td>
<td>32598</td>
</tr>
<tr>
<td>2.</td>
<td>F2</td>
<td>Spindle No. 6</td>
<td>30Sec</td>
<td>1rp</td>
<td>25.1C</td>
<td>32727</td>
</tr>
<tr>
<td>3.</td>
<td>F3</td>
<td>Spindle No. 6</td>
<td>30Sec</td>
<td>1rp</td>
<td>25.1C</td>
<td>30475</td>
</tr>
</tbody>
</table>

4. Spreadibility:

Table 7: Determination of Spreadibility

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Batch No</th>
<th>Load apply</th>
<th>Distance in cm</th>
<th>Spreadibility g/cm/sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>F1</td>
<td>15 gm</td>
<td>0.675</td>
<td>9.15</td>
</tr>
<tr>
<td>2.</td>
<td>F2</td>
<td>15 gm</td>
<td>0.760</td>
<td>9.12</td>
</tr>
<tr>
<td>3.</td>
<td>F3</td>
<td>15 gm</td>
<td>0.720</td>
<td>9.16</td>
</tr>
</tbody>
</table>

5. Tube extrudability:

Table 8: Determination of Extrudability

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Batch No</th>
<th>Load apply</th>
<th>Cream out in cm</th>
<th>%Extrudability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>F1</td>
<td>15 gm</td>
<td>13.8</td>
<td>93.33</td>
</tr>
<tr>
<td>2.</td>
<td>F2</td>
<td>15 gm</td>
<td>14.2</td>
<td>94.20</td>
</tr>
<tr>
<td>3.</td>
<td>F3</td>
<td>15 gm</td>
<td>13.9</td>
<td>93.75</td>
</tr>
</tbody>
</table>

6. Drug content:

Table 9: Determination of drug content

<table>
<thead>
<tr>
<th>Final formula</th>
<th>Sample</th>
<th>% Assay</th>
<th>% Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2</td>
<td>Top</td>
<td>97.92</td>
<td>98.54</td>
</tr>
<tr>
<td>F2</td>
<td>Middle</td>
<td>99.3</td>
<td></td>
</tr>
<tr>
<td>F2</td>
<td>Bottom</td>
<td>98.7</td>
<td></td>
</tr>
</tbody>
</table>

Table 10: Assay of Diacerein Cream by UV Spectroscopy

<table>
<thead>
<tr>
<th>Batch No</th>
<th>Absorbance (238&amp;505nm)</th>
<th>% purity</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>3.165±0.2635</td>
<td>95.94</td>
</tr>
<tr>
<td>F2</td>
<td>3.263±0.2688</td>
<td>97.92</td>
</tr>
<tr>
<td>F3</td>
<td>3.165±0.2457</td>
<td>94.80</td>
</tr>
<tr>
<td>Marketed product</td>
<td>3.198±1.2593</td>
<td>96.22</td>
</tr>
</tbody>
</table>

Stability studies

Table 11: Accelerated Stability Studies

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Initial</th>
<th>After one month 40/75(°C/RH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Yellowish colour</td>
<td>Yellowish colour</td>
</tr>
<tr>
<td>Feelon</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td>Application</td>
<td>Ph</td>
<td>4.5</td>
</tr>
<tr>
<td>Viscosity</td>
<td>32727</td>
<td>32457</td>
</tr>
<tr>
<td>Assay (%)</td>
<td>97.92</td>
<td>97.75</td>
</tr>
</tbody>
</table>
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 physical-chemical parameters 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 and the yellowish semisolid cream, viscosity was 32,727 cps, Spreadibility Diacerein was found to be 97.92 %. The pH was 4.5 and colour was 89,-90,93,-177,214,-215.


