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Research Article

A NOVEL NATURAL PEARMEATION ENHANCER FOR FAMCICLOVIR CREAM

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ABSTRACT

The aim of present work was to formulate efficacious and safe and to increase the permeation rate of famciclovir using novel permeation enhancer1,2,3.

INTRODUCTION

HSV have a worldwide distribution and produce primary, latent and recurrent infections. Over 1/3rd of the world’s population have the ability to transmit the virus during periods of viral shedding. A series of clinical investigations over the last 6 years have shown acyclic guanosine derivative famciclovir to be effective in both shortening the course and suppressing the occurrence of symptomatic HSV type 1 (HSV-1) and HSV-2 infections in both normal and infective patients.

Cream is a semisolid medicament dissolved or suspended in water removable or emollient bases. Creams are defined as viscous liquid or semisolid emulsions of either O/W or W/O type. O/w creams - more comfortable and cosmetically acceptable as they are less greasy and more easily water washable w/o creams – accommodate and release better lipophilic active pharmaceutical ingredient - Moisturizing and Cold creams. Ideal cream must - spread easily, remain stable in the presence of most other chemical reagents, provide an oil film of low surface tension, must not be hygroscopic, must be absorbed into the skin up to some extent, be easy to remove without the use of detergents and soaps. The aim of the present work was to formulate efficacious and safe and stable semisolid dosage forms and to increase the permeation rate of famciclovir using novel permeation enhancer1,2,3.

KEYWORDS: Famciclovir, Ghee, Surfactant, Rheology.

Fig 1: Infection of skin
MATERIALS AND METHODS

Famciclovir drug is received from Wockhardt Pharma, Aurangabad.

SDG prepared in lab at Smt. S. S. Patil College of Pharmacy, Chopda, Maharashtra, India.

Methyl paraben, Propyl paraben and Oleic acid purchased from SD fine chemicals.

Formulation of cream

Table 1: Composition of famciclovir cream

<table>
<thead>
<tr>
<th>Ingredient (% w/w)</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Famciclovir</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>SDG</td>
<td>85.00</td>
<td>84.00</td>
<td>83.00</td>
<td>81.5</td>
<td>80.5</td>
</tr>
<tr>
<td>Nerolidol</td>
<td>--</td>
<td>1.0</td>
<td>2.0</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td>BHT</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Methyl paraben</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Propyl paraben</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Oleic acid</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Purified water</td>
<td>7.77</td>
<td>7.77</td>
<td>7.77</td>
<td>7.77</td>
<td>7.77</td>
</tr>
</tbody>
</table>

Formulation
Firstly, preparation of oligogenous phase by heating on water bath at 72°C which contained Shata-dhauta-ghrita, Nerolidol, Span60/80, TBHQ/BHT, BHA and stirred frequently to avoid localizing heat. Maintained temperature 68-72°C. Then, aqueous phase prepared by famciclovir in purified water and maintained at temperature of 70°C. Preparation of cream phase by adding aqueous phase in oil phase, addition of preservative phase with Methyl paraben and Propyl paraben and the bulk was maintained at 45-48°C and lastly, mixing of both phases.

RESULT AND DISCUSSION

The formulation of famciclovir cream is obtained as stable in nature; there is no change in physical and chemical properties. Calibration curve of famciclovir cream in phosphate buffer pH 7.4 as shown below.

Fig 2: Standard calibration curve of famciclovir in phosphate buffer pH 7.4

IR Spectrum of famciclovir cream:
As shown in interpretation of IR Spectrum, there is no interaction between drug and other chemical of formulated famciclovir cream.

Fig 4: IR spectra of famciclovir

Fig 5: DSC of famciclovir
Rheological Study
The rheological studies performed on Brookfield LVDV-III ultra viscometer using spindle no. 7. The generated data of shear stress, shear rate and viscosity of formulations of transdermal Famciclovir cream were used to understand the rheological characteristic of transdermal famciclovir cream.

The results of rheological studies indicated that the formulations were non-Newtonian systems because as shear rate changes the formulations showed change in the viscosity.

Table 2: Evaluation of famciclovir cream

<table>
<thead>
<tr>
<th>Batch</th>
<th>pH</th>
<th>Viscosity (Centi-Poise)</th>
<th>Spreadability (gm/cm/sec)</th>
<th>%Drug content</th>
<th>Extrudability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>7.15 ±0.01</td>
<td>9770</td>
<td>11.54 ±0.26</td>
<td>98.52 ± 0.96</td>
<td>81 ±0.44</td>
</tr>
<tr>
<td>R2</td>
<td>6.46 ±0.03</td>
<td>9548</td>
<td>15.34 ±0.24</td>
<td>98.47 ± 0.28</td>
<td>85 ±0.67</td>
</tr>
<tr>
<td>R3</td>
<td>6.43 ±0.04</td>
<td>9523</td>
<td>15.49 ±0.14</td>
<td>99.67±0.56</td>
<td>90 ±0.79</td>
</tr>
<tr>
<td>R4</td>
<td>6.81±0.12</td>
<td>9223</td>
<td>13.33±0.34</td>
<td>99.87±0.30</td>
<td>80 ±0.45</td>
</tr>
<tr>
<td>R5</td>
<td>6.63 ±0.15</td>
<td>9156</td>
<td>15.55±0.35</td>
<td>98.98 0.17</td>
<td>80.16</td>
</tr>
</tbody>
</table>

Fig 6: DSC of famciclovir cream
Stability of Cream
The stability of the cream containing famciclovir was studied according to ICH guidelines for 3 months. The formulation was packed in aluminum lacquered tube and kept in stability chamber.

Microscopic characterization of optimized batch
Microscopic evaluation after accelerated stability studies showed that the cream was stable as emulsion retaining its biphasic integrity and globule size did not increase to considerable extent the globule size is measured by Motic microsphere, i.e., there is no change in globule size and other characteristic of famciclovir cream.

SUMMARY & CONCLUSION
The purpose of the present study was to develop a stable cream formulation of Famciclovir. Also present study showed that the nature of Nerolidol exert an imp influence on cutaneous barrier impairment. The rheological data obtained from the Famciclovir cream shows non-Newtonian behavior—Thixotrophy. Histopathological studies revealed that Nerolidol enhanced the skin permeation of active medicament by disruption and extraction of lipid bilayers of SC. The optimized batch shows faster and better drug released than commercial famciclovir cream. The Microscopy of optimized R5 batch showed uniform globule size with no sign of emulsion breaking.

REFERENCES