**INTRODUCTION:**

Transdermal delivery is a very effective alternative approach. A typical adult’s skin is penetrated by one-third of the blood that circulates through their body, with a surface area of about 2m. It is necessary to have some information about the skin because they administer the drug by use of the skin’s transdermal layer.1,2

The transdermal approach has the advantage because increasing the permeability of the drug, the formulation is applied directly to the skin. Transdermal drug delivery approaches can avoid the drawbacks of an oral route. A specialized drug delivery method promotes patient compliance. An injury to biological tissue results in a local defense mechanism.2,3

The need for a microemulsion as a vehicle may improve transdermal penetration through a variety of mechanisms. Additionally, a variety of substances or solubilized in microemulsions cause a change in the drug’s thermodynamic activity, adapting their partition coefficient and promoting penetration of the stratum corneum.4 Further, its constituent surfactant inhibits, although there are several ways to administer a dose of medication using microemulsion and its gel, transdermal microemulsion application has drawn more attention transdermal release of several drugs has been enhanced using microemulsion gel over traditional preparations like emulsion.5,6 Using a transdermal microemulsion approach, baclofen is delivered transdermally in this situation. The drug’s permeability is enhanced and its solubility is improved due to the microemulsion transdermal approach.7,8

Baclofen is a mostly odorless crystalline powder with a molecular weight of 213.66 g/mol and white (or off-white). GABA-B receptors are stimulated by baclofen.9 It is used to lessen muscle spasms and pain, especially in spinal cord injuries in conditions like paraplegia and multiple sclerosis.10 Recently, the skin’s lymphocytes, monocytes, and neutrophils were stimulated by the drug baclofen, which also significantly reduced inflammation-related symptoms.11,12

Baclofen has significant pharmacokinetic drawbacks when taken orally because it has a short biological half-life of 3–4 hours and is absorbed in the upper small intestine. Making its duration of action limited. Patient failure to comply results from the requirement that it be taken often.13 Recent studies attempted to develop oral dosage forms of sustained release in response to all the prior restrictions of oral baclofen, but the efforts failed for a variety of reasons, including dose dumping.14,15 Baclofen is a great choice for transdermal drug delivery because of its excellent physical - chemical and biological data, which were obtained from the best sources.

In this study, various polymers, penetration enhancers, and plasticizers were used to develop transdermal patches containing baclofen microemulsion. Studying the compliance of drugs made with various film-forming polymers was done. Also, the optimal formulation’s in-vitro drug release was...
looked at. Physical observation of the prepared patches was done to check for factors like moisture content, drug content, in-vitro drug release, and the results of the kinetic study of drug release.

**MATERIALS AND METHODS:**

Received baclofen sample purchased from Yarrow Chem Maharashtra. The following ingredients came from Central Drug House in New Delhi: Pluronic F127, HPMC K15, soy lecithin, isopropyl palmitate, sorbic acid, potassium sorbate, and ethanol. The materials were all of an analytical calibrated.

**Research methodology of microemulsion**

**Drug Solubility Analysis**

A magnetic stirrer was used to mix the suspension for 24 hours at room temperature. A further 0.45m membrane filter was used to filter the sample. Baclofen content was measured spectrophotometrically at 220nm. Various solvents, including distilled water temp. 60°C, Tween 20, castor oil, propylene glycol, DMSO, and methanol, have been used to dissolve the drug. The baclofen’s solubility was greatest. 60°C for distilled water temp.

**Determining the oils to use and the HLB value for O/W microemulsions**

<table>
<thead>
<tr>
<th>S.no</th>
<th>Content</th>
<th>Baclofen (mg)</th>
<th>Castor oil (%w/v)</th>
<th>Tween-20 (%w/v)</th>
<th>PG (%w/v)</th>
<th>Distilled water (%w/v)</th>
<th>Final vol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ME-1</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>ME-2</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>ME-3</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>ME-4</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>ME-5</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>3</td>
<td>11</td>
<td>30</td>
</tr>
</tbody>
</table>

**Preparing a microemulsion of baclofen**

To make a baclofen microemulsion, castor oil and baclofen were mixed in a correctly optimized ratio (1:2) and added drop by drop. This was followed by continuous magnetic stirring with tween-20 and propylene glycol (1:1). The monophasic formulations spontaneously developed at room temperature for an hour at 3000 rpm. With better microemulsion, dilution research was also carried out & shown in Table 1.

### Table 1: Formulation of baclofen microemulsion

<table>
<thead>
<tr>
<th>S.no</th>
<th>Content</th>
<th>Baclofen (mg)</th>
<th>Castor oil (%w/v)</th>
<th>Tween-20 (%w/v)</th>
<th>PG (%w/v)</th>
<th>Distilled water (%w/v)</th>
<th>Final vol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ME-1</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>ME-2</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>ME-3</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>ME-4</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>ME-5</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>3</td>
<td>11</td>
<td>30</td>
</tr>
</tbody>
</table>

**The formation of transdermal patches incorporating baclofen microemulsion**

Developing transdermal baclofen patches using HPMC as the film-forming polymer:

The appropriate volume of hot distilled water (80-100°C) was used to dissolve HPMC (3% w/v) with constant stirring. The solution was then cooled. The cooled HPMC solution was gradually supplied with the mixture of plasticizer, DMSO as a penetration enhancer, and baclofen microemulsion. The required amount of bio-adhesive polymer was next added while stirring and the final volume was then adjusted with distilled water to reach 10 ml. then was made in the same method.shown in Table 2.

### Table 2: formation of transdermal patch incorporating baclofen microemulsion

<table>
<thead>
<tr>
<th>Film-forming polymer-HPMC (mg)</th>
<th>Bio-adhesive polymer-Carbopol 940 (mg)</th>
<th>Plasticizer-Propylene glycol (ml)</th>
<th>Penetration enhancer-DMSO Dimethyl sulfoxide (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>50</td>
<td>0.25</td>
<td>0.5</td>
</tr>
</tbody>
</table>
The microemulsion required a UV spectrophotometer with a maximum 220 nm calibration. The average of three patch measurements was used to determine the baclofen concentrations, which were then converted to percentages in Microsoft Excel using a standard curve prepared.

**Baclofen microemulsion patch’s folding resistance**

3 patches of each formula were manually divided and cut to size (1 cm x 2 cm) for the different patches that were prepared. A strip was folded at the same spot repeatedly until it broke, or a strip was folded up to 39 times at the breakpoint to determine the film's fold strength.

**The baclofen microemulsion patch’s present moisture content**

An electronic balance was used to weigh three patches of each formulation (3.77 cm²), and the mean was calculated as an initial weight. The weighed patches were then left at room temperature in desiccator with anhydrous 

**Baclofen microemulsion patch moisture absorption percentage**

In a desiccator with a potassium chloride solution, the films were dried for 24 hours. The final weight was then recorded after 24 hours when the weight was no longer changing. The equation was used to estimate and determine the percentage of moisture and absorption.

**Baclofen microemulsion patch in vitro drug release**

A cellophane membrane and a modified Franz diffusion cell apparatus are used in an in vitro study. Phosphate buffer (PBS) pH 7.4 is the dissolving solvent used in the test. The patch accurately weighed before being put on the cellophane membrane’s central portion. The opening end of the made specifically hollow glass cylinder was then connected to this cellophane membrane. The glass cylinder was attached to the metal shaft and dipped into a 20 ml beaker of pH 7.4 phosphate buffer until the membrane was just above the top. Throughout the testing, the dissolving solvent was continuously stirred with the help of magnetic stirrer at 50 rpm while being maintained at 37+0.5°C. The experiment continued under certain conditions until it was over. The 3 ml sample of receptor media was divided into aliquots and filtered over a specific duration. After dilution, the abs. of each filtered patch was determined using a UV spectrometer at 220 nm.

**Result & discussion of baclofen microemulsion patch:**

**Results of solubility of the baclofen**

The most significant components of a microemulsion. A study of solubility in various solvents is shown in the table below. Castor oil is the ideal oil to use while preparing the drug because it dissolves when mixed with distilled water as a solvent. A solubility study found that Tween 20 is more soluble. Given that it provided the highest drug solubility, The co-surfactant selected for further study is propylene glycol. study on drug solubility is listed in Table 3 for baclofen.

**BACLOFEN MICROEMULSION CHARACTERIZATION**

**Microemulsion optical transparency**

To evaluate the formulation’s optical transparency, the sample was viewed in front of a lit, black-and-white background while being viewed in a transparent, clear container under good lighting and covered against reflection in the eyes.

**Microemulsion pH & viscosity determination**

The pH of the microemulsion obtained was measured using a digital pH meter and calibrated with phosphate buffer. For greater accuracy, every reading was obtained in triplicate, and the estimate of the triplicates was obtained. & the viscosity measurement Spindle, S-4 was used to measure the viscosity using a (DV-E viscometer LV) Brookfield Viscometer. After putting the samples in the beaker, the spindle was then placed inside the beaker.

**Baclofen microemulsion’s drug content**

Baclofen Microemulsion Formulations 1 ml were added to a beaker having 10 ml methanol. The beaker’s contents were stirred for 30 minutes, then left alone for 24 hours. After 24 hours, After being transferred to the centrifuge tube, the beaker’s contents were shaken at 3000 rpm for 10 minutes. The excess was divided and filtered. After that, the drug concentration of 0.1 ml of the residue was spectrophotometrically measured after being properly diluted by Phosphate Buffer Saline (PBS) pH 7.4.

**Baclofen microemulsion in vitro drug release**

a cellophane membrane-based modified in vitro release mechanism, pH 7.4 phosphate buffer, and the study’s dissolution medium was utilized to perform an in vitro drug release analysis of drug ME-1 to ME-5 baclofen microemulsion formulations. The pH 7.4 phosphate buffer was used to soak the cellophane membrane for the test for the entire night. The middle portion of cellophane membrane with the microemulsion on it was precisely weighed and fastened to one of the open ends of the hollow glass cylinder with string. The metal shaft was then connected to the glass cylinder, which was then immersed in the 20 ml of pH 7.4 phosphate buffer that was kept in the beaker until the membrane was just above the top. Throughout the study, the dissolving medium was stirred with a magnetic stirrer at 50 rpm while being maintained at 37 °C, and this condition was maintained until the completion of the study. The receptor media sample was divided into three 3 ml aliquots, each of which was filtered. Each filtered sample was diluted before having the absorbance at 220 nm of a UV spectrometer measured.

**Characterization of the transdermal patch incorporating baclofen microemulsions**

**Baclofen microemulsion patch’s physical characteristics**

The prepared patches were examined and evaluated visually for factors like color, smoothness, homogeneity, stickiness, texture, uniformity, smoothness, elasticity, transparency, or the presence of tiny air bubbles. These qualities significantly influence patient compliance and acceptance, physical resistance during preparation and storage, and therapeutic efficacy. The analysis did not include samples that had air bubbles, splits, precipitates, or uniform surfaces.

**Baclofen microemulsion patch’s uniform drug content**

A volumetric flask containing 250 ml of phosphate buffer (pH 7.4) and baclofen microemulsion patch units (3.77 cm²) of each formulation was added, and it was constantly stirred. The solution was then filtered and, if necessary, adjusted dilute with the same medium. Determining the amount of Baclofen in
Table 3: Different solvents in which baclofen is soluble

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Solvents</th>
<th>Solubility (mg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Distilled water at temp. 60°C</td>
<td>2.508</td>
</tr>
<tr>
<td>2</td>
<td>Methanol</td>
<td>3.453</td>
</tr>
<tr>
<td>3</td>
<td>Tween-20</td>
<td>3.341</td>
</tr>
<tr>
<td>4</td>
<td>Castor oil</td>
<td>3.75</td>
</tr>
<tr>
<td>5</td>
<td>Propylene glycol</td>
<td>0.112</td>
</tr>
<tr>
<td>6</td>
<td>DMSO</td>
<td>13.70</td>
</tr>
</tbody>
</table>

A standard plot of baclofen in distilled water

Absorption maxima of Baclofen in distilled water:

Table 4: standard plot of baclofen in distilled water

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Concentration (µg/ml)</th>
<th>Absorbance (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>0.023</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>0.046</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>0.070</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>0.099</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>0.122</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>0.139</td>
</tr>
</tbody>
</table>

Standard graph plot of loxoprofen in distilled water

Figure 1: Standard plot of Baclofen in distilled water at 220(nm)

FTIR of baclofen

Figure 2: FTIR of baclofen

FTIR of baclofen microemulsion

Figure 3: FTIR of baclofen microemulsion
Results of HLB value of selected components of the microemulsion

Table 5: HLB value of selected components of the microemulsion

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Substance</th>
<th>HLB value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Span-80</td>
<td>4.7</td>
</tr>
<tr>
<td>2</td>
<td>Span-20</td>
<td>8.3</td>
</tr>
<tr>
<td>3</td>
<td>Tween-80</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>Tween-20</td>
<td>16.9</td>
</tr>
<tr>
<td>5</td>
<td>Sodium oleate</td>
<td>16</td>
</tr>
</tbody>
</table>

Selecting the oils

To determine the best oil for a microemulsion’s oil phase that will improve baclofen skin penetration. At 25°C, the solubility of baclofen in a selection of oils was measured, along with oleic acid, castor oil, isopropyl myristate, and isopropyl palmitate. The solubility of oleic acid, castor oil, isopropyl myristate, and isopropyl palmitate in oily mixtures was also examined and shown in Table 6.

Table 6: Selecting the oils at 25°C

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Drug solubility (in mg/10 g of oil)</th>
<th>Oils</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>120</td>
<td>Olive oil</td>
</tr>
<tr>
<td>2</td>
<td>140</td>
<td>Isopropyl -myristate</td>
</tr>
<tr>
<td>3</td>
<td>120</td>
<td>Isopropyl -palmitate</td>
</tr>
</tbody>
</table>

Selection of surfactants

Because they are very friendly with both cationic and anionic substances, non-ionic surfactants like Tween-20 (1:1) and cosurfactants like propylene glycol (2:1) do not ionize to a large extent in solution. shows clear appearance shown in Table 7.

Baclofen microemulsion optical transparency:

Table 7: Baclofen microemulsion optical transparency

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Formulations</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ME-1</td>
<td>Cloudy</td>
</tr>
<tr>
<td>2</td>
<td>ME-2</td>
<td>Pearlescent</td>
</tr>
<tr>
<td>3</td>
<td>ME-3</td>
<td>Clear</td>
</tr>
<tr>
<td>4</td>
<td>ME-4</td>
<td>Cloudy</td>
</tr>
<tr>
<td>5</td>
<td>ME-5</td>
<td>Cloudy</td>
</tr>
</tbody>
</table>

Microemulsion pH & viscosity determination

All microemulsions were found in the pH range up to 6.6 to 6.8 after the pH of microemulsion was calculated using a digital pH meter. Thus, the developed formulations’ obtained pH is a good match for the pH of the skin. & The viscosities of all developed microemulsions were determined using spindle S-4 at 25 °C and 60 rpm. The presence of more oil phase in the ME-5 formulation may have contributed to its higher viscosity of 109.2 cps. The ME-1 formulation had the lowest viscosity, measuring 53.5cps. The correlation between viscosity and oil concentration and S/Cos was inversely shown in Table 8.

Table 8: Baclofen microemulsion pH & viscosity

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Formulations</th>
<th>pH</th>
<th>Viscosity (cps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ME-1</td>
<td>6.2</td>
<td>53.5</td>
</tr>
<tr>
<td>2</td>
<td>ME-2</td>
<td>5.6</td>
<td>76.9</td>
</tr>
<tr>
<td>3</td>
<td>ME-3</td>
<td>6.4</td>
<td>93.5</td>
</tr>
<tr>
<td>4</td>
<td>ME-4</td>
<td>5.6</td>
<td>101.5</td>
</tr>
<tr>
<td>5</td>
<td>ME-5</td>
<td>5.2</td>
<td>109.2</td>
</tr>
</tbody>
</table>

Baclofen microemulsion drug content

The baclofen microemulsion formulation’s drug content was calculated through a study of it. The drug content is measured using a range of 90.02% to 96.36%. According to the data, formulation ME-1 has the least drug, whereas formulation ME-3 contains the highest amount shown in Table 9.

Table 9: The uniform drug content

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Drug content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME-1</td>
<td>90.02</td>
</tr>
<tr>
<td>ME-2</td>
<td>93.54</td>
</tr>
<tr>
<td>ME-3</td>
<td>96.36</td>
</tr>
<tr>
<td>ME-4</td>
<td>94.21</td>
</tr>
<tr>
<td>ME-5</td>
<td>95.79</td>
</tr>
</tbody>
</table>

In-Vitro (%) drug release of baclofen microemulsion ME-1 to ME-5

Analysis of the in-vitro release of baclofen microemulsion in all its forms. The research was performed over a cellophane membrane for 8 hours using a modified in vitro Franz diffusion cell apparatus. Formulation ME-1 showed a release of 50.63 %, Formulation ME-2 showed a release of 66.56 %, Formulation ME-3 showed a release of 88.79 %, and Formulation ME-4 showed a release of 78.13 %, and Formulation ME-5 demonstrated a release of 76.40 %, show in Table 10.
Table 10: In-Vitro (%) drug release of baclofen microemulsion ME-1 to ME-5

<table>
<thead>
<tr>
<th>TIME</th>
<th>ME-1</th>
<th>ME-2</th>
<th>ME-3</th>
<th>ME-4</th>
<th>ME-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>10.09</td>
<td>18.52</td>
<td>33.12</td>
<td>25.44</td>
<td>25.41</td>
</tr>
<tr>
<td>30</td>
<td>15.14</td>
<td>20.25</td>
<td>41.24</td>
<td>29.05</td>
<td>28.36</td>
</tr>
<tr>
<td>60</td>
<td>18.02</td>
<td>24.65</td>
<td>47.14</td>
<td>32.72</td>
<td>31.14</td>
</tr>
<tr>
<td>120</td>
<td>21.80</td>
<td>27.53</td>
<td>53.98</td>
<td>35.68</td>
<td>33.80</td>
</tr>
<tr>
<td>180</td>
<td>25.44</td>
<td>29.73</td>
<td>61.19</td>
<td>43.53</td>
<td>36.22</td>
</tr>
<tr>
<td>240</td>
<td>27.96</td>
<td>33.77</td>
<td>67.24</td>
<td>50.34</td>
<td>44.61</td>
</tr>
<tr>
<td>300</td>
<td>32.76</td>
<td>42.23</td>
<td>75.68</td>
<td>57.30</td>
<td>49.65</td>
</tr>
<tr>
<td>360</td>
<td>35.57</td>
<td>49.62</td>
<td>83.24</td>
<td>66.56</td>
<td>57.80</td>
</tr>
<tr>
<td>420</td>
<td>43.53</td>
<td>59.03</td>
<td>86.12</td>
<td>70.92</td>
<td>64.76</td>
</tr>
<tr>
<td>480</td>
<td>50.63</td>
<td>66.56</td>
<td>88.79</td>
<td>78.13</td>
<td>76.40</td>
</tr>
</tbody>
</table>

Figure 4: In-Vitro % drug release of baclofen microemulsion ME-1 to ME-5

Baclofen microemulsion patch's physical appearance

Table 11: Microemulsion patch physical appearance

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME-3</td>
<td>Transparent, colorless, homogenous</td>
</tr>
</tbody>
</table>
Figure 6: Baclofen microemulsion incorporated into a transdermal patch

Baclofen microemulsion patch’s folding resistance

The patch showed appropriate physical and mechanical characteristics, as indicated in Table 13, and the findings were most satisfactory for a chosen ME-3. In this study, it was found that the patch was flexible and provided resistance to breaking after being folded more than 39 times in the same place. It also showed no cracks, which was the test’s endpoint. Further, it was noted that HPMC-based formulations limited flexibility. The patch grew more fragile and its resistance to folding may have been caused by the high concentration of HPMC, shown in Table 12.

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Folding endurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME-3</td>
<td>39</td>
</tr>
</tbody>
</table>

Baclofen microemulsion patch’s moisture content

Calculations were used to determine the moisture content. The moisture content was found to be at a moderate level of 20%. As the amount of PG increased, no moisture content was visible, showing that the results were due to a plasticizer. shown in Table 13.

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Moisture content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME-3</td>
<td>20</td>
</tr>
</tbody>
</table>

In vitro drug release from a baclofen microemulsion patch

The physical and chemical properties of the microemulsion Baclofen ME-3 allowed it to be selected as an applicant for the transdermal patch. ME-3 was the satisfactorily control release in the in vitro release research when HPMC was used as the film-forming polymer, offered strong physical qualities, appearing as flexible films that were translucent. It was determined that ME-3 contains PG, a plasticizer that adds flexibility, as well as DMSO, a penetration enhancer. Finally, it was determined that ME-3 released baclofen with a regulated release rate for 4 hours. Similarly, 97.67% release is shown in Table 15.

<table>
<thead>
<tr>
<th>TIME (min)</th>
<th>ME-3 In-vitro drug release (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>37.69</td>
</tr>
<tr>
<td>10</td>
<td>41.93</td>
</tr>
<tr>
<td>15</td>
<td>45.74</td>
</tr>
<tr>
<td>30</td>
<td>50.24</td>
</tr>
<tr>
<td>45</td>
<td>51.86</td>
</tr>
<tr>
<td>60</td>
<td>57.05</td>
</tr>
<tr>
<td>120</td>
<td>67.79</td>
</tr>
<tr>
<td>180</td>
<td>87.85</td>
</tr>
<tr>
<td>240</td>
<td>97.67</td>
</tr>
</tbody>
</table>
Kinetic models of the three best baclofen microemulsion formulations ME-3, ME-4 & ME-5

Table 16: Kinetic models of the three best baclofen microemulsion formulations ME-3, ME-4 & ME-5

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Zero order</th>
<th>First order</th>
<th>Higuchi model</th>
<th>Korsmeyer-peppas Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME-3</td>
<td>0.8294</td>
<td>0.9866</td>
<td>0.9536</td>
<td>0.9806</td>
</tr>
<tr>
<td>ME-4</td>
<td>0.9113</td>
<td>0.9699</td>
<td>0.9606</td>
<td>0.9601</td>
</tr>
<tr>
<td>ME-5</td>
<td>0.8929</td>
<td>0.898</td>
<td>0.9186</td>
<td>0.8466</td>
</tr>
</tbody>
</table>

Stability studies of baclofen microemulsion patch formulation

Table 17: Stability studies of baclofen microemulsion patch formulation

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Formulation ME-3</th>
<th>Before storage</th>
<th>Stored at 40°C ± 2°C and 75%±5% RH 1 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drug content (%)</td>
<td>88.79</td>
<td>87.22</td>
</tr>
<tr>
<td>2</td>
<td>pH</td>
<td>6.4</td>
<td>6.4</td>
</tr>
<tr>
<td>3</td>
<td>Viscosity (cps)</td>
<td>93.5</td>
<td>93.5</td>
</tr>
</tbody>
</table>

CONCLUSION:

The Baclofen Microemulsion with Castor Oil was chosen as the vehicle for the phase of the microemulsion’s oil since the study shows that it consumed the greatest quantity of baclofen. Tween-20 and Propylene Glycol were selected in the optimal ratios as the ideal co-surfactant and surfactant. Baclofen Microemulsion reduces the side effects caused by regular oral doses because it is formulated as a controlled release dosage form that lasts for 24 hours. Evaluation of the chosen ME-3 formulation with castor oil (6%), Tween-20/propane glycol (30%), and other ingredients showed that it was stable after centrifuge stress testing that its viscosity made it suitable for the transdermal application, and that its pH value was within the range of physiological values. The formulation contains 96.36% active ingredients. This study focused on the performance of baclofen ME-3 in enhancing in vitro drug release. ME-3 shows 88.79%. The formulation is in accordance with fits the Korsmeyer-Peppas model, and after that for the microemulsion, the physical and chemical characteristics of Baclofen ME-3 allowed it to be chosen as a candidate for the transdermal patch. ME-3 was the successfully controlled release in the in vitro release study.

REFERENCES:


Panghal et al


