INTRODUCTION

The plants belonging to Loranthaceae family are found to be a rich source of substances of phytopharmaceutical interest. Many plants from this family are used in traditional system of medicine. The plants belonging to Loranthaceae family are found to be a rich source of substances of phytopharmaceutical interest. Many plants from this family are used in traditional system of medicine. The physicochemical appearance of the formulation was consistent, brilliant, dark amber, due to the color of the extract, without apparent loss of his structure during 60 days of conditions of rest.

Topical administration of corpo gel showed significant antiedematogenic activity. The maximal activity was 20% at 2.5 h after carrageenan injection and maintained for 4.5 h of assay. The results concluded that topical preparation containing 4% of corpo gel possesses antiinflammatory effect which can be useful for the treatment of local inflammation.

Keywords: Tripodanthus acutifolius, Topical gel formulation, Antiinflammatory activity

MATERIALS AND METHODS

Plant material

The plant materials used in this study consisted of the flowers of Tripodanthus acutifolius (Ruiz & Pav.) Eichler (Corpo) collected during the flowering season (May–June) in Amaicha del Valle, in the province of Tucumán, Argentina. The voucher herbarium (no. 511125) specimen was identified by using morphological, anatomical and histochemical techniques and by comparison with an identified specimen at the herbarium “Miguel Lillo” of San Miguel de Tucumán, Tucumán, Argentina.

Preparation of extract

Aqueous extract was prepared from the flowers of the plant under study. The dried materials were milled into particles of about 5-10 mm in diameter. For aqueous extracts, samples were soaked for 2 days in 100 ml of distilled water. The extract was filtered through Whatman Paper No. 1 and evaporated by a lyophilizer to dryness.

Preparation of topical extract gel preformulation

The formulation was development used a gel base prepared with anionic hydrophilic colloid (carboxypolymethylene (Carbopol 940®)) added with glycerine (emollient), methylparabene (preservative) and triethanolamine (for neutralized pH). Carbopol is commonly used in cosmetic and pharmaceutical products because of its high stability, compatibility and low toxicity. The formation was packaged in impermeable polypropylene containers for 60 days at 25±3°C/AH (ambient humidity). Samples from formulation container were evaluated every 7 days at room temperature.

For the semisolid forms transferred aliquots of 2 g in pipes of test, they were closed and were controlled visually in regular form.

Analysis of the stability

The formulation was packaged in impermeable polypropylene containers for 60 days at 25±3°C/AH (ambient humidity). Samples from formulation container were evaluated every 7 days at room temperature.

For the semisolid forms transferred aliquots of 2 g in pipes of test, they were closed and were controlled visually in regular form.

Evaluation of formulated gels
The organoleptic features of the samples were examined at the same temperature, lighting and packaging conditions to assess variations in appearance, phase separation, color, sheen and smell.

The pH values of prepared gels were checked by using a calibrated digital pH meter at constant temperature.

Gel spreadability

The spreadability evaluates the consistency of a semisolid form in order to assure that his extension on the skin. It is a term expressed to denote the extent of area to which gel readily spreads on application to skin or affected part. The therapeutic efficacy of a formulation also depends upon its spreading value.

A sample of 20 mg of each formulation was pressed between two slides on which weights of 2g, 4g, 7g and 10g were placed at intervals of one minute. The diameters during each interval were given as the area (mm²), according to the National Formulary[6]. The variation of the area as a function of weight was then analyzed. The results obtained are an average of three determinations.

Animals

The Wistar rats (190-240 g) of either sex were selected for this study and were obtained from the Bioterio of Facultad de Bioquímica, Química y Farmacia, Instituto de Biología (INSIBIO).

All animals were kept under normal laboratory conditions of humidity, temperature (25±1°C) with photoperiod (12 h light/12 h dark cycle), and allowed free access to food and water ad libitum. The studies were conducted in accordance with the internationally accepted principles for laboratory animal use and care (EEC Directive of 1986; 86/609/EEC).

Antiinflammatory activity

The topical antiinflammatory activity was evaluated by the method of the induction of the edema according to Winter et al. (1962)[9]. In this study there were used 3 groups of six rats Wistar each one.

<table>
<thead>
<tr>
<th>Physical and organoleptics characters</th>
<th>Recent preparation of the gel of corpo</th>
<th>Corpso gel preparation at 60 days</th>
<th>Gel base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Dark amber</td>
<td>Dark amber</td>
<td>Colorless</td>
</tr>
<tr>
<td>Brightness</td>
<td>Shiny</td>
<td>Shiny</td>
<td>Shiny</td>
</tr>
<tr>
<td>Smell</td>
<td>Characteristic of flowers used</td>
<td>Characteristic of flowers used</td>
<td>Odorless</td>
</tr>
<tr>
<td>Transparency</td>
<td>Media</td>
<td>Media</td>
<td>High</td>
</tr>
<tr>
<td>Tactile sensation</td>
<td>Soft</td>
<td>Soft</td>
<td>Soft</td>
</tr>
<tr>
<td>Aspect</td>
<td>Homogeneous, unctuous</td>
<td>Homogeneous, unctuous</td>
<td>Homogeneous, unctuous touch</td>
</tr>
<tr>
<td>pH</td>
<td>touch, free of lumps</td>
<td>touch, free of lumps</td>
<td>5.5±0.1</td>
</tr>
</tbody>
</table>

The results expressed in the table 1 indicated that the characters organoleptics obtained were acceptable for the natural product. The color was dark amber, typical for the extract used for this preparation. The greasiness to the tact is good and presence of grooms is not observed.

The pH of the gel formulation was in the range of 6 ± 0.3 to 6 ± 0.5, compatible with the normal pH range of the skin and would not produce any skin irritation, similar results was obtained by Das and Ahmed[8]. There was no significant change in pH values as a function of time after 60 days of preparation. The measurement of pH of the formulations is necessary to detect alterations during time storage, ensuring that the pH value is compatible with the components of the formulation and with the application place, avoiding irritation.

It was found in this study that the formulations showed functional and physical stability in the period of assay. None of the gels presented detectable alteration during 60 days to temperature set.

It is a term expressed to denote the extent of area to which gel readily spreads on application to skin or affected part. The therapeutic efficacy of a formulation also depends upon its spreading value.

Gel Spreadability

Spreadability is the parameter which will help in the uniform application of gel to the skin. The results of the test of spreadability showed (table 2) that the formulated gels presented major spreadability compared with the gel base and the gel of diclofenac (Curinflam®) (figure 1).

The expressed results indicated that the average spreadability with a weight of 14.97 g were 359 mm², inside the allowed limits (500 mm²).

<table>
<thead>
<tr>
<th>Weight (g)</th>
<th>Spreadibility</th>
<th>Average (mm²)</th>
<th>Gel of diclofenac</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Values of the spreadability with regard to the weight of the gels
It is clearly evident that the gel formulation showed good homogeneity and spreadability.

With regard to the greasiness it does not leave residues, does not stain and allows to rub with a soft massage the skin where it was applied. After applying the gel of corpo is not observed in the rate any cutaneous deleterious manifestation.

The results evidenced that the formulation could be considered stable since the rheological parameters were constant during the period of study.

**Evaluation of the antiinflammatory topical activity**

The antiinflammatory activity after topical administration of corpo gel was studied. Carrageenan induced paw edema is the standard experimental model of acute inflammation. Moreover, the experimental model exhibits a high degree of reproducibility. The induced edema is a biphasic response. The first phase is mediated through the release of histamine, serotonin and kinins whereas the second phase is related with the release of prostaglandins and slow reacting substances.

Topical administration of corpo gel showed significant antiedematogenic activity (table 3, figure 2). The maximal activity was 20 % at 2.5 h after carrageenan injection and maintained for 4.5 h of assay. In early study1 demonstrated significant corpo antiedematogenic action of 100% for dose of 100 mg/kg orally administrated in Wistar rats before the injection of carrageenan.

The diclofenac produces a decrease of the inflammation of 15 % at 2.5 h, increasing to a percentage of 20 % at 3.5 h and it is kept up to the end.

Similar results were observed for a topical gel formulation of carbopol and Achillea and Ruscus extracts extracts8, for lapachol9 and for leaves of *Vitex negundo*17.

**Table 3: Effect of topical administration of corpo gel on carrageenan induced paw edema in rats**

<table>
<thead>
<tr>
<th>Time 'h'</th>
<th>Treatment*</th>
<th>Control</th>
<th>Gel of corpo</th>
<th>Gel of diclofenac</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>Carrageenan 1.5% (0,1 mL)</td>
<td>1.13 ± 0.02</td>
<td>1.26 ± 0.01</td>
<td>1.23 ± 0.03</td>
</tr>
<tr>
<td>T1 (1.5)</td>
<td>Gel base-Gel of corpo - Gel of diclofenac</td>
<td>1.49 ± 0.03</td>
<td>1.61 ± 0.03</td>
<td>1.58 ± 0.03</td>
</tr>
<tr>
<td>T2 (2.5)</td>
<td>-</td>
<td>1.52 ± 0.02</td>
<td>1.43 ± 0.02</td>
<td>1.51 ± 0.02</td>
</tr>
<tr>
<td>T3 (3.5)</td>
<td>-</td>
<td>1.47 ± 0.02</td>
<td>1.41 ± 0.03</td>
<td>1.45 ± 0.02</td>
</tr>
<tr>
<td>T4 (4.5)</td>
<td>-</td>
<td>1.45 ± 0.03</td>
<td>1.40 ± 0.02</td>
<td>1.41 ± 0.03</td>
</tr>
</tbody>
</table>

*To: the paw volume measured before the carrageenan injection, T1: the paw volume before the treatment with different gels formulations*
**Fig. 2:** Antiinflammatory effect of topical administration of corpo gel after carrageenan injection. Results are means ± SD of three experiments.

**CONCLUSION**

The results concluded that topical preparation containing 4% of corpo gel possesses antiinflammatory effect which can be useful for the treatment of local inflammation.

There was elaborated a gel of hackneyed use based on water extract of flowers of corpo, who was compared with a gel of commercial origin (registered trademark) that contains diclofenac 1,16% as reference to prove the antiinflammatory effect. The prepared formulation was it tipples give plastic containers, do not be transparent with lid to pressure. The gel does not present grooms, is homogeneous with good spreadability of 359 mm² and supporting his parameters organoleptics after 60 days of test.

For the checking of the efficiency of the gel in rats Wistar, there was used the method of induction of the edema to plant with carrageenan. There is verified that the gel diminishes the inflammation of a way similar to the obtained one for the diclofenac.

**ACKNOWLEDGEMENT**

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**REFERENCES**