INTRODUCTION

Inflammation is an important causative agent of human morbidity and mortality, such as Systemic Inflammatory Response Syndrome, Multiple Organ Dysfunction Syndrome and Multiple Organ Failure. Tephrosia purpurea is a shrub, found throughout India. Tephrosia purpurea Linn. is a wild plant known as “Sarapunkha” in Sanskrit, ‘Purple Tephrosia’ or ‘Wild indigo’ in English and “Kolanji” in Tamil. T. purpurea used for mediated chain reaction has been implicated in the centuries of Indian traditional medicine for the treatment various inflammatory disorders. It is considered beneficial for liver, spleen and kidney disorders and also it has property to cure all types of wounds. Experimental studies suggest that Tephrosia purpurea Linn. exerts anti-ulcer, anti-oxidant, hepatoprotective and hypoglycemic activities.

The literature survey reveals that there is no literature related to anti-inflammatory and analgesic activities of this plant. Hence, in the present study, ethanol extracts of Tephrosia purpurea Linn. root (EETPR) and aerial parts (EETPA) are evaluated for anti-inflammatory activity in acute and sub-acute as well as analgesic activity by tail immersion method are determined. Furthermore, the activities of the plant extracts were compared with the standard indomethacin (20mg/kg, i.p).

EXTRACTION OF PLANT MATERIAL

Dried finely powdered Tephrosia purpurea aerial/root parts (500 g) of were soaked with 1500 mL of 95% ethanol overnight. The residue obtained was again resuspended in equal volume of 95% ethanol for 48 h and filtered again. The above two filtrate was mixed and the solvents was evaporated in a roto vapour at 40-50°C under reduced pressure, dark semisolid material obtained was stored at -4°C, until use. For experimental studies, known volume of the extract was suspended in distilled water.

Animals

Colony in breed strains of male wistar rats weighing 150-250 g were used for the pharmacological studies. The animals were kept under standard conditions (day/night rhythm) 8.00 am to 8.00 pm at 22±1°C room temperature in polypropylene cages. The animals were feed on standard pelleted diet and tap water ad libitum. The animals were housed for one week in polypropylene cages prior to the experiments to accommodate to laboratory conditions. It is randomly distributed into six different groups with six animals in each group under identical conditions throughout the experiments. The experimental protocol was approved by the Institutional Animal Ethical Committee (IAEC).

ANTI-INFLAMMATORY ACTIVITY

Carrageenan-induced paw edema

Edema was induced by injecting 0.1 ml of 1% (w/v) carrageenan suspension into the subplantar region of the right hind paw of the rats according to the method described by Winter et al. The test
Cotton pellet granuloma in rats

A sterilized cotton pellet weighing 100 mg was introduced subcutaneously into the groin region of rats according to the method of Mossa et al. The test groups of animals (groups B and group C) were treated orally with 250, 500 mg/kg of the ethanol extract of root part and the test groups (group D and group E) were treated orally with 250, 500 mg/kg of the ethanol extract of aerial part, respectively. Animals in the control and reference (group A and group F) received 0.9% saline (10 ml/kg, p.o.) and indomethacin (20 mg/kg, i.p.), respectively daily for 7 days. The animals were sacrificed on the eighth day after an overdose of chloroform. The pellets surrounded by granuloma tissue (six animals per group) were dissected out carefully and dried at 60 °C to a constant weight. Mean weight of the granuloma tissue formed in each group was obtained and the percentage inhibition was expressed by comparing the mean weight in the test groups with the mean weight in the control group.

Table 1. Anti-inflammatory activities of EETPR and EETPA on Carrageenan induced paw oedema in rats.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Groups</th>
<th>Paw volume in ml (% Inhibition Treatment of Paw Oedema)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>0 hr ½ hr 1 hr 2 hr 4 hr 8 hr</td>
<td></td>
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<td></td>
<td>0 hr ½ hr 1 hr 2 hr 4 hr 8 hr</td>
</tr>
<tr>
<td>1</td>
<td>Group A (control)</td>
<td>1.098±0.1189 1.405±0.1037 1.552±0.06814</td>
<td></td>
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<td>1.063±0.4271 1.077±0.03029***</td>
</tr>
<tr>
<td>2</td>
<td>Group B (EETPR - 250)</td>
<td>1.083±0.02965 1.282±0.01833 1.330±0.02069*</td>
<td></td>
<td>2</td>
<td>Group B (EETPR - 250)</td>
<td>1.077±0.03029***</td>
</tr>
<tr>
<td>3</td>
<td>Group C (EETPR - 500)</td>
<td>1.033±0.04551 1.347±0.04551 1.382±0.02315*</td>
<td></td>
<td>3</td>
<td>Group C (EETPR - 500)</td>
<td>1.077±0.03029***</td>
</tr>
<tr>
<td>4</td>
<td>Group D (EETPA - 250)</td>
<td>1.027±0.01978 1.210±0.03296 1.403±0.06431***</td>
<td></td>
<td>4</td>
<td>Group D (EETPA - 250)</td>
<td>1.250±0.03531***</td>
</tr>
<tr>
<td>5</td>
<td>Group E (EETPA - 500)</td>
<td>1.087±0.01978 1.325±0.03575 1.467±0.05258*</td>
<td></td>
<td>5</td>
<td>Group E (EETPA - 500)</td>
<td>1.490±0.05241***</td>
</tr>
<tr>
<td>6</td>
<td>Group F (Indomethacin (20 mg/kg, i.p))</td>
<td>1.043±0.01667 1.147±0.03297* 1.097±0.02155***</td>
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<td>6</td>
<td>Group F (Indomethacin (20 mg/kg, i.p))</td>
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Table 2. Anti-inflammatory activity of EETPR and EETPA on Cotton pellet induced granuloma.

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<td>182.2±3.260</td>
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<td>147.3±3.490*** (23.69%)</td>
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<td>120.8±4.175*** (50.82%)</td>
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<td>Group D (EETPA - 250)</td>
<td>174.8±2.688 (4.23%)</td>
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<td>Group E (EETPA - 500)</td>
<td>155.0±3.386*** (17.55%)</td>
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<td>6</td>
<td>Group F (Indomethacin (20 mg/kg, i.p))</td>
<td>122.3±3.737*** (48.97%)</td>
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Figure 2. Effect of EETPR, EETPA and Indomethacin on Cotton pellet induced granuloma in rats.

Figure 3. Effect of EETPR, EETPA and Indomethacin on thermally induced nociception in rats.

Cotton pellet granuloma in rats

A sterilized cotton pellet weighing 100 mg was introduced subcutaneously into the groin region of rats according to the method of Mossa et al. The test groups of animals (groups B and group C) were treated orally with 250, 500 mg/kg of the ethanol extract of root part and the test groups (group D and group E) were treated orally with 250, 500 mg/kg of the ethanol extract of aerial part, respectively. Animals in the control and reference (group A and group F) received 0.9% saline (10 ml/kg, p.o.) and indomethacin (20 mg/kg, i.p.), respectively daily for 7 days. The animals were sacrificed on the eighth day after an overdose of chloroform. The pellets surrounded by granuloma tissue (six animals per group) were dissected out carefully and dried at 60°C to a constant weight. Mean weight of the granuloma tissue formed in each group was obtained and the percentage inhibition was expressed by comparing the mean weight in the test groups with the mean weight in the control group.

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Figure 3. Effect of EETPR, EETPA and Indomethacin on thermally induced nociception in rats.
The extracts were evaluated for their anti-inflammatory activity by Carrageenan method. Among the six groups, third group (Group C) which is treated with 500 mg/kg body weight of EETPR showed significant anti inflammatory activity which was maximum, when compared to Group C and Group F. Group B and Group D which is treated with 250 mg/kg body weight of EETPA and EETPR respectively show considerable anti-inflammatory activity but it is not much effective. The responses with 250 mg/kg body weight of EETPA and EETPR were compared to the standard drug, Indomethacin which is given intra peritoneal. The anti-inflammatory effect and analgesic properties of Tephrosia purpurea Linn. extracts were investigated in the present study. For the anti-inflammatory effect, it is important to estimate the activities of the extracts in the acute phase of inflammation as well as in the chronic phase of inflammation. Accordingly the carrageenan test was selected because of its sensitivity in detecting orally active anti-inflammatory agents particularly in the acute phase of inflammation. The anti-inflammatory effect but it is not much effective. The responses with 250 mg/kg body weight of EETPA and EETPR respectively show considerable anti-inflammatory activity but it is not much effective. The responses with 250 mg/kg body weight of EETPA and EETPR were compared to the standard drug, Indomethacin which is given intra peritoneal. The anti-inflammatory effect and analgesic properties of Tephrosia purpurea Linn. extracts were investigated in the present study. For the anti-inflammatory effect, it is important to estimate the activities of the extracts in the acute phase of inflammation as well as in the chronic phase of inflammation. Accordingly the carrageenan test was selected because of its sensitivity in detecting orally active anti-inflammatory agents particularly in the acute phase of inflammation.

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In the Cotton pellet granuloma method, the oral doses of Tephrosia purpurea Linn. extract show a dose dependent reduction in the size of the edema from 1.405 ± 0.1037 to 1.147 ± 0.3297. This effect of the extracts in the acute phase of inflammation as well as in the chronic phase of inflammation. Accordingly the carrageenan test was selected because of its sensitivity in detecting orally active anti-inflammatory agents particularly in the acute phase of inflammation.

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activity when compared to standard drug (Group F). The Group D and Group E, which is treated with EETPA at the dose of 250 and 500 mg/kg body weight show less significant activity when compared to standard drug (Group F). The response was expressed as mean±S.E.M. and were given in Table 2.

The results obtained from using the two models show that Tephrosia purpurea Linn. ethanol extracts can effectively reduce inflammation in both the acute and chronic phases (Tables 1 and 2). This result provides a scientific basis for the practice of using Tephrosia purpurea Linn. extracts in the treatment of wounds.

Analgesic properties were also studied using sensitive model that could provide different grades of noxious stimuli (in thermal stimulus). In the present study, the tail immersion method⁹ was selected because of several advantages including the sensitivity to strong analgesics and limited tissue damage. Hot water was used to induce pain in rats to study the analgesic activity of EETPR and EETPA, all the five groups showed marked decrease in response to thermal pain stimulus. Group B which was treated with 500 mg/kg body weight of EETPR showed analgesic activity at 2 h which was maximum and also has significant analgesic activity at 0, ½, 1 and 4 h of drug administration. Group D which was treated with 500 mg/kg body weight of EETPA showed analgesic activity at 2 h which was maximum and also has significant analgesic activity at 0, ½, 1, and 4 h of drug administration. Group A and Group C also show significant analgesic activity. The responses at 0, ½, 1, 2, and 4 h of drug administration were expressed as mean±S.E.M. and were given in Table 3. The observed effect in this study (Table 3) has shown that Tephrosia purpurea Linn. can significantly inhibit the responses to thermal stimulus. Therefore, it is concluded that the Tephrosia purpurea Linn. extract is capable of inhibiting inflammatory reactions as well as inflammatory pain.

ACKNOWLEDGEMENTS

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REFERENCES


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