Anti-inflammatory activity of *Murraya koenigii* Spreng on experimental animals

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ABSTRACT

The aim of the present study is to evaluate the anti-inflammatory activity of *Murraya koenigii* leaves. The leaves and roots are bitter, acrid, cooling, anthelmintic, analgesic, it cures piles, allays heat of the body, reduces inflammation and itching. It is also useful in leucoderma and blood disorders. An infusion of the toasted leaves in used to stop vomiting. Crushed leaves are applied externally cures skin eruption and to relieves burn. For screening the activity The male wistar rats having weight (150-200g) were used. The petroleum Ether, chloroform and ethanol extracts were prepared by using soxhlet extraction method. The petroleum ether, chloroform and ethanol extracts of *Murraya koenigii* were screened at dose of (250mg/kg) for anti inflammatory activity by using acute carrageenan induced paw oedema method and yeast induces hyperpyrexia method respectively. The ethanolic extract shows significant effects in anti-inflammatory activity. This study had rationalized the ethanomedicinal use of the plant for cut, injury & alignment of body temperature by treble people.

Key Words: *Murraya koenigii*, anti inflammatory, carrageenan, yeast.

INTRODUCTION

*Murraya koenigii* spreng. Synonym: *Bergera koenigii* (L.) Roxb. (*Rutaceae*) commonly known as *kari patta* or *meetha neem* is use to evaluate the anti-inflammatory activity. The roots and leaves are bitter, acrid. This plant use for cooling, anthelmintic, analgesic, piles, allays heat of the body, reduces inflammation and itching. It is also useful in leucoderma and blood disorders. An infusion of the toasted leaves in used to stop vomiting1. Crushed leaves are applied externally cures skin eruption and to relieves burn. The pastes of leaves are applied externally to treat the bites of poisonous animals2. Steam distillate of the leaves can be used as stomachic, purgative, febrifuge and anti emetic3. Leaves are applied externally to bruises and eruption4.
The plant have been reported to possess positive inotropic effect\(^5\) Antidiabetic and cholesterol reducing property\(^6,7,8\). Antimicrobial, antibacterial and other microbiological Activity\(^9,10\). Antulcer Activity\(^11\). Antioxidative Property, Cytotoxic Activity\(^12\). The study was undertaken to evaluate the anti inflammatory of *Murraya koenigii* in rats.

**MATERIAL AND METHODS**

Freshly collected leaves of *Murraya koenigii* from local habitat after authentication were shade dried and powdered to course powder size.

**Extraction**

The powdered material was subjected to successive hot extraction (soxhlet) with various solvents in increasing order of polarity from Petroleum ether, Chloroform and Ethanol. After the complete extraction, the solvent was distilled off and concentrated on a water bath\(^13\).

**Preliminary Phytochemical Screening of extracts**

The plants may be considered as biosynthetic laboratory for multitude of compounds like alkaloids, glycosides, volatile oils, tannins, saponins, flavonoids, sugar etc. that exerted physiological effect. These compounds are termed as secondary metabolites. To check the presence or absence of primary and secondary metabolites all the extracts were subjected to a battery of chemical tests\(^14\).

**Pharmacological Screening**

**Animal**

Albino rats, Wister strain, of weighing 150-200 gm were used for acute model. Rats were kept in polypropylene cages and fed on standard laboratory diet. The animals were exposed to 12 hours of darkness and light each. The bedding material of cages was changed everyday.

**Acute Toxicity Study**

Acute toxicity study was carried out according to OECD guidelines. The extracts were suspended in saline. The extracts were given to rats by oral route at a dose level of 500, 1000 and 2500 mg/kg body weight, to groups of 4 animals. After administration of extracts the rats were observed for gross behavioral, neurological, autonomic and toxic effects. The toxicological effects were observed in terms of mortality. No death occurred within 24 h of dose of 500, 1500 mg/kg but at a dose of 2500 mg/kg 50% mortality was observed. As dose was increased further up to 5000 mg/kg, at that dose all the animals were died. Hence 2500 mg/kg dose was considered as LD\(_{50}\). 1/10\(^{th}\) of the LD\(_{50}\) was considered as an effective dose i.e. 250 mg/kg\(^15\).

**Assessment of Anti-Inflammatory Activity**

**Carrageenan Induced Rat Paw Edema Method.**\(^16\)

**Procedure**

Thirty minutes after drug or test compound (extracts) administration, 0.1 ml. of 1% carrageenan in distilled water was injected into the sub plantar region of right hind paws of all groups. A mark was put on the leg at the malleolus to facilitate uniform dipping at subsequent readings. The paw edema volume was measured with the help of plethysmometer at zero hr. (Immediately after injecting carrageenan). The same procedure was repeated at 30 minutes 1, 2, 3 hours. The difference between 1 hours and subsequent hours reading was taken as actual edema volume.
The percentage inhibition of paw edema in the various treated groups was then calculated by using the formula:

\[
\text{Percentage inhibition} = (1 - \frac{V_t}{V_c}) \times 100
\]

Where \( V_t = \) is the edema volume in the drug treated group. 
\( V_c = \) is the edema volume in the control group.

- **Group I**: Served as control and received 1ml water.
- **Group II**: Treated with Carrageenan only.
- **Group III**: Standard group Ibuprofen 50mg/kg.
- **Group IV**: Petroleum ether extract 250 mg/kg.
- **Group V**: Chloroform extract 250 mg/kg.
- **Group VI**: Ethanol extract 250 mg/kg.

**RESULTS**

**Extraction**

**Table No.1:** The Percentage Yield of Petroleum Ether, Chloroform and Ethanol

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Solvent Nature of Extract</th>
<th>Color %Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pet.Ether(40-60˚C) Semisolid</td>
<td>Greenish black 3.9</td>
</tr>
<tr>
<td>2</td>
<td>Chloroform Semisolid Dark green</td>
<td>3.1</td>
</tr>
<tr>
<td>3</td>
<td>Ethanol Semisolid Green</td>
<td>6.3</td>
</tr>
</tbody>
</table>

**Table 2:** The result of preliminary phytochemical screening of the plant extract.

<table>
<thead>
<tr>
<th>Plant constituents</th>
<th>Ethanol Extract</th>
<th>Pet. Ether Extract</th>
<th>Chloroform Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloid</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>-ve</td>
<td>-ve</td>
<td>-ve</td>
</tr>
<tr>
<td>Proteins</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>Tannins</td>
<td>-ve</td>
<td>-ve</td>
<td>-ve</td>
</tr>
<tr>
<td>Steroids</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>Saponins</td>
<td>-ve</td>
<td>-ve</td>
<td>-ve</td>
</tr>
<tr>
<td>Amino acids</td>
<td>-ve</td>
<td>-ve</td>
<td>+ve</td>
</tr>
</tbody>
</table>

+ indicate **Present** and – Indicate **Absent**

**Table No. 3:** Results of Anti-inflammatory activity of extracts

<table>
<thead>
<tr>
<th>Group No.</th>
<th>Treatment</th>
<th>Dose</th>
<th>1hr Mean±S.D.</th>
<th>2hr Mean±S.D.</th>
<th>3hr Mean±S.D.</th>
<th>Average reading</th>
<th>% Inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carrageenan</td>
<td>0.1mL,1% sol.</td>
<td>1.43±0.08</td>
<td>1.50±0.06</td>
<td>1.42±0.04</td>
<td>1.45</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>Ibuprofen</td>
<td>50mg/kg</td>
<td>0.50±0.05</td>
<td>0.60±0.06</td>
<td>0.64±0.04</td>
<td>0.58</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>Pet. Ether extract</td>
<td>250mg/kg</td>
<td>0.79±0.12</td>
<td>0.92±0.15</td>
<td>0.96±0.11</td>
<td>0.89</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>Chloroform extract</td>
<td>250mg/kg</td>
<td>0.89±0.17</td>
<td>0.90±0.09</td>
<td>1.10±0.12</td>
<td>0.93</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>Ethanol extract</td>
<td>250mg/kg</td>
<td>0.75±0.09</td>
<td>0.72±0.1</td>
<td>0.66±0.12</td>
<td>0.71</td>
<td>52</td>
</tr>
</tbody>
</table>

**Evaluation of Anti-inflammatory Activity of Extract**

It was observed that Petroleum ether and chloroform extract did not show significant decrease in paw edema volume with respect to corresponding control. The Ethanolic extract gives significantly reduced paw edema volume. Results are given in Table No.2
Histogram No. 1: Histogram of Anti-inflammatory Activity. Histogram Showing Effect of Extracts of Leaves of *Murraya koenigii* spreng. on Carrageenan Induced Rat Paw Edema Method

**Anti-inflammatory Activity of Extracts**

![Graph showing anti-inflammatory activity of extracts](image)

**DISCUSSION**

The fresh leaves of *Murraya koenigii* was collected from local habitat after authentication were shade dried and powdered to course powder size. The powdered material was subjected to successive hot extraction (soxlet) with various solvents in increasing order of polarity from Petroleum ether, Chloroform and Ethanol. After the complete extraction, the solvent was distilled off and concentrated on a water bath. The preliminary phytochemical screening of extracts of *Murraya koenigii* shows presence of mucilage, proteins, sterols and Triterpenoids, alkaloids, flavonoids, phenolic compounds. Thus these activities of *Murraya koenigii* could be due to alkaloids, flavonoids and triterpenoids. Albino rats, Wister strain, of weighing 150-200 gm were used for acute model. Acute toxicity study was carried out according to OECD guidelines. The extracts were given to rats by oral route at a dose level of 500, 1000 and 2500 mg/kg body weight, to groups of 4 animals. No death occurred within 24 h of dose of 500, 1500 mg/kg but at a dose of 2500 mg/kg 50% mortality was observed. As dose was increased further up to 5000 mg/kg, at that dose all the animals were died. Hence 2500 mg/kg dose was considered as LD\(_{50}\). 1/10\(^{th}\) of the LD\(_{50}\) was considered as an effective dose i.e. 250 mg/kg. The Carrageenan induced rat paw oedema has been a popular inflammatory model to investigate the anti-inflammatory effect of compounds. It has a biphasic effect. The first phase is due to release of histamine and serotonin (5HT) (0-2hr), plateau phase is maintained by kinin like substance (3hr) and second accelerating phase of swelling is attributed to P.G. release (>4hr)\(^{10}\). In this study ethanolic extract of *Murraya koenigii* (250mg/kg, p. o.) significantly reduces oedema induced by carrageenan in all the phases. Hence it can be concluded that ethanolic extract of *Murraya koenigii* possess anti inflammatory activity that may be mediated by alkaloids, flavonoids and triterpenoids.
CONCLUSION

In this study ethanolic extract of *Murraya koenigii* (250mg/kg, p. o.) significantly reduces oedema induced by carrageenan in all the phases. Hence it can be concluded that ethanolic extract of *Murraya koenigii* possesses anti-inflammatory activity.

REFERENCES