**SARACA ASOCA – IN THE MANAGEMENT OF PAIN AND INFLAMMATION**

B.Deepi*¹, Santhrani Thaakur², P. Srinivasa babu¹, T. Priyatamnadh¹, B.L.Narendra¹

1. Vignan College of Pharmacy, Vadlamudi, Andhra Pradesh, India.
2. Sri Padmavathi Mahila Viswa Vidyalayam, Tirupathi, Andhra Pradesh, India

E Mail Id : deepubandarupalli@gmail.com

**Summary**

*Saraca asoca* is one of the most renowned and a religious tree of India. It is mainly used as uterine tonic and also in the management of burning sensation, piles and in inflammation. The analgesic activity was assessed on rats by tail flick method and hot plate method. The anti-inflammatory activity was estimated by measuring the mean increase in hind paw volume of rat with the help of plethysmometer. In our present study, it is observed that methanolic extract of *Saraca asoca* exhibited significant analgesic and anti-inflammatory action.

**Key words**: Medicinal plants, Saraca Asoca, Pain, Inflammation, Traditional medicine.

**Introduction**

*Saraca asoca* belongs to the family Fabaceae, which is commonly known as Asoka in Sanskrit. Handful reports document the diverse properties of this plant. Saraca asoca possess antimicrobial activity(1), haemorrhoids and haemorrhagic dysentery (2), Oxytocic activity (3). Pain has been officially defined as disagreable sensory and emotional experience associated with actual or potential tissue damage. However, it is primarily protective in nature, but often causes discomfort. Analgesics relieve pain as a symptom, without affecting its cause (4). Currently available drugs used in the management of pain and inflammation such as opiates, NSAIDS, corticosteroids are not useful in all cases due to their side effect profile. Opiate analgesics such as morphine has strong addictive potential and other side effects including respiratory depression, drowsiness, decrease in G.I motility, nausea and several alterations of endocrine and Autonomic Nervous System while NAIDS are well known for their G.I bleeding, ulceration etc (5). Harmless and efficient management of pain and inflammation through plant resources has received much response in recent years. This study was undertaken to evaluate the efficacy of methanolic extract of *saraca asoca* in regulation of pain and inflammation.
Materials and Methods

Preparation of extract
Bark of *Saraca asoca* was collected from the Mada Ramayya Sons Ayurvedic Shop, Guntur, A.P, India. They were shade dried and coarsely powdered, extracted with soxhlet extractor.

Phytochemical analysis
An attempt was made to observe the presence and absence of different phytochemical constituent’s viz. alkaloids, saponins, flavonoids, terpenes, glycosides, steroids, proteins, carbohydrates and fats.

Acute toxicity studies
Acute toxicity studies were carried out after administration of methanolic extract of bark of *Saraca asoca* on mice weighing about 20 – 25gm. The mice were divided in to 5 groups each of 6 animals and were given test extracts orally in the form of suspension in 2% Tween 80 to overnight fasted mice. The animals received the doses at 50, 100, 200, 400, 1000 mg/kg body weight. After administration of the extracts, Animals were observed continuously for the first three hours for any toxic manifestation. There after, observations were made at regular intervals for 24hrs. Further the animals were under investigation up to a period of one week (6).

Drug formulations
The methanolic extract of *Saraca asoca* was suspended in 1% gum acacia solution. Drug doses of 400mg/kg and 800mg/kg body weight were administered to different groups of animals.

Experimental animals
Wistar albino rats (150-180 gm) were used in the study. They were housed individually in standardized environmental condition. All the animals were provided with water food ad libitum. In the each experiment, rats were divided in to four groups, each group consisting of 5 animals. Group 1, treated with control base and received 1% gum acacia solution; Group 2, treated with 50mg/kg of Diclofenac sodium; Group 3&4, treated with 400mg/kg and 800mg/kg of methanolic extract of *Saraca Asoca*.

Hot plate method
The paws of rats are very sensitive to temperature at 55±0.5°C, which are not damaging to the skin. The animals were placed on Eddy’s hot plate kept at a temperature of 55±0.5°C. A cut off period of 15 sec (7), was observed to avoid damage to the paw. Reaction time was recorded when animals licked their fore or hind paws, or jumped prior to and 0, 30, 60 and 90 min after oral administration of the samples (8-10).

Tail-flick method
The tails of the rats were individually inserted into the Tail-flick Analgesiometer. The temperature was maintained at 50-55°C The reaction time was recorded by using Tail-
flick Analgesiometer at 0 min, 30 min, 60 min, 120 min and 180 min time interval after the administration of the drug (11).

Carragenan induced paw edema method

Acute inflammation was induced by intramuscular administration of 0.1 ml of carrageenan (1%) (12). Rats were treated with either vehicle or Saraca asoca 1h before administration of the carrageenan. The paw volume was measured prior to injection of carrageenan (0 hr) and then at predetermined interval for each agent. For carrageenan, the interval was 3 hr. Paw volume was measured using digital Plethysmometer .Change in the paw volume was measured and anti-inflammatory activity was calculated by using the following formula

\[ \% \text{ Inhibition of inflammation} = 1 - \frac{(V_t/V_c)}{100}, \] where,

\[ V_t = \text{change in the paw volume in Saraca asoca treated group} \]

\[ V_c = \text{change in the paw volume in the corresponding vehicle treated control group.} \]

Statistical Analysis

All values were expressed as Mean ± SEM the data was analyzed using analysis of variance followed by students T-test. In all tests, the criterion for statistical significance was P<0.05.

Results

Preliminary phytochemical constituents that were present were displayed in Table- 1. Increase in reaction time is generally considered as important parameter of analgesic activity and the results of significant analgesic activity by tail-flick method and hot plate method was displayed in Figure 1 and Figure 2. Decrease in paw volume is generally considered as important parameter for anti-inflammatory activity and was displayed in Figure 3.

Table 1 – Qualitative analysis of the phytochemical constituents

<table>
<thead>
<tr>
<th>Methanolic extract of bark of S.Asoca</th>
<th>Presence/Absence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td>+</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>+</td>
</tr>
<tr>
<td>Proteins</td>
<td>+</td>
</tr>
<tr>
<td>Steroids</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
</tr>
<tr>
<td>Alkaloids</td>
<td>-</td>
</tr>
<tr>
<td>Glycosides</td>
<td>+</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+</td>
</tr>
</tbody>
</table>

(+ – presence of constituents, (-) – absence of constituents)
Values are expressed as mean ± SEM (n = 5)
* (p<0.05) vs control group, *** (p<0.001) vs control group
+ (p<0.01) vs standard group, +++ (p<0.001) vs standard group
x (p<0.05) vs SAme -400mg group, xx (p<0.01) vs SAme -400mg group,
xxx (p<0.001) vs SAme -400mg group.
Discussion and Conclusion

Preliminary phytochemical constituents of the present extract showed the presence of phenolic constituent’s flavonoids, tannins, saponins, steroids, glycosides, proteins, fats, carbohydrates. This suggests that major component responsible for showing this analgesic activity may be seen in this extracts. In Ayurveda, it was mentioned that it has the action of “Vedana sthapana”- useful in inhibition of pain. The womenfolk use this bark paste at the site of pain for relief (13). Hence, the experimental data obtained from the present work provides justification for the traditional use of this plant as analgesic.

In the present study anti-inflammatory activity provides the pharmacological evidence for the folklore consideration of this plant as it has the action of “Shothajit” – useful in the management of edematous conditions (13). The paw edema that was induced in this experiment by means of subplantar injection of carragenan shows a biphase. The first phase involves the release of serotonin and histamine while the second phase is mediated by the liberation of prostaglandins and continued by kinins (14). Diclofenac sodium used as a standard shows its action by inhibiting prostaglandin synthesis (4). Previous studies demonstrate that various flavonoids produced antinociceptive and anti-inflammatory activities (15-16).
Tannins also play a role in antinociceptive and anti-inflammatory activities in some studies (17). Flavonoids and tannins inhibit prostaglandin synthesis by modifying the production of cyclooxygenase (cox – 1& cox – 2) and lipooxygenase (lox) involved in the prostaglandin synthesis (18-19). Thus the studies reveals that major mechanism by which methanolic extracts of *Saraca asoca* represents antinociceptive and anti-inflammatory action is by means of inhibition of release or synthesis of inflammatory mediators especially the cyclooxygenase products like prostaglandins. Thus, the isolation and identification of phytoconstituents responsible for wound healing activity may lead to evolution of a potential drug for treatment of pain and inflammation.

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**References**

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