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Research Article

**COMPARATIVE EVALUATION OF EXTRACTS OF SENNA UNIFLORA  
FOR ANTI-INFLAMMATORY ACTIVITY**

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**ABSTRACT**

**Aims and Objective:** To study the benzene, alcohol and petroleum ether extract of *Senna uniflora* treatment against carrageenan induced paw oedema in albino rat model.

**Methods:** The benzene, alcohol and petroleum ether extracts of *Senna uniflora* was given to paw oedema induced albino rats at doses administered intraperitoneally (I.P.) ranged from 50 to 200 mg/kg body weight, which comparable with indomethacin (10 mg/kg) used as a reference drug.

**Results:** The benzene and alcohol extracts administrated orally at dose of 200 mg/kg produced significant ( $P < 0.05$ ) oedema inhibition when compared with indomethacin.

**Conclusion:** The result suggested that benzene and alcohol extracts of *Senna uniflora*, showed significant inhibition on paw oedema albino rats. This study reveals the possible rationale for its folkloric use as an anti-inflammatory agent.

**Keywords:** Anti-inflammation, *S. uniflora*, Carrageenan, Plethysmograph.

## **INTRODUCTION**

Inflammation is a biological complex of vascular tissues in harmful stimulated by pathogens and irritants (1) and has been major health problems in the world (2). Although, several agents are known to treat inflammatory disorders, their prolonged use often leads to gastric intolerance, bone marrow depression, water and salt retention (3). Now-a-days herbal treatments are becoming increasing by popular as the herbal preparations have no or least side effects (4). World Health Organization (WHO) estimates that 80% of the population relies on plant based products for human health care (5).

*S. uniflora* (Caesalpinaceae) is common weeds available in like tropics and poultrice area of Tamil Nadu, India. The traditional people has utilized as a wound remedies, eczema and combat dropsy (6). Even though, two main species of this family *Cassia grandis* and *Cassia fistula* are highly exposed to anti-inflammatory activity (7). Still no more pharmacological data are available in this medicinal plant. Thus, the present study to evaluate the anti-inflammatory potential of *S. uniflora* against carrageenan induced paw oedema in albino rats.

## **MATERIALS AND METHODS**

### ***Plant material collection and extraction:***

*S. uniflora* leaves were collected from Pachamalai hills, Tamil Nadu, India. The air dried and powered leaves of *S. uniflora* (1 kg) were extracted with different organic solvents such as petroleum ether, benzene and alcohol by using in soxhlet apparatus. The extracts were filtered and concentrated in rotatory evaporator at 35-40 °C under reduced pressure to obtain a semisolid material 500 mg/kg of each solvent.

***Experimental animals:***

Albino rats (150-200 g) of either sex were taken and maintained in laboratory conditions at 25±1°C under the 12/12 h light/dark and the standard pellet diet (Gold Mohur brand, Lipton India Ltd.) with water *ad libitum* were freely given. Ethical clearance was given by Institutional Animal Ethics Committee and conducted experimental rules of Indian National Science Academy (CPCSEA/265).

***Drugs:***

Experimental purpose, Indomethacin and Carrageenan was purchased from Sigma (U.S.A.). Indomethacin (10 mg/kg) was used as a standard drug for anti-inflammatory studies. 0.1 ml Carrageenan (1%) was injected into the plantar surface of left hind paw of rats at 1 h before treatment of *S. uniflora* extract. Overnight fasting conditions test drug was administered.

***Acute toxicity study:***

Acute oral toxicity study was performed as per guidelines OECD-423 (acute toxic class method). The test was performed in rats divided into different groups of 6 each. Mortality was not determined; hence, experiments repeated with higher doses (200-5000 mg/kg body weight). The toxicity symptom was observed after 2 h, the mortality screened at 24 h (8).

***Anti-inflammatory activity:***

Albino rats were divided into 11 groups with 7 rats in each group. Group 1 received saline water only and served as control. While, the groups 2-4, 5-7, 8-10 were received saline with benzene, alcoholic and petroleum ether *S. uniflora* extracts (50 to 200 mg/kg) respectively. However, group 11 received 10 mg/kg of Indomethacin orally as a vehicle (control). The thickness of left hind paw was measured by mercury displaced in plethysmograph at initial, 60, 120 and 180 min. Percentage was significantly increased in paw oedema treated group and

compared with control based on inhibition. The given drugs potency was measured depends upon the percentage inhibition.

***Statistical Analysis:***

The observation was expressed in mean  $\pm$  S.E. The difference response in test drugs was determined by one way analysis of variance and Duncan's test.  $P < 0.05$  was significantly considered.

**RESULT AND DISCUSSION**

The anti-inflammatory activities of the benzene, alcoholic and petroleum ether extracts of *S. uniflora* were evaluated by carrageenan-induced rat paw oedema method and the result is shown in Table 1. Carrageenan-induced rat paw oedema has been used as an inflammation model in order to investigate the anti-inflammatory effect of drug (9). The extracts were tested at three different dose levels such as 50, 100 and 200 mg/kg. The results showed that higher dose of benzene and alcohol extracts of *S. uniflora* (200 mg/kg) showed 45.61 and 46.34% of inhibition on carrageenan induced rat paw oedema at 180 min. This result indicated that benzene and alcohol extracts with a dose of 200 mg/kg b.w showed a maximum anti-inflammatory activity is similar to the reference drug indomethacin, which showed 46.68% of inhibition. While, petroleum ether extract with three different doses showed only 4.04, 9.57 and 17.02% of inhibition respectively. It was lower as compared to the reference drug.

In general, oedema has an early stage of inflammation (10) is due to release of histamine and serotonin like substances (11). Higher dose (200 mg/kg) of *S. uniflora* extract anti-inflammatory activity may be due to inhibition of the mediators of inflammation histamine, serotonin and prostaglandin at after 180 min. Such a phenomenon, a number of medicinal plants are used in various medical systems for pain and inflammation relief at after 180 min, and has

already been observed in *Jatropha gossypifolia* (12), *Bambusa vulgaris* (13), *Tabernaemontana catharinensis* (14) and *Tagetes erecta* (15). More over, the dose level of 50 and 100 mg/kg of the *S. uniflora* all extracts does not produce a significant anti-inflammatory activity than the reference drug.

**Table 1: Percentage inhibition of paw oedema exhibited by methanolic extract of leaves of *S. uniflora*.**

| Treatment  | Dose (mg/kg)  | Oedema volume (ml) |            |            |             | Percentage inhibition after 180 min |
|--|---------------|--------------------|------------|------------|-------------|-------------------------------------|
|  |               | 0 min              | 60 min     | 120 min    | 180 min     |                                     |
| <b>Control</b>                                   | Normal saline | 39.02±1.02         | 68.29±3.21 | 96.68±5.12 | 108.43±7.37 | --                                  |
| <b><i>S. uniflora</i><br/>Benzene Extract</b>    | 50 mg/kg      | 36.08±2.01         | 53.00±3.63 | 79.03±4.12 | 78.23±4.12  | 27.85                               |
|  | 100 mg/kg     | 34.09±2.21         | 50.00±3.73 | 76.13±5.12 | 68.18±4.92  | 37.12                               |
|  | 200 mg/kg     | 24.40±1.61         | 45.51±2.21 | 76.14±5.12 | 58.97±5.02  | 45.61                               |
| <b><i>S. uniflora</i><br/>Alcohol Extract</b>    | 50 mg/kg      | 37.50±1.02         | 53.15±4.17 | 68.45±5.06 | 77.52±5.22  | 28.51                               |
|  | 100 mg/kg     | 36.58±1.22         | 51.11±4.16 | 64.44±4.92 | 73.33±5.13  | 32.37                               |
|  | 200 mg/kg     | 31.91±2.73         | 56.52±4.16 | 72.09±5.16 | 58.07±4.91  | 46.34                               |
| <b><i>S. uniflora</i><br/>Pet. ether Extract</b> | 50 mg/kg      | 36.82±1.98         | 64.28±4.32 | 96.29±6.31 | 104.05±6.32 | 4.04                                |
|  | 100 mg/kg     | 34.88±1.97         | 62.27±3.62 | 93.27±5.72 | 98.05±5.13  | 9.57                                |
|  | 200 mg/kg     | 28.40±1.61         | 65.51±2.21 | 69.14±5.12 | 89.97±5.02  | 17.02                               |
| <b>Indomethacin</b>                              | 10 mg/kg      | 27.08±0.92         | 33.08±1.83 | 48.08±2.21 | 57.81±1.17  | 46.68                               |

n= 6, Values are expressed as mean +S.E, p<0.05 when compared with control.

## CONCLUSION

This study reports for the first time to our knowledge that *S. uniflora* has anti-inflammatory activities. Acute toxicity study was observed that the all extracts of *S. uniflora* did not show any behavioral changes or mortality even at a dose of 5000 mg/kg indicative of the safety of these extracts. Further studies may reveal the exact mechanisms of action responsible to treat for the analgesic and inflammatory activities. Though the study has highlighted the anti-inflammatory activity of *S. uniflora* could be a potential new natural source as well as scientific proof of its ethno-pharmacological use in inflammatory disorders.

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