



ANTI-INFLAMMATORY EFFECT OF METHANOLIC EXTRACT OF LEAVES OF VARIOUS PLANTS

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ABSTRACT

The aim of this study is to establish the anti-inflammatory activity by using carrageenan induced paw oedema in rats for methanolic extract of leaves of *Solanum pubescens*, *Sophora interrupta* Bedd. and *Tabebuia rosea*. The effect was assessed by difference in paw oedema volume, before & after the dose administration of the extracts in rats. Anti-inflammatory effects were compared with Standard drug- Indomethacin (10mg./kg/ml.). These observations helped us to conclude that methanolic extract of *Solanum pubescens*, *Sophora interrupta* Bedd and *Tabebuia rosea* is endowed with anti-inflammatory property.

KEY WORDS: carageenin, anti-inflammatory.



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INTRODUCTION

The importance of medicinal plants in traditional health care practices, providing clues to new areas of drug research and biodiversity conservation is now well recognized. Inflammation is a complex biological response of vascular tissues to harmful stimuli such as pathogens, damaged cells and irritants. It is the protective attempt by the organism to remove the injurious stimuli as well as initiate healing process for the tissue and considered to be the major cause of rheumatoid arthritis. Drugs currently used for management of pain and inflammatory conditions present toxic side effects on chronic administration. Therefore, attempts are being taken to study promising plants which may lead to develop newer or safer drugs¹. Inflammation is the tissue reaction to infection, irritation or foreign substance. It is a part of the host defense mechanisms that are known to be involved in the inflammatory reactions such as release of histamine, bradykinin & prostaglandins. The development of non-steroids in overcoming human sufferings such as Rheumatoid arthritis has evoked much interest in the extensive search for new drugs with this property. *Solanum pubescens* belong to the family Solanaceae leaves contains flavonol 3-o-methyl ethers from *solanum pubescens*^{2,3}. *Sophora interrupta* Bedd commonly called as *Edwardsia maderaspatana* wt. and in Telugu Adavibillu is a woody perennial shrubs, belongs to the family Fabaceae. The leaves are odd-pinnate leaflets are broadly ovate. The plant has its own medicinal value like antifungal anticancer and antibacterial. Several phytochemical researches, have demonstrated that *sophora* contains many phytoconstituents like matrine, oxymatrine type of alkaloids⁴. The methanolic extract of *Tabebuia rosea* (Bignoneaceae) revealed the presence of saponins, tannins, phenolic acids, flavonoids and alkaloids and antibacterial activity towards different bacterial strains⁵. So far no systematic study has reported for anti-inflammatory property of these plants. In the present study effort has made to establish the scientific validity to the

anti-inflammatory property of *Solanum pubescens*, *Sophora interrupta* Bedd and *Tabebuia rosea* leaf extract using Indomethacin as standard by Carrageenan induced paw oedema model in Rats.

MATERIALS AND METHODS

Plant material and extraction

The leaves of *Solanum pubescens*, *Sophora interrupta* Bedd and *Tabebuia rosea* was collected in march 2010 from S.V. University, Tirupathi, Andhra pradesh, India. The plant material was taxonomically identified by the Botanist Dr. K. Madhavachetty and the voucher specimen was retained in our laboratory for future reference. The leaves were dried, powder material (500g) of the leaves of *Solanum pubescens* was extracted with 2000ml of methanol in a Soxhlet apparatus. The methanol extract was distilled, evaporated and dried in vacuum. The resulted extract yield was 7was calculated and the appearance of the extract was dried gum resin in nature. The chemical constituents of the extract were identified by qualitative analysis followed by their conformation through the literature. Wistar rats (110-240g, fasted) of either sex were used and grouped and housed in polyacrylic cages (six animals per cage) and maintained under standard laboratory conditions (temp 24-28°C, relative humidity 60-70% and 12hr dark light cycle). They were fed commercial rat feed and drinking water were provided *ad libitum* throughout the experimental period. The animals were acclimated to laboratory conditions one week prior to the initiation of experimental work. All animal experiments were carried out according to NIH guidelines, after getting the approval of the Institute's Animal Ethics Committee (Reg.No. 1447/PO/a/11/CPCSEA).

Carrageenan-induced rat paw edema

The animals were divided into four groups of six animals each and were fasted for a period of 24 h prior to the study. The animals were placed in

different groups. Group 1 was treated as control, Group 2 received indomethacin 10mg./kg/ml. suspended in 1% sodium carboxymethyl cellulose. Group 3, 4 and 5 were treated with 300 mg/kg, 400 mg./kg/ml. and 500mg /kg of methanolic extracts of *Solanum pubescens*, *Sophora interrupta Bedd* and *Tabebuia rosea*. Oedema was induced by injecting 0.1 ml. of a 1% solution of carrageenan in saline into the subplantar region of the right hind paw of the rats. The vehicle, extracts and the standard drugs were administered 60 min. prior to the injection of the phlogestic agent. The volumes of oedema of the injected and the contralateral paws were measured at 1, 2, 3, 4, 5 h after the induction of inflammation using a plethysmograph to calculate the percentage of paw oedema inhibition. The difference in left and right paw volumes indicated the degree of inflammation. The anti-inflammatory activity of the plant extract was estimated as the degree of edema inhibition⁶.

RESULTS

Anti-inflammatory activity

The methanolic extract *Solanum pubescens*, *Sophora interrupta Bedd* and *Tabebuia rosea*.

has been tested for their possible anti-inflammatory activity in Albino rats of five groups, each group containing six animals of either sex weighing between 150-250 gm. The first group received saline which served as control. The second group was given standard NSAID indomethacin drug (10mg./kg./ml) orally, which served as standard anti-inflammatory agent. The third fourth & fifth groups received the *Solanum pubescens* (300mg/kg), *Sophora interrupta Bedd*(400mg/kg) and *Tabebuia rosea* (500mg/kg) respectively, orally. The percentage inhibition of rat paw oedema was calculated and compared with that of standard indomethacin. Indomethacin produced a 79.41% inhibition of paw oedema when observed after 3 hours of carrageenan injection. The methanolic extract of *Solanum pubescens* (300mg/kg), *Sophora interrupta Bedd* (400mg/kg) and *Tabebuia rosea* (500mg/kg) significantly inhibited the paw oedema by 58.8%, 76.47% and 78.97% when compared to the saline group after 3 hours of carrageenan injection. According to statistical analysis of anti-inflammatory data, we can say that the values were significantly different from the control or saline group at P< 0.05 (ANOVA, followed by Dunnett's-test).

Table no.1

antiinflammatroty effect of Methanolic extract of *Solanum pubescens*, *Sophora interrupta* and *Tabebuia rosea* leaves on carrageenan induced paw edema in rats.

S.No	Treatment	Oral dose (mg/kg)	1hr	2hr	3hr	4hr
1	Control	-	0.74±0.013	0.66±0.009	0.69±0.01	0.68±0.011
2	Indomethacin	5mg/kg	0.12±0.005** (83.8%)	0.23±0.071** (65.15%)	0.27±0.021** (60.86%)	0.14±0.014** (79.41%)
3	MESP	300mg/kg	0.178±0.101** (75.9%)	0.36±0.01** (45.45%)	0.46±0.01** (33.33%)	2.88±0.015** (58.8%)
4	MESI	400mg/kg	0.165±0.07** (77.7%)	0.27±0.020** (59.09%)	0.388±0.0164** (44.92%)	0.165±0.012** (76.47%)
5	METR	500mg/kg	0.165±0.007** (77.7%)	0.255±0.021** (61.36%)	0.35±0.010** (49.27%)	0.143±0.013** (78.97%)

Values are the mean ± SEM, n=6, **p<0.01, compared to carrageenan control.

DISCUSSION

Although several agents are known to treat chronic inflammatory diseases, prolonged use of these agents should be avoided due to serious or adverse side effects. Consequently, there is a

need to develop new anti-inflammatory agents with minimum side effects. Plants are used for treating various diseases like rheumatism, fever, infection, edema etc., Analgesic drugs available

in the market today also exert a wide range of side effects. The study of plant species traditionally used as pain killers should still be seen as a logical and fruitful research strategy, in search of analgesic drugs. Inflammation is a complex process and various mediators like prostaglandins, leucotriens, platelet activating factor etc., have been reported to be involved in the development of inflammatory diseases.

The results of present study revealed that the time course of edema development in carrageenan induced paw edema models in rats is generally represented by a biphasic curve⁷. The first phase occurs within an hour of injection and is partly due to the trauma of injection due to the serotonin component⁵. Prostaglandins play a major role in development of the second phase of reaction which is measured around 3hr time⁸. The presence of prostaglandins in the inflammatory exudates from the injected foot can be demonstrated.

Carrageenan induced paw edema model is known to be sensitive to cyclooxygenase inhibitors and has been used to evaluate the effect of non-steroidal anti-inflammatory agents which primarily inhibit the enzyme cyclooxygenase involved in prostaglandin synthesis. Based on these reports, it can be inferred that the inhibitory effect of *Solanum pubescens* (300mg/kg), *Sophora interrupta Bedd* (400mg/kg) and *Tabebuia rosea* (500mg/kg) on carrageenan induced inflammation in rats could

be due to inhibition of the enzyme cyclooxygenase leading to inhibition of prostaglandin synthesis⁹. Phytochemical reports on *Solanum pubescens* (300mg/kg), *Sophora interrupta Bedd* (400mg/kg) and *Tabebuia rosea* (500mg/kg) have shown the presence of alkaloids and tannins which are considered to produce significant anti-inflammatory effects. Further studies are warranted on these lines to pinpoint the chemicals and their exact mechanism of action.

CONCLUSION

It can be concluded from present study that *Solanum pubescens* (300mg/kg), *Sophora interrupta Bedd* (400mg/kg) and *Tabebuia rosea* (500mg/kg) leaf extract showed anti-inflammatory activity. Further research, to isolate anti-inflammatory principle & exact mechanism involved, is needed can be used for the development of herbal drug for anti-inflammatory conditions and warrants further studies to decipher its exact mechanism of action.

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