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# Evaluation of Anti-inflammatory Activity of Flower Extracts of *Tecoma stans* on Carrageenan Induced Paw Oedema in Rats by Using Digital Plythesmometer.

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**ABSTRACT**

The study of was undertaken to evaluate the anti-inflammatory activity of *Tecoma stans* flower extracts using carrageenan induced paw oedema in rats. Paw oedema was produced by the injection of carrageenan underneath the plantar region of hind limb in rats. The study comprised of six treatment groups namely: control, standard and test (*Tecoma stans* aqueous and ethanol flower extracts 200 and 400mg) all with five animals in each group. Severity of inflammation was observed and measured by using digital plythesmometer. At the end of study the test group showed significant anti-inflammatory activity, showing an overall p value<0.0001 when compared with other treatment groups i.e., control and standard, and showed p value <0.001 when compared with other treatment groups i.e. test vs standard.

**Keywords:** *Tecoma stans*, anti-inflammatory activity, carrageenan, paw oedema, digital plythesmometer, phlogistic agent (irritant).

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## INTRODUCTION

Inflammation is a tissue reaction to infection, irritation or foreign substances. It is a part of the host defence mechanism [1]. Inflammation is the complex biological response of vascular tissues to harmful stimuli including pathogens, irritants, or damaged cells. It is a protective attempt by the organisms to remove the injurious stimuli as well as initiate the healing process for the tissue.

The process of inflammation is necessary in healing of wounds. Inflammation however if runs unchecked, lead to onset of disease like vasomotor rhinorrhoea, rheumatoid arthritis and atherosclerosis [2]. There are several tissue factors or mechanisms that known to be involved in the inflammatory reactions such as release of histamine, that is synthesised from the amino acid histidine by the action of histidine decarboxylase [3], bradykinin and prostaglandins [4].

The inflammatory reaction is readily produced in rats in the form of paw oedema (underneath the plantar region) with the help of irritants. Irritants generally known as phlogistic agents, some of them are carrageenan (sulphated polysaccharide1% w/v), formalin (0.1ml of 1%), bradykinin(0.1ml of 0.005%), histamine, serotonin, mustard (0.1ml of 2.5%mustard powder suspension) or egg white (0.05ml of undiluted fresh egg white) brewer's yeast (0.1ml of 2.5%.), formaldehyde, dextran (0.1ml of 1-3% of dextran solution), kaolin(0.1ml of 5% suspension)[5].

### Carrageenan Induced Paw Oedema

Carrageenan which is a phlogistic agent known to produce inflammation by releasing histamine, serotonin and bradykinin and prostaglandin. Carrageenan-induced oedema is used to study the effect of drugs on acute phase of inflammation[4]. Carrageenan is a polysaccharide obtained from seaweed (Rhodophyceae).Carrageenan induced paw oedema 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 [6].

## EXPERIMENTAL ANIMALS

Wistar rats of either sex (180-250gms) were maintained for 7 days in the animal house of Chalapathi Institute of Pharmaceutical Sciences, Guntur under standard conditions temperature (24±10C), relative humidity (45-55%) and 12:12 light: dark cycle. The animals were fed with standard rat pellet and water ad libitum. The animals were allowed to acclimatize to laboratory conditions 48h before the start of the experiment 5 rats/group was used. The experiment conducted after obtaining permission from the Institutional Animal Ethics Committee (IAEC) of Chalapathi Institute of Pharmaceutical Sciences, Guntur.

### Selection Of Dose And Treatment

### Equipment

### Digital plythesmometer

The digital plythesmometer is an advanced instrument for screening anti-inflammatory drugs. It is designed for accurate measurement of rat and mouse paw oedema. The advanced instrument design records small differences in fluid level due to displacement when the paw is immersed. The digital read-out shows the exact volume of the paw.

### Animals

Wistar albino rats of either sex (body weight: 180-250gms).

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**Dose**

The anti-inflammatory activity of the flower extracts of *Tecoma stans* was investigated using the carrageenan induced paw oedema. The test animals were randomly chosen and divided into six groups having five rats in each as follows:

Group1: Control group (prepared 1%w/v solution of carrageenan and injected 0.1ml underneath the plantar region).
Group2: Standard (Indomethacin dose 20mg/kg s.c., stock solution containing 4mg/ml of the drug and injected 0.5ml/100gms of body weight of the animal.)
Group3: EETS I(*Tecoma stans* ethanol flower extract 200mg/kg, i.p)
Group4: EETS II (*Tecoma stans* ethanol flower extract 400mg/kg, i.p)
Group5: AETS I (*Tecoma stans* aqueous flower extract 200mg/kg, i.p)
Group6: AETS II (*Tecoma stans* aqueous flower extract 400mg/kg, i.p)

**Drug profile**

Indomethacin comes under the classification of anti-inflammatory drugs as NSAID'S. Acetic acid derivatives group include indomethacin, sulindac, and etodolac [7].

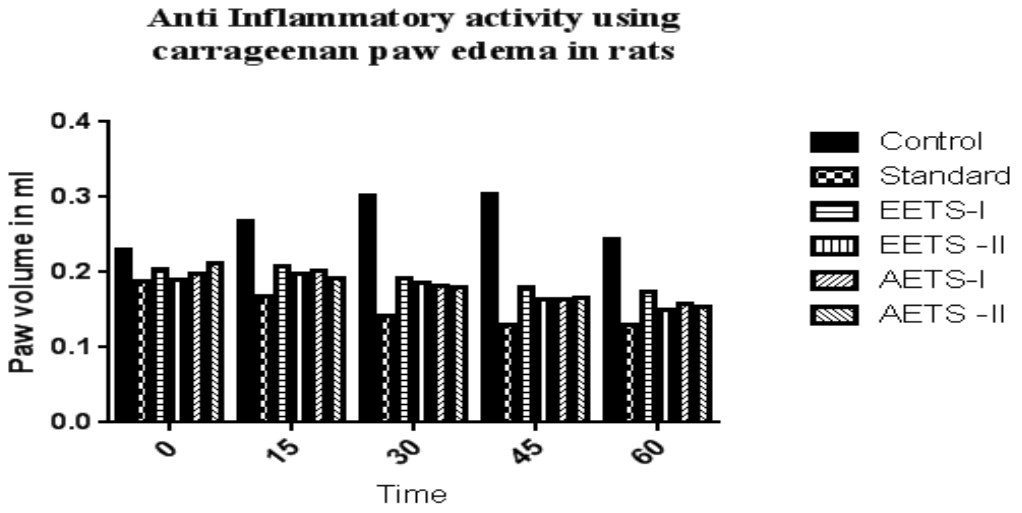
**Statistical Analysis**

The values are expressed as mean ± SEM. The results were analysed for statistical significance using two way ANOVA followed by Dunnett's multiple comparison test.

**RESULTS AND DISCUSSION**

Carrageenan-induced rat paw oedema model is a suitable test for evaluating anti-inflammatory drugs, which has frequently been used to assess the anti oedematous effect of the drug. Carrageenan is a strong chemical use for the release of inflammatory and pro-inflammatory mediators (prostaglandins, leukotriene, histamine, and bradykinin. Micro-organisms can be used for assessment of the anti-inflammatory property in carrageenan induced paw oedema in rats [8]. The present results suggest that *Tecoma stans* flower extracts suppresses the first phase of carrageenan-induced paw oedema, thus confirming an NSAID-like property [9-11]. The present study showed that *Tecoma stans* aqueous and ethanol flower extracts have anti-inflammatory property (Figure 1).

**Figure 1: Anti inflammatory activity of aqueous and ethanol flower extracts of *Tecoma stans* compared to the control group.**



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## CONCLUSION

The aqueous and ethanol flower extracts of *Tecoma stans* showed significant anti-inflammatory activity (EETS 200 mg, AETS 400 mg, $p<0.001$) when compared with the other treatment groups and therefore has the potential of being used in the treatment of inflammation.

## REFERENCES


[1] Kulkarni SK, Arzi, Kaul PN. Japan J Pharmacol 1980; 163-166.

[2] Uma Bhandari, Vinay Kumar, Rahila Ahmad Pathan. Introduction to experimental pharmacology. Birla Publications, Delhi, 2010-2011, pp. 119-121.

[3] Barar F.S.K. Essentials of Pharmacotherapeutics.4th Edition 2007, pp.517.

[4] Wills A.L. Release of histamine, kinin and prostaglandins during carrageen in induced inflammation of the rats in Prostaglandins, Peptides and Amins , P. Montagazza and E. W. Horton, Eds31–48, Academic Press, London, UK, 1969, pp. 31.

[5] Gerhard Vogel H. Drug Discovery and Evaluation. Springer-Verlag Berlin Heidelberg, 2nd edition 2002, Germany, pp.759-761.

[6] Sanjay B. Kasture. Handbook of experiments in preclinical pharmacology, Career, 2006; pp.75-76.

[7] Richard A Harvey, Pamela C Champe. Lippincott's Illustrated Reviews, Pharmacology, 4th Edition Lippincott Williams & Wilkins; Fourth, North American Edition, 2008, pp.507.

[8] Valiollah Hajhashemi,Hossein Sadeghi, Mohsen Minaiyan, Ahmad Movahedian and Ardeshir Talebi Clinics (Sao Paulo). 2010; 65(11): 1183–1187.

[9] Kusuma Priya N, Sirisha K, Sai Prathyusha T V, Sathish Kumar M. Res J Pharm Biol Chem Sci 2014; 5(6): 180-183.

[10] Sathish Kumar M, Ramarao N. Res J Pharm Bio Chem Sci 2014; 5(1): 948-952.

[11] G. Divya Sri, A. Narendra Babu, M. Sathish Kumar, V. Venkateswarlu, K. Ashok Kumar. Journal of Medical and Pharmaceutical Innovation. 2014; 1 (2): 1-4.