

## Antiinflammatory activity of seed extract of *Entada pursaetha* DC against carrageenan induced Paw edema

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### ABSTRACT

*Entada pursaetha* DC seeds are used by Kanikkar tribe in Agasthiarmalai Biosphere Reserve, Western Ghats, Tamil Nadu, India for curing some ailments. In the present study, *Entada pursaetha* seed was extracted with ethanol and evaluated for antiinflammatory activity in rats using a carrageenan induced paw edema method. Ethanol extract exhibits potent antiinflammatory activity at 400 mg/kg at 3 hrs after administration is compared with reference standard drug, Indomethacin. Observed pharmacological activity in the present study provides scientific validation of ethnomedicinal use of this plant seed in treating acute inflammation.

**Key words:** *Entada pursaetha*, antiinflammation, Paw edema.

### INTRODUCTION

*Entada pursaetha* DC belongs to the family Mimosaceae and is commonly known as "Parandaikodi" among Kanikkar tribals of Agasthiarmalai Biosphere Reserve, Western Ghats, Tamil Nadu. Seed paste prepared of *Entada pursaetha* is applied over the affected and the inflamed swellings by the Kanikkars to reduce pain due to rheumatism (Shanmugasundaram *et al*, 2011). The Kanikkar women consume the seed paste of *Entada pursaetha* to improve lactation (Viswanathan *et al*, 2006). The Valmiki, Bakatha and Nakkalolu tribal communities living in the Eastern Ghats of Tamil Nadu and Andhra Pradesh use seeds of *Entada pursaetha* to treat various ailments. The seeds of *Entada pursaetha* is used as antihelmenthic and febrifuge. The powdered seed kernal is given to the women for post delivery recuperation. Seed kernal is also used to cure cough and stomach ache. The kernal paste is used as contraceptive (Priya and Rao, 2008). To the best of our knowledge no report is available on the effect of this plant seed acting as antiinflammatory agent. This study was therefore, undertaken to evaluate the effect of ethanol extract of this plant seed on antiinflammatory activity in carrageenan induced rat paw edema.

### MATERIALS AND METHODS

#### Plant Material

The mature seeds of *Entada pursaetha* were collected from Agasthiarmalai Biosphere Reserve, Western Ghats, Tamil Nadu, India. The plant was identified with the help of local flora and

authenticated in Govt of India, Botanical Survey of India, Sourthern Circle, Coimbatore, Tamil Nadu, India.

#### Preparation of seed extract for antiinflammatory activity

The dried seeds of *Entada pursaetha* DC were powdered in a Wiley mill. Hundred grams of seed powder was packed in a Soxhlet apparatus and extracted with ethanol. The ethanol extract was concentrated in a rotary evaporator. The concentrated ethanol extract was used for antiinflammatory activity.

#### Animals

Adult Wistar Albino rats of either sex (150-200g) were used for the present investigation. Animals were housed under standard environmental conditions at temperature (25±2°C) and light and dark (12:12 h). Rats were fed with standard pellet diet (Goldmohur brand, MS Hindustan lever Ltd., Mumbai, India) and water *ad libitum*.

#### Acute toxicity study

For toxicity studies, six Albino rats of either sex were administered orally with the test substance in the range of 200-2000 mg/kg and the mortality rates were observed after 72h. The ethanol extract of *Entada pursaetha* exhibiting no mortality at 2000 mg/kg dose was considered as LD<sub>50</sub> cut off dose (safe dose). So 1/10 and 1/5 of that were selected (200 and 400 mg/kg) for the experiment as sub maximal and maximal dose.

**ANTIINFLAMMATORY ACTIVITY****Carrageenan induced hind paw edema**

Albino rats of either sex weighing 150-200 grams were divided into four groups of six animals each. The dosage of the drugs administered to the different groups was as follows. Group I - Control (normal saline 0.5 ml/kg), Group II – Indomethacin (5 mg/kg, p.o.), Group - III and IV - *Entada pursaetha* (200 mg/kg and 400 mg/kg, p.o.). All the drugs were administered orally. Indomethacin served as the reference standard antiinflammatory drug.

After one hour of the administration of the drugs, 0.1 ml of 1% W/V carrageenan solution in

normal saline was injected into the subplantar tissue of the left hind paw of the rat and the right hind paw was served as the control. The paw volume of the rats were measured in the digital plethysmograph (Ugo basile, Italy), at the end of 0 min., 60min., 120min., 180min., 240min., 360min., and 480min. The percentage increase in paw edema of the treated groups was compared with that of the control and the inhibitory effect of the drugs was studied. The relative potency of the drugs under investigation was calculated based upon the percentage inhibition of the inflammation.

**Percentage inhibition:**

$$\frac{\text{Control (\% increase in paw volume in 3}^{\text{rd}} \text{ hour)} - \text{Test (\% increase in paw volume in 3}^{\text{rd}} \text{ hour)}}{\text{Control (\% increase in paw volume in 3}^{\text{rd}} \text{ hour)}} \times 100$$

**Statistical analysis**

The data were analyzed using student's t-test statistical methods. For the statistical tests a P values of less than 0.01 and 0.05 was taken as significant.

**RESULTS AND DISCUSSION**

The seed extract did not exhibit any mortality up to the dose level of 2000 mg/kg. So at

this concentration the extracts were found to be safe for long term administration. The seed extract of *Entada pursaetha* at the dose level of 200 and 400 mg/kg decreased the edema significantly ( $p < 0.001$ ) at 3<sup>rd</sup> and 4<sup>th</sup> hrs after administration of the extract when compared to the control group. The effect was compared to the activity ( $p < 0.001$ ) produced by standard drug Indomethacin at 3<sup>rd</sup> and 4<sup>th</sup> hr after administration (Table I).

**Table I: Antiinflammatory activity of ethanol extracts of *Entada pursaetha* seed**

Group	Dose (mg/kg. B.Wt)	Inflammation (volume in ml)				
		0 min	60 min	120 min	180 min	240 min
Group I	-	17.94±2.1	34.76 ± 3.8	45.9 ± 3.2	65.7 ± 2.8	69.5 ± 2.4
Group II	5	12.24±1.4 *** (31.77%)	22.58 ±2.4*** (35.04%)	28.2 ± 4.1** (38.56%)	20.4 ±4.8*** (68.95%)	9.25 ±3.1*** (86.69%)
Group III	200	15.26±2.6** (14.93%)	29.15 ± 2.8** (16.14%)	32.5±3.8* (29.19%)	24.61±3.6*** (62.54%)	24.04±6.1*** (65.41%)
Group IV	400	13.34±1.7*** (25.64%)	25.41±2.9*** (26.89%)	31.2±3.6** (32.03%)	14.35±4.8*** (78.16%)	12.92±5.6*** (81.41%)

\*P < 0.05 when compared to control. \*\* P < 0.01. \*\*\* P < 0.001 when compared to control. Number of animal / in each group = 6 Data expressed in mean ± SEM; EP = *Entada pursaetha*

In the present study, the antiinflammatory activity of the seed extract of *Entada pursaetha* has been established. The extract is found to significantly inhibit the carrageenan induced rat paw edema, a test which has significant predictive value for

antiinflammatory agents acting by inhibiting the mediators of acute inflammation. Carrageenan induced inflammation is useful in detecting orally active antiinflammatory agents (Di Rosa *et al*, 1971; Ismail *et al*, 1997).

The development of carrageenan induced edema is believed to be biphasic (Vinegar *et al.*, 1969). The initial phase is attributed to the release of histamine and serotonin. The edema produced at the peak 3<sup>rd</sup> hour is thought to be due to the release of kinin-like substances, especially bradykinin (Crunkhon and Meacock, 1971). The second phase of edema is due to the release of prostaglandins, protease and lysosomes and it is sensitive to most antiinflammatory drugs (Vinegar *et al.*, 1969; Di Rosa *et al.*, 1971). Results of the present study are suggesting that the drugs under investigation predominantly inhibit the release of prostaglandin like substances. The seed extract of *Entada pursaetha* possesses varying degree of antiinflammatory activity when tested at two different doses. The seed extract of *Entada pursaetha* at the dose of 400 mg/kg shows high significant antiinflammatory activity at 4<sup>th</sup> hours, where it caused 81.41% inhibition, as compared to

that of 5 mg/kg of Indomethacin (86.69%). Vitamin E and n-Hexadecanoic were reported in the ethanolic extract of *Entada pursaetha* seed by GC – MS analysis. These compounds may have the role in antioxidant and antiinflammatory effect.

#### CONCLUSION

The present study on extract of *Entada pursaetha* has demonstrated that this plant has significant antiinflammatory properties, and it justifies the traditional use of this plant in the treatment of various types of pains and inflammation.

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