

ANTI-INFLAMMATORY EFFECT OF ETHANOLIC EXTRACT OF *EMBELIA TSJERIAM COTTAM*.

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## ABSTRACT

The Anti-inflammatory effect of the dried berries of *Embelia tsjeriam cottam* Linn. (Family - *Myrsinaceae*) was evaluated using carrageenan induced rat paw oedema and cotton pellet induced granuloma (chronic) models. The ethanolic extract of *Embelia tsjeriam cottam* (EEETC) exhibited significant anti-inflammatory effect at the dose 75 and 150 mg/kg. Maximum inhibition (37.68 %) was noted at the dose of 150 mg/kg after 3 hr. of drug treatment in carrageenan induced paw oedema, where as the indomethacin 10 mg /kg (standard drug) produced 80.29 % of inhibition. In the chronic model (cotton pellet induced granuloma) the EEETC (150 & 300 mg/kg) showed decreased formation of granuloma tissue by 28.93 % ( $P < 0.01$ )\*\* and 25.42 % ( $P < 0.05$ ) \* respectively. Thus, the present study revealed that the ethanolic extract of *Embelia tsjeriam cottam* exhibited significant anti-inflammatory activity in the tested models.

**Keywords:** *Embelia tsjeriam cottam*, Carrageenan, Cotton pellet induced granuloma, Anti-inflammatory activity.

## INTRODUCTION

Herbal medicines derived from plant extracts are being increasingly utilized to treat a wide variety of clinical diseases, through relatively little knowledge about their mode of action is available. There is growing interest in the pharmacological evaluation of various plants used in Indian traditional systems of medicine. Thus the present investigation was carried out to evaluate the anti-inflammatory potential of *Embelia tsjeriam cottam* in experimental models.

*Embelia tsjeriam cottam* Linn., (Family - *Myrsinaceae*) commonly known as *Vidanga, Ambati* (common name) is a climbing shrub distributed in the mountains of the Western ghats is Wayanad district, Kerala and Malabar <sup>(1)</sup> It has considerable reputation as a potent medicament in the treatment of various ailments such as antifertility, antioestrogenic, and anthelmintic <sup>(2)</sup>. One of its components, embelin, is reported to possess anti-inflammatory activity. Hence the present study was undertaken to evaluate the effect of the ethanolic extract of *Embelia tsjeriam cottam* (EEETC) for its anti-inflammatory activity in standard experimental animal models. The effect of the extracts was compared with that of the standard drug Indomethacin, a well-known anti-inflammatory agent.

## MATERIALS AND METHODS

## Plant material

The berries of *Embelia tsjeriam cottam* linn. was collected from the interior regions of Pune and authenticated by Botanical survey of India, Pune. The dried berries pulverized by a mechanical grinder to get the fine powder.

## Chemicals and reagents

The chemicals used in the present study were carrageenan (S.D Fine IND) and Indomethacin (Cadila IND).

## Preparation of extract

The dried berries were extracted with 50% v/v ethanol in Soxhlet extraction apparatus at 78°C. After exhaustive extraction the ethanolic extract was concentrated under reduced pressure at 50-55°C and semi-solid mass was obtained (yield 15.75 w/w % with respect to the dry starting material). The extract at the different doses of 75,150, and 300 mg/kg was suspended in 2% gum acacia and indomethacin (10 mg/kg) in distilled water was used for the present study.

## Animals

Albino Wistar rats of the either sex (150-200 gm) were used for the present study. They were purchased from National Toxicology Center, Pune. They were housed in a group of 3-4 per cage under

standard laboratory conditions and temperature was maintained 27±1°C. The animals were fed with pellets and water *ad libitum*. A 12 hrs, light and dark cycle was maintained. Animals were divided in five (n=6) groups. Group I is for control, Group II is for standard, Group III, Group IV and V for respective doses of *Embelia tsjeriam cottam* i.e. 75, 150 and 300 mg/kg orally for rats.

Carrageenan - induced rat paw oedema<sup>(3,11)</sup>

The rats were divided into 5 groups (n= 6). Acute inflammation was produced by the sub-plantar administration of 0.1 ml of 1 % w/v carrageenan in normal saline in the right paw of the rats. The different groups were treated with EEETC (75, 150, and 300 mg/kg, p.o.), indomethacin (10 mg/kg, p.o.) And control vehicle were administered orally <sup>(4)</sup>. The paw volume measured immediately after carrageenan injection 3 hour after the administration of carrageenan injection using Plethysmometer <sup>(5)</sup>. The animals were pretreated with extract 1 hr. before the administration of carrageenan. The extract and standard was prepared in the same manner as mentioned earlier. The inhibitory activity of EEETC was calculated by the following equation. <sup>(6)</sup>

$$\% \text{ Inhibition} = (A-B / A) 100$$

Cotton pellets- induced granuloma<sup>(7)</sup>

The rats were divided into five groups (n=6). After shaving the fur, the rats were anaesthetized and 10 mg of sterile cotton pellets were inserted, one in each axilla. The EEETC (75,150 and 300 mg/kg, p.o.) and indomethacin (1mg/kg, p.o.) and control vehicle were administration orally for seven consecutive days from the day of cotton pellet implantation. The animals were anesthetized on the eight day and cotton pellets were removed surgically and made free from extraneous tissues. The pellets were incubated at 37 ° c for 24 hr and dried at 60 ° c to constant weight. Increase in the dry weight of the Pellets were taken as measure of granuloma formation

## Statistical analysis

The observations were expressed as mean ± S.D. the difference in response to the test drugs and control was determined by one way analysis of variance followed by Dunnett's t test.  $P < 0.05$  was considered as significant.

## RESULTS AND DISCUSSION

Table 1 shows anti-inflammatory effect of crude extract of *Embelia tsjeriam cottam* Linn. against carrageenan induced inflammation. Paw volume was considerably reduced in all the two volumes of extracts. But EEETC at the dose of 75 ( $P < 0.01$ ) and 150 mg/kg ( $P < 0.01$ ) significantly inhibited the paw oedema induced by carrageenan at the third hour while the percentage of inhibition of standard drug i.e. indomethacin was 80.29 % ( $P < 0.01$ ).

Table 2 shows anti-inflammatory effect of crude extract of *Embelia tsjeriam cottam Linn.* against cotton pellets induced granuloma in rats. The weight of granuloma was significantly reduced by 150 mg/kg (P<0.01) \*\* and 300 mg/kg (P<0.05)\* and indomethacin at the dose of 1 mg/kg significantly decreased the weight of granuloma (P<0.01)\*\*.

The response in carrageenan induced oedema is biphasic, the first phase beginning immediately after injection and diminishing in one hour whereas, the second phase begins at second hour and remains throughout the three hours. (8) in first phase histamine, kinins and

other mediators of inflammation are released and in second phase mostly prostaglandins are released which are the principal mediator of inflammation (9).

In granuloma method inflammation is always accompanied by increase vascular permeability and collagen formation at the sight of injury (10). Therefore the decrease in granuloma weight indicates suppression of the collagen formation, which was effectively inhibited by *Embelia tsjeriam cottam Linn.* in the present investigation.

**Table 1: Effect of *Embelia tsjeriam cottam Linn.* On rat paw oedema and percent oedema inhibition induced by carrageenin**

Group	Difference in paw volume (mean ± SD) and Percent inhibition				
	1 hr	2 hr	3 hr	4 hr	5 hr
Vehicle	0.493 ±	0.665 ±	0.795 ±	0.718 ±	0.640 ±
Control	0.138	0.091	0.077	0.078	0.161
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Std. (IND)	0.1 ±	0.156 ±	0.228 ±	0.266 ±	0.378 ±
10 mg/kg	0.046	0.038	0.121	0.121	0.186
	79 %**	74 %**	71 %**	62 %**	40 %
ETC	0.293 ±	0.42 ±	0.736 ±	0.63 ±	0.593 ±
75mg/kg	0.2173	0.2052	0.0568	0.0600	0.0416
	41.17 %**	36.84 % *	15.72 %	13.64%	6.25 %
ETC	0.1 ±	0.203 ±	0.406 ±	0.503 ±	0.48 ±
150 mg/kg	0.0556	0.0493	0.0850	0.0404	0.0200
	79.71%**	69.92 %**	49.68%**	30.36%*	25 %
ETC	0.313 ±	0.433 ±	0.7 ±	0.703 ±	0.643 ±
300 mg/kg	0.0776	0.0550	0.0608	0.0503	0.0288
	37.11 % *	24.81 %	14.46 %	8.77 %	4.68 %

IND = Indomethacin, \*\* P < 0.01, \*P < 0.05

**Table 2: Effect of *Embelia tsjeriam cottam Linn.* on weight of granuloma and percent granuloma inhibition in cotton pellets induced granuloma in rats**

Groups	Drug	Mean ± S.D.	Percent inhibition
Control	Vehicle	94.08 ± 21.37	-
Std.	IND	52.51 ± 7.14 **	44.18 %
Treated 75	EEETC	76.33 ± 11.37	18.86 %
Treated 150	EEETC	66.86 ± 8.89 **	28.93 %
Treated 300	EEETC	70.16 ± 8.87 *	25.42 %

IND = Indomethacin, \*\* P < 0.01, \*P < 0.05

## CONCLUSION

From the studies carried out it may be observed that *Embelia tsjeriam cottam Linn.* Endowed with anti-inflammatory activity, which may be due to inhibition of prostaglandins, which is the principal mediator of inflammation.

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