International Journal of PharmTech Research
CODEN (USA): IJPRIF ISSN : 0974-4304
Vol. 3, No.1, pp 24-26, Jan-Mar 2011

Anti-Inflammatory activity of Leaf of *Erythropalum scandens* Bl., Bijdr against Carrageenan induced Paw Edema

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Abstract: *Erythropalum scandens* Bl., Bijdr leaf used in ethnomedicine by *Kanikkar* tribes in Kalakad- Mundanthurai Tiger Reserve, Tamil Nadu. In the present study, *Erythropalum scandens* Bl., Bijdr was extracted with ethanol and evaluate for their anti-inflammatory activity in rat using a carrageenan induced paw edema method. Ethanol extract exhibits potent anti-inflammatory activity at 200 mg/kg 3 hrs. after administration in compare with reference standard, Indomethacin. Observed pharmacological activities provide the scientific basis for the folkloric use of the plant in treating acute inflammation.
Key Words: Anti-inflammatory, Carrageenan, Albino rat.

Introduction

Despite progress within medical research during the past decades, the treatment of many serious diseases remains problematic[1] . Chronic inflammatory diseases remain one of the world's major health problems[2]. Currently, both steroidal anti-inflammatory drugs and non-steroidal anti-inflammatory drugs (NSAIDs) are used in the relief of inflammation. Steroids have an obvious role in the treatment of inflammatory diseases, but due to their toxicity, can only be used over short periods. Prolonged use of NSAIDs is also associated with severe side effects[3]. Consequently, there is a need to develop new anti-inflammatory agents with minimum side effects[4].

Erythropalum scandens Bl., Bijdr (Erythropalaceae) also known as Vaathavallikodi in *Kanikkar* tribals of KMTR, Tamil Nadu. The chopped tender shoots are boiled with water, bath is taken with warm water until relieve from the rheumatic complaint. Fresh leaf paste mixed with one teaspoon of honey is given orally twice a day for treating rheumatism by the *Kanikkar* tribals[5]. To our knowledge no reports on the effects of this plant an experimental inflammation. This study was therefore under taken to evaluate the effects of an ethanol extract of the leaf of *Erythropalum scandens* on anti-inflammatory activity in carageenan induced Rat paw edema.

Materials and Methods

Plant material

The leaf of *Erythropalum scandens* Bl., Bijdr. collected from Kalakad-Mundanthurai Tiger Reserve Sanctuary, Western Ghats, Tamil Nadu. The plant was identified with the help of local flora and authenticated in Botanical Survey of India, Southern Circle, Coimbatore, Tamil Nadu, India. A voucher specimen was deposited in Ethnopharmacology unit, Research

Department of Botany, V.O.Chidambaram College, Tuticorin, Tamil Nadu.

Preparation of plant extract for anti-inflammatory activity

The leaf of *Erythropalum scandens* Bl., Bijdr were cut into small pieces, washed, shade dried at room temperature and the dried leaves was powdered in a Wiley mill. Hundred grams of leaf powdered was packed in a Soxhlet apparatus and extracted with ethanol. The ethanol extracts were concentrated in a rotary evaporator. The concentrated ethanol extract was used for anti-inflammatory activity.

Animals

Adult Wistar albino rats of either sex (150-200g) were used for present investigation. Animals were housed under standard environmental conditions at temperature (25±2°C) and light and dark (12:12 h). Rats were feed 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 doses 200-2000 mg/kg and the mortality rates were observed after 72h. The ethanol extract of *Erythropalum scandens* has shown no mortality at 2000 mg/Kg. Therefore 2000mg/Kg dose was considered as LD_{50} cut off dose (safe dose). So 1/20 and 1/10 of that were selected (100 and 200 mg/Kg) for the experiment as sub maximal and maximal dose.

Anti-inflammatory 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 and III - *Erythropalum scandens* (100 mg/kg and 200 mg/kg, p.o.) respectively and Group IV - Indomethacin (10 mg/kg, p.o.). All the drugs were administered orally.

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., 60 min., 120 min., 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 were studied. The relative potency of the drugs under investigations was calculated based upon the percentage inhibition of the inflammation.

Percentage inhibition

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

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.

TABLE. 1. ANTI-INFLAMMATORY ACTIVITY OF *ERYTHROPALUM SCANDENS* BL., BIJDR. LEAF EXTRACTS AGAINST CARRAGEENAN-INDUCED PAW EDEMA IN ALBINO RATS

Treatment	% increase in paw volume & mean ± S.E (n=6)					% inhibition in paw volume
	Post insult time of assay in minutes					
	0	60	120	180	240	
Control (0.5 ml/Kg)	38.72±2.34	71.24±6.28	98.34±8.36	107.96±9.12	110.16±10.35	--
***E. scandens* 100mg/Kg**	35.25±2.1	53.47±4.6	72.69±6.2	69.58*±6.1	65.61*±5.8	35.55
***E. scandens* 200mg/Kg**	32.76±1.9	49.82±4.3	70.25±6.9	64.36*±5.21	60.51*±4.9	40.38
Indomethacin 10 mg/Kg	27.9±0.92	33.8±1.80	38.8±2.32	55.9*±3.21	58.82*±3.92	48.52

***P< 0.001 Vs Control by Students't' test**

Results

In the present study, the anti-inflammatory activity of ethanol extract of *Erythropalum scandens* Bl., Bijdr was assayed in Albino rats using carrageenan-induced rat paw edema (acute inflammation) method. Table 1 shows that the anti-inflammatory activity of ethanol extract of the leaves of *Erythropalum scandens* significantly inhibited the rat paw edema at 3rd hr post carrageenan were 35.55% and 40.38% for 100 and 200 mg/Kg of ethanol extract of *Erythropalum scandens* respectively.

Discussion

Edema represents the early phase of inflammation in carageenan induced paw edema and is the simplest and most widely used acute inflammatory model for studying anti-inflammatory agents. Carrageenan-induced inflammation is useful in detecting orally active anti-inflammatory agents[6,7]. The development of carrageenan-induced edema is believed to be biphasic[8]. The initial phase is attributed to the release of histamine and serotonin. The edema produced at the peak 3hr is thought to be due to the release of Kinin-like substances, especially bradykinin[9]. The second phase of edema is due to the release of prostaglandins, protease and lysosomes and it is sensitive to most anti-inflammatory drugs[6,8]. Results of the present study are suggesting that the drugs under investigation predominantly inhibit the release of prostaglandin like substances.

The present study on extract of *E. scandens* has demonstrated that this plant has significant anti-inflammatory properties, and it justifies the traditional use of this plant in the treatment of various types of pains and inflammation.

Acknowledgement

The authors are thankful to Dr. R. Sampathraj, Honorary Director, Dr.Samsun Clinical Research Laboratory, Thiruppur for providing necessary facilities to carry out this work.

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