



Evaluation of Anti-Arthritic activity of Ethanolic Extract of *Cleome rutidosperma*

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ABSTRACT:

The various extracts of *Cleome rutidosperma* were investigated for its anti-arthritic activity in male albino rats. The evaluation of anti-arthritic activity was carried out using cotton pellet granuloma method and Freund's adjuvant induced arthritis model. Prednisolone (5 mg/kg bw) was used as a standard drug. The ethanolic extract of *Cleome rutidosperma* exhibited significant anti-arthritic activity as compared to other extracts. The doses of 200 mg/kg bw of the ethanolic extract of *Cleome rutidosperma*, in chronic model of granuloma pouch in rats produced 48.0% and in arthritis model produced 44.0 % inhibition respectively with that of the standard drug Prednisolone (5 mg/kg) which produced 58.5% and 59% inhibition.

KEYWORDS: *Cleome rutidosperma*, Anti-arthritic, cotton pellet granuloma, Freund's adjuvant.

INTRODUCTION:

Cleome rutidosperma (Capparidaceae) is a low-growing herb, up to 70 cm tall, found in waste herb, grounds and grassy places with trifoliate leaves and small, violet-blue flowers, which turn pink as to West Africa, although it has become naturalized in various parts of tropical America as well as Southeast Asia^{1,2}. According to traditional use, the different parts of the plants of *Cleome* genus are used as stimulant, antiscorbutic, anthelmintic, vesicant, rubifacient and carminative³. The antiplasmodial, analgesic, locomotor antimicrobial, diuretic, laxative^{4,5} activities of *Cleome rutidosperma* were reported earlier. *Cleome rutidosperma* is traditionally used in the treatment of paralysis, epilepsy, convulsions, spasm, pain and skin disease. The popular use of the roots, however, refers mainly to its analgesic, anti-inflammatory and anthelmintic activity⁶. However, there are no scientific reports on the anti-arthritic activity of this plant. Therefore, in the light its use in traditional medicine, the present study was undertaken to investigate anti-arthritic activity of the ethanolic extract and its fractions of *Cleome rutidosperma* in experimental animal models.

MATERIALS AND METHODS:

Plant materials

The Plant material (whole plant) was collected from the forests of Ganjam district of Odisha, India during September 2008 and was authenticated at Botanical Survey of India, Shibpur, Howrah and West Bengal, India. The fresh aerial parts were washed under running tap water to remove adhered dirt, followed by rinsing with distilled water, shade dried and pulverized in a mechanical grinder to obtain coarse powder.

Preparation of extracts

The aerial parts were extracted with 90% ethanol using Soxhlet apparatus. The solvent was removed under reduced pressure, which gave a greenish black coloured sticky residue (yield- 11.6% w/w on dried material basis). A portion of dried ethanolic extract (EE) was suspended in water and fractionated successively with petroleum ether (40 – 60°C) (PEE), diethyl ether (DEE) and ethyl acetate (EAE). All the fractions were dried by distillation under reduced pressure. Standard methods (Trease and Evans, 1989; Harborne, 1994) were used for preliminary phytochemical screening of the ethanolic extract (EE) and its fractions to know the nature of phytoconstituents present in it.

Animals

Experiments were performed on albino rats of either sex (Wistar strain) weighing about 120-160 g, divided into groups of six each. Test drug was freshly prepared as a fine homogenized suspension in tween-80 (2% w/v). Indomethacin (10 mg/kg bw) was used as a standard drug. All the animals were approved by the ethics committee of the institute.

Cotton pellet granuloma in rats⁷: Autoclaved cotton pellets 50±1 mg was implanted subcutaneously by incision on the back under ether anaesthesia. Drugs were administered orally for 7 days. Animals were killed on day 7 and the granuloma was dissected out, dried in an oven at 60°C and weighed to determine the percent inhibition of granuloma (Table 1).

Table 1: Effect of various extracts of *Cleome rutidosperma* in Cotton pellet granuloma model.

Treatment	Cotton pellet granuloma	
	Weight of granuloma (mg)	Percent inhibition
Control tween-80 (2%)	188.67±1.21	-
Prednisolone (5 mg/kg)	78.83±1.78*	58
PEE (200 mg/kg)	112.35±2.01*	40
DEE(200 mg/kg)	116.67±2.26*	38
EAE(200 mg/kg)	121.46±2.12*	35
EE(200 mg/kg)	97.67±1.46*	48

N=6 per group. Values are mean±SEM. *P<0.05 (as compared to control)

Table 2: Effect of various extracts of *Cleome rutidosperma* Adjuvant induced arthritis model.

Treatment	Adjuvant induced arthritis		
	Edema volume (ml)		Percent inhibition after 21 days
	After 3 days	After 21 days	
Control tween-80 (2%)	0.35±0.02	0.27±0.03	-
Prednisolone (5mg/kg)	0.32±0.02*	0.11±0.01*	59
PEE(200 mg/kg)	0.35±0.03	0.17±0.02*	37
DEE(200 mg/kg)	0.35±0.03	0.18±0.02	33
EAE(200 mg/kg)	0.35±0.03	0.20±0.03	26
EE(200 mg/kg)	0.34±0.02	0.15±0.03*	44

N=6 per group. Values are mean±SEM. *P<0.05 (as compared to control)

Adjuvant induced arthritis in rats⁸: Arthritis was induced in rats in groups of six animals by injecting 0.05 ml of 0.5% (w/v) suspension of killed Mycobacterium tuberculosis (Difco) in paraffin oil by intradermal injection into the left hind paw. Paw volume was measured till the 12th day by using UGO Basile Plethismometer (Model 7140). Drug treatment was started on day 13 and terminated on day 21. The difference in paw volume on day 13 and day 21 were considered as oedema volume. The percent inhibition of oedema was determined. The details of drug dosage for the granuloma and arthritis experiments are given in Table 2.

Data analysis: Data are expressed as a mean±SEM. Statistical analysis was performed by one-way ANOVA followed by Dunnett's test. P values <0.05 were considered as significant

RESULTS AND DISCUSSION:

The LD50 values of all the extracts were found to be more than 1000 mg/kg. All the extracts of *Cleome rutidosperma* showed potent anti-arthritic activity and the potency of the extracts follows the order standard>EE>PEE>DEE>EAE. The results of cotton pellet granuloma model as well as adjuvant induced arthritis model indicate that among all the extracts, the ethanolic extract shows more potent activity. In chronic cotton pellet granuloma model, oral administration of 200 mg/kg of the ethanolic extract produced 48% inhibition of granuloma as compared to standard Prednisolone (5mg/kg) which produced 58% inhibition of granuloma. Oral administration of 200 mg/kg of ethanolic extract inhibited Freund's adjuvant induced rat paw oedema by 44% after 21 days where as Prednisolone (5 mg/kg) inhibited rat paw oedema by 59% after 21 days.

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