

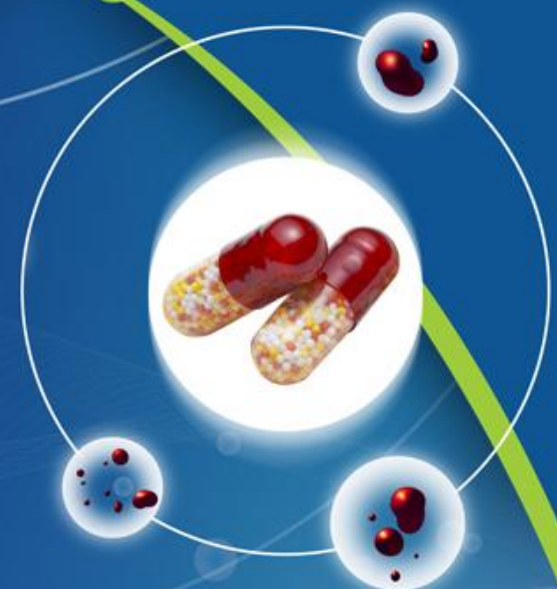


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Research Article

ANTI-INFLAMMATORY ACTIVITY OF METHANOLIC EXTRACT OF ROOTS OF GLYCOSMIS PENTAPHYLLA**Namita Arora*, Pankaj Arora**

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ABSTRACT

The plant *Glycosmis pentaphylla* corr. belongs to the family Rutaceae. This plant has great medicinal value and is widely distributed in India. The anti-inflammatory effect of methanolic extract of roots of *G. pentaphylla* was studied using carrageenan and egg albumin-induced rat paw edema, xylene induced mouse ear edema and formaldehyde induced arthritis inflammation tests at doses of 50-400 mg/kg, intra peritoneally. The extract produced a significant ($P < 0.05$) dose dependant inhibition of edema formation in all four methods. The results of pharmacological tests performed in the present study suggest that the methanolic extract of *G. pentaphylla* possess anti-inflammatory effect and these findings seem to justify the use of plant in traditional Indian medicine in the treatment of inflammation.

KEY WORDS: *Glycosmis pentaphylla*, Rutaceae, Anti-inflammatory

INTRODUCTION

The plant *Glycosmis pentaphylla* Corr. belongs to the family Rutaceae. This plant is thornless shrub or small tree¹. The plant is native to south-eastern Asia and north-eastern Australia. In India the plant is found in various states like Assam, Arunachal, Meghalya, Nagaland and Mizoram². This plant is used in indigenous medicine for cough, jaundice, inflammation, rheumatism and anemia³.

A bibliographic survey showed that *G. pentaphylla* is traditionally used against various ailments, but till date it has not been scientifically explored for its anti-inflammatory potential. Therefore, in present study our efforts were devoted to explore this plant scientifically for its anti-inflammatory potential.

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MATERIAL AND METHODS**Plant material**

The plant material (roots) of *Glycosmis pentaphylla* Corr. were collected from the campus of Dibrugarh University, Assam (India) and it was positively identified and authenticated from botanical survey of India, Shillong. A voucher specimen (DU/PSc/HRB-2/08) was deposited in the Herbarium of the institute.

Extraction

The roots of *G. pentaphylla* were dried in the shade, powdered (100g) and extracted with methanol using Soxhlet apparatus (Yield: 22.45%).

Animals

Albino rats (150-200g) and Swiss mice (20-30g), were maintained in standard environmental conditions. The animals were fed with standard food and water ad libitum.

The experimental protocol was approved by the institutional ethical committee.

Anti-inflammatory evaluation

Before anti-inflammatory evaluation, all the animals were fasted overnight and maintained with free access to water.

Carrageenan-induced paw edema

The initial body weights of healthy rats were recorded and they were divided at random into six groups of six animals each. Group I (normal control) was treated with propylene glycol (1ml/kg, i.p.), used as vehicle. Group II to V were treated intra peritoneally with *G. pentaphylla* methanolic extract at doses 50, 100, 200, 400 mg/kg respectively, while group VI was treated with indomethacin (10 mg/kg, i.p.) used as reference standard. One hour after, edema was induced by injection of carrageenan (0.1 ml, 1% w/v in saline) into the subplantar tissue of the right hind paw⁴. The linear paw circumference was measured using the cotton thread method⁵. Measurements were made immediately before injection of the phlogistic agent and at 15 minutes interval until the peak of the effect was observed.

Egg albumin induced paw edema

The same protocol as described above was used. One hour after treatment, edema was induced by injection of egg albumin (0.1 ml, 1% w/v in saline). Chlorpheniramine (60mg/kg, i.p.), was used as a reference standard⁶.

Xylene induced ear edema

The initial body weights of healthy mice were recorded and they were divided at random into six groups of six animals each. Thirty minutes after i.p. administration of mice with propylene glycol (1 ml/kg), dexamethasone (1 mg/kg) and extract (50-400mg/kg), edema was induced in each mouse by applying a drop of xylene to the inner surface of the right ear. Fifteen minutes later, the animals were killed under ether anesthesia and both ears cut off, sized and weighed. The mean of the difference between right and left ears was determined for each group⁶.

Formaldehyde induced arthritis inflammation

Rats were injected with 0.1 ml of formaldehyde solution in the plantar aponeurosis of the left foot, on the first and third day of the test. The extract (50-400 mg/kg) and propylene glycol (1 ml/kg) were administered i.p. once a day for 10 days. Indomethacin (10 mg/kg) given i.p., was used as reference standard. The rat paw circumference was measured daily for 10 days. The percent inhibition of the mean increase in the paw edema of each group was calculated on the tenth day and compared with the normal control^{7,8}.

Statistical analysis

Results obtained in the present investigation were expressed as mean SEM. The data were analyzed using Student's t-test and results were considered significant when $P < 0.05$.

RESULTS AND DISCUSSION

As shown in Table 1 and 2, the methanolic root extract of *G. pentaphylla* administered 1h before injection of carrageenan and egg albumin caused a significant ($P < 0.05$) and dose dependent inhibition of increase in paw edema. Peak inhibitory effect was observed with a dose of 200mg/kg at 75 and 90 min post-carragenen and egg albumin injection, respectively. In the carrageenan test; the peak effect produced by the extract was comparable to that of Indomethacin and in the egg albumin test; the peak effect produced by the extract was also comparable to that of Chlorpheniramine.

In the xylene induced edema test, the extract caused a dose dependent inhibition of development of ear edema. The effect produced by 400mg/kg of the extract was comparable to that of the dexamethasone.

In the formaldehyde induced arthritis inflammation test, the extract also significantly inhibited edema formation. Peak inhibitory effect was observed by the extract at the dose of 200mg/kg. This effect was lower than the effect of the indomethacin.

The development of ear edema after a subplantar injection of carrageenan in the animals is attributed to the release of histamine, serotonin, kinins and prostaglandins^{9, 10}. Edema induced by egg albumin results from the release of histamine and serotonin¹¹. The ear edema model permits the evaluation of anti-inflammatory steroids and is less sensitive to non steroidal anti-inflammatory agents¹².

In the conclusion, the methanolic root extract of *G. pentaphylla* was found to possess anti-inflammatory activity mediated via either inhibition of phospholipase A₂ activity or by blocking the release of vasoactive substances (histamine, serotonin and kinins). These findings seem to justify the use of plant in traditional Indian medicine in the treatment of inflammation.

Table-1: Effect of methanolic roots extract of *G. pentaphylla* on carrageenan induced paw edema in rats

Groups	Dose (mg/kg, i.p.)	Increase in paw edema (cm) at time T (min)		
		T(60)	T(75)	T(90)
Control	1ml/kg	0.556±0.07(-)	0.444±0.05(-)	0.356±0.05(-)
Methanolic roots extract of <i>G. pentaphylla</i>	50	0.438±0.09(21.22%)	0.234±0.03(42.30%)	0.282±0.07(20.79%)
	100	0.404±0.06(27.33%)	0.201±0.05(54.73%)	0.193±0.04(45.78%)
	200	0.308±0.09(44.60%)	0.138±0.04(68.92%)	0.192±0.04(46.06%)
	400	0.296±0.07(46.76%)	0.184±0.05(58.55%)	0.227±0.06(36.24%)
Indomethacin	10	0.136±0.06(75.53%)	0.128±0.04(71.17%)	0.136±0.04(61.79%)

Values are mean ±SEM, P<0.05, In parenthesis: % Inhibition

Table-2: Effect of methanolic roots extract of *G. pentaphylla* on egg albumin induced paw edema in rats

Groups	Dose (mg/kg, i.p.)	Increase in paw edema (cm) at time T (min)		
		T(75)	T(90)	T(105)
Control	1ml/kg	0.426±0.05(-)	0.384±0.04(-)	0.398±0.04(-)
Methanolic roots extract of <i>G. pentaphylla</i>	50	0.348±0.06 (18.31%)	0.234±0.02 (39.06 %)	0.252±0.06 (36.68%)
	100	0.322±0.06 (24.41%)	0.212±0.04 (44.79%)	0.194±0.04 (51.25%)
	200	0.248±0.04 (41.78%)	0.188±0.05 (51.04%)	0.200±0.06 (49.74%)
	400	0.270±0.07 (36.62%)	0.244±0.06 (36.45%)	0.210±0.08 (47.23%)
Chlorpheniramine	60	0.236±0.03 (44.60%)	0.178±0.02 (53.65%)	0.216±0.02 (45.73%)

Values are mean ±SEM, P<0.05, In parenthesis: % Inhibition

Table-3: Effect of methanolic roots extract of *G. pentaphylla* on xylene induced ear edema in mice

Groups	Dose (mg/kg, i.p.)	Weight of right ear (mg)	Weight of left ear (mg)	Difference (mg)
Control	1ml/kg	38.0±3.35	16.0±2.44	22.0±2.44(-----)
Methanolic roots extract of <i>G. pentaphylla</i>	50	33.0±2.15	16.0±2.34	17.0±2.34(22.73%)
	100	29.0±2.00	15.0±2.42	14.0±2.14(36.36%)
	200	27.0±2.35	16.0±2.14	11.0±2.24(50.00%)
	400	25.0±2.18	16.0±2.10	09.0±2.10(59.09%)
Dexamethasone	01	23.0±2.10	15.0±2.00	08.0±2.04(63.64%)

Values are mean ±SEM, P<0.05, In parenthesis: % Inhibition

Table-4: Effect of methanolic roots extract of *G. pentaphylla* on formaldehyde induced edema in rats

Groups	Dose (mg/kg, i.p.)	Edema (cm)	% inhibition
Control	1ml/kg	0.572±0.04	-
Methanolic roots extract of <i>G. pentaphylla</i>	50	0.531±0.07	07.17
	100	0.465±0.06	18.70
	200	0.356±0.05	37.76
	400	0.481±0.07	15.90
Indomethacin	10	0.298±0.04	47.34

Values are mean ±SEM, P<0.05, In parenthesis: % Inhibition

REFERENCES

1. Khare, C.P, *Indian Medicinal Plants-An Illustrated Dictionary*, Springer-Verlag Berlin Publishers, New Delhi, 2007, 289.
2. Islam, M., *Weeds of North-East India*, First Edition, The Assam paper industry, Tinsukia, 1996,108,152.
3. Kirtikar, K.R. and Basu, B. D., *Indian Medicinal Plants*, Vol. 3, International Book Publisher, Dehradun, 1993, 1621–22.
4. C. A. Winter and C. C. Porter, *Effect of alteration in side chain upon anti-inflammatory and liver glycogen activities in hydrocortisone esters*, *J. Am. Pharm. Assoc.* **46** (1957) 515–519.
5. Bangbose SOA, Noamesi BK. *Planta Med*, 1981; 42:392.
6. Akindele A.J., Adeyemi O.O., *Anti-inflammatory activity of the aqueous leaf extract of *Byrsocarpus coccineus**, *Fitoterapia*, 78 (2007) 25–28
7. Perez RM, Perez S, Zavala MA, Salazar M. *J Ethnopharmacol*, 1995; 47:85.
8. Seyle H., *Brit Med J*, 1949; 2:1129.
9. Winter C, Risley E, Nuss O. *Fed Proc*, 1962; 46:118.
10. Larsen GL, Henson PM. *Annu Rev Immunol*, 1983; 1:335.
11. Pearce FL. *Pharmacology*, 1986; 32:61.
12. Zaninir JC, Medeiros YS, Cruz AB, Yunes RRA, Calixto JB. *Phytother Res*, 1992; 6:1.