

Anti-inflammatory activity of *Argyreia populifolia* leaf juice

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Abstract

Leaves of *Argyreia populifolia* Choisy (Convolvulaceae) is used in traditional medicine for inflammation in joints and Arthropod bites. However, the pharmacological confirmation for anti-inflammatory activity of the leaves are lacking. The aim of this study was to evaluate the anti-inflammatory action of the leaves using carrageenan-induced paw oedema test in rats. 10 ml/kg oral dose of fresh juice of the leaves significantly impaired the initial phase of the acute inflammatory response (by 33%) in this model. The juice showed a marked anti-histamine activity when assessed using histamine-induced vascular permeability test. It was concluded that the leaf juice has anti-inflammatory activity mediated via antihistamine action justifying its use in traditional medicine.

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1. Introduction

Argyreia populifolia Choisy (Convolvulaceae), (Giritilla in Sinhala) is a common endemic plant in Sri Lanka (Jayaweera, 1981). In the Sri Lankan traditional medicine fresh leaves are indicated for joint inflammation and animal (Arthropod) bites (Chandresena, 1994). This is suggestive of anti-inflammatory and antihistamine activities. Lack of pharmacological confirmation for these activities in the leaves of this plant prompted us to initiate this study.

2. Materials and methods

Fresh mature leaves of *A. populifolia* were collected from Ganemulla, Sri Lanka and authenticated by professor (Ms) A. S. seneviratne, Depart-

ment of Botany University of Colombo, Sri Lanka 50g of leaves were macerated in a porcelain mortar and squeezed through a muslin cloth. The yield was 30%(v/w). The juice was screened for phytochemicals according to Farnsworth (1966).

Cross-bred female albino rats (175-200g) at dioestrus, housed under standardised animal house conditions were used. Food and water were given *ad libitum*.

Female rats (n=39) in dioestrus were selected by microscopic examination of their vaginal smears. These rats were randomly assigned into 4 groups. The rats in group 2 (n=9) or 1 ml 1% methyl cellulose (n= 6) or 10 ml/kg of water (n=9). After 2 h of the treatment, paw oedema was induced in all these rats using 1% carrageenan suspension as described by Winter *et al.*, (1962). The paw volume of these rats were measured prior to the carrageenan injection, 2 and the after the injection using the water displacement method described by Ratnasooriya and Dharmasiri, (1999). Then, the increase in paw volume (oedema) was calculated.

Twenty four female rats at dioestrus were selected and their posterior lateral side of the skin was shaved. 24 h later they were randomly divided into 3 groups. The rats in groups 1 (n=9) and 2 (n=6) were orally treated with 10 ml/kg of juice and 0.67 mg/kg of water (control). After 2 h, 50 μ g/ml histamine dihydrochloride in normal saline was injected subcutaneously to the shaved area of the skin and the area of the wheal formed was determined (Spector *et al.*, 1956)

The data were analysed with Mann-Whitney U-test. A $P \leq 0.05$ 0.05 was considered as significant.

3. Results

Phytochemical screening revealed the presence of alkaloids and flavonoids in the juice. As shown in Table 1, at 2 h but not at 4 h, the juice significantly suppressed the paw oedema (by 33%) in the carrageenan test. chlorpheniramine also induced a significant ($P < 0.01$) anti-inflammatory activity both at 2 h (by 83%) and 4 h (by 76%). In the histamine-induced vascular permeability test a significant ($P < 0.01$) impairment in the area of the wheal was evident both with chlorpheniramine (by 48%) and juice (by 32%) (area of the wheal; control vs. extract vs. chlorpheniramine; 136.30 ± 6.49 vs. 91.69 ± 7.77 vs. $70.56 \pm 6.43 \text{mm}^2$).

Table 1. Anti-inflammatory activity of *Argyrea populifolia* leaves in rats (means± SEM)

Treatment	Amount of paw oedema (ml)		
	n	2h	4h
Water (control)	9	0.48±0.04	0.51±0.03
<i>A. populifolia</i>	9	0.32±0.02*	0.54±0.04
Chlorpheniramine	9	0.28±0.06*	0.51±0.03
Indomethacin	6	0.08±0.03*	0.12±0.03*
1% methyl cellulose	6	0.55±0.03	0.55±0.05

As compared with control : *P<0.01(Mann-Whitney U-test).

4. Discussion

The results provide first pharmacological confirmation for the presence of anti-inflammatory activity in leaf juice of *A populifolia*, justifying its use at least in certain disorders, in the traditional medicine in Sri Lanka. The juice contained flavonoids and alkaloids and its anti-inflammatory action may be attributable to them: as many kinds of alkaloids and flavonoids show anti-inflammatory activity (Forestieri *et al.*, 1996; Ramesh *et al.*, 1998). In the carrageenan model, the anti-inflammatory activity was confined only to the first phase (upto 3h of carrageenan injection) which correspond to the early exudative phase of the inflammatory response (Vinagar *et al.*, 1987). It is now generally accepted that, histamine is a major mediator of the early phase of acute inflammatory process in rats (Antonio and Brito, 1998). Antihistamins suppress this phase (Antonio and Brito, 1998) as evident in this study with chlorpheniramine. Juice had a potent antihistamine activity. Thus, its anti-inflammatory activity is likely to be mediated by this mechanism. cyclooxygenase inhibitors, one of the most potent anti-inflammatory agents (Rang *et al.*, 1995) suppress both phases of carrageenan-induced inflammatory process (Tsai and Lin, 1999) as seen with indomethacin in this study. The inability of the juice to suppress both these phases of acute inflammation suggest that the anti-inflammatory action is unlikely to be due to cyclooxygenase inhibition.

5. References

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