

EFFECT OF LEUCAS ASPERA ON EXPERIMENTAL INFLAMMATION AND MAST CELL DEGRANULATION

M. KANNAPA REDDY, S. VISWANATHAN, P. THIRUGNANA SAMBANTHAM,
SANTA RAMACHANDRAN AND L. KAMESWARAN

*Medicinal Chemistry Research Centre, Institute of Pharmacology, Madras Medical College,
Madras – 160 003, India.*

Received: July 16, 1985

Accepted: September 30 1985

ABSTRACT: *The aqueous and alcoholic extracts of Leucas aspera were investigated for their action on experimental inflammation and on mast cell degranulation. Both the extracts exhibited significant antiinflammatory action of acute and chronic inflammation. The mast cell degranulation induced by propranolol and Carbachol was effectively prevented by pretreatment with Leucas aspera extracts.*

INTRODUCTION

Leucas aspera (Labiatae) is widely used in the treatment of scabies, cold and snake bite. It is also claimed to be useful in psoriasis and as an insecticide (Nadkarni 1954). Antifungal and antibacterial properties have been reported for the alcoholic extract of Leucas aspera (Thakur et al 1982 Chopra, 1980). Leucas aspera has also been used to treat inflammatory and allergic conditions. But for the above few reports, there is no detailed information available regarding the pharmacological actions of Leucas aspera. In the present study the effect of Leucas aspera on experimental inflammation and on mast cell degranulation was investigated.

MATERIALS AND METHODS

Leucas aspera was collected around Madras. The air dried plant material was powdered and extracted with water and alcohol separately. The extracts were concentrated and dried in vacuo.

Anti inflammatory study

Adult male albino rats (125 – 150 g) were used in both acute and chronic experiments.

Acute inflammation

Paw edema was induced in rats by injecting 0.1 ml of 1% carrageenin (Winter et al 1962) into the right hind paw. The animals were treated with different doses (50, 100 and 200 mg / kg s.c subcutaneous route) of aqueous or alcoholic extract, 30 min. prior to Carrageenin injection. The increase in paw volume was measured plethysmographically 5 hr. after carrageenin injection. A separate group of animals treated with phenylbutazone (100 mg / kg S. C.) served as reference group.

Chronic inflammation

Cotton pellet implantation (Winter and Porter 1957): Sterile cotton pellets were

implanted s.c. in rats under light ether anaesthesia. The animals were treated with three different doses (50, 100, and 200 mg / kg s.c) of aqueous or alcoholic extracts of *Leucas aspera* for 7 days. On the eighth day the animals were sacrificed and the Cotton pellets removed. They were dried at 50°C for 12 hr and weighed. The increase in weight over the initial weights was recorded.

Mast cell degranulation

In vitro test for mast cell degranulation was carried out by the modified method of Keley and Weiner (1971). Male albino rats were sacrificed; the mesentery was carefully removed and cut into small bits, of about one Cm². These bits were incubated for 5 min. in tyrode solution containing different concentrations (1, 10 and 100 µg / ml) of aqueous or alcoholic extracts of *Leucas aspera*. Mast cell degranulating substances like propranolol (50 µg / ml) and Carbachol (10 µg / ml) were added to the incubates and

the bits were removed after 10 min. They were carefully spread over glass slides and stained with 1% toluidine blue. Mast cells were counted in five different fields at random under high power objective field. The percentage of degranulated cells was calculated in each treatment group. Disodium cromoglycate, a known mast cell stabilizer was included in the study for comparison. All results were analyzed using students 't' test.

RESULTS

Anti-inflammatory study

Treatment with aqueous and alcoholic extracts produced a significant reduction in the volume of paw edema (Table 1). The weight of the cotton pellets were reduced after treatment with both aqueous and alcoholic extracts of *Leucas aspera*. The reduction was significant with a dose of 100 mg/ kg (Table 2).

TABLE – 1

Effect of *Leucas Aspera* on Acute Inflammation

Treatment	50	Dose mg / kg 100 VOLUME OF PAW EDEMA (ml)	200
Aq. Ext.	0.59 ± 0.2	0.37 ± 0.12*	0.33 ± 0.09*
Alc. Ext.	0.64 ± 0.2	0.45 ± 0.09*	0.48 ± 0.11 *
Phenylbutazone		0.40 ± 0.06*	
Saline		0.83 ± 0.1	

Each value represents the Mean ± Sem of Six experiment

* P < 0.05 compared with saline value.

TABLE – 2**Effect of Leucas Aspera on Cotton Pellet Granuloma**

Treatment	50	Dose mg / kg 100 VOLUME OF COTTON PELLETS (mg)	200
Aq. Ext.	29.0 ± 2.3 *	29.6 ± 2.4*	24.3 ± 4.5*
Alc. Ext.	36.5 3.0 **	34.3 ± 2.2*	30.2 ± 2.9 *
Phenylbutazone		27.3 ± 2.2*	
Saline		49.6 ± 3.1	

Each value represents the Mean ± Sem of six experiments

** P < 0.05 and * P < 0.01 compared with saline value.

Mast cell degranulation

Propranolol (50 µg / ml) and Carbachol (10 µg / ml) produced 59.6 ± 3.0% and 52.5 ± 3.1% degranulation of rat mesenteric mast cells. Pretreatment with aqueous or

alcoholic extracts of Leucas aspera significantly reduced percentage of degranulation induced by either propranolol or Carbachol (Table 3).

TABLE – 3**Effect of Aqueous and Alcoholic Extracts of Leucas Aspera on Mast Cell Degranulation**

Treatment µg / ml	Saline	Propranolol (50 µg/ ml) % DEGRANULATION	Carbachol (10 µg/ ml)
Control	24.5 ± 3	59.6 ± 3.0	52.5 ± 3.1
L. Aspera Aq. Ext.			
1		33.1 ± 2.2*	29.3 ± 4.4 *
10		19.5 ± 1.5**	26.3 ± 2.2 *
100		11.8 ± 0.6**	18.1 ± 3.11 **

L. Aspera Alc. Ext.			
1		21.1 ± 3.4**	31.1 ± 5.4 *
10		17.1 ± 3.7 **	31.0 ± 4.6 **
100		16.3 ± 2.7 **	18.5 ± 2.7 **
DSCG			
10		26.0 ± 2.0 **	36.3 ± 3.6 *

Each value represents the Mean ± Sem of six experiments

* P < 0.01 and ** P < 0.001 compared to control value.

DISCUSSION

The results of the present study suggest a significant anti inflammatory effect for the aqueous and alcoholic extracts of Leucas aspera in both acute and chronic models of inflammation. The effect was comparable to that of phenylbutazone.

The rupture of mast cell membrane and degranulation are important stages in the allergic reaction. Leucas aspera has been claimed to be very useful in allergic conditions. The present study reveals a significant mast cell stabilizing effect of Leucas aspera. A dose dependent inhibition

was observed for both the aqueous and alcoholic extracts of Leucas Aspera against the degranulation induced by Carbachol as well as propranolol. This may be responsible for the antiallergic properties attributed to Leucas aspera.

ACKNOWLEDGEMENT

The authors express their sincere thanks to the Convenor, Medicinal Chemistry Research Centre and the Dean, Madras Medical College for the facilities extended.

REFERENCES

1. CHOPRA. R. N., Supplement to Glossary of Indian Medicinal plants pp 55 (1980).
2. KALEY. G. and WEINER. R. Y., Prostaglandin 'E' a potential mediator in Annals of N. Y. Acad. Sci. Vol. 180 347 – 348. Eds. Peter Ramwell and Jan Jane E. Shaw, Press New York (1971).
3. NADKARNI – Indian Materia Medica Vol. I, pp 739 (1954).
4. THAKUR. D. K. et al – Antifungal activity of Leucas aspera spreng against Expt. Dermatormycosis in mice. J. Res. Panjab Agri. Univ. 19(3) 265 – 266 (1982).

5. WINTER. C. A. and PORTER C.C. Effect of alteration in side chain upon anti – inflammatory and liver glycogen activities of hydrocortisone esters. J. Amer. Pharm. Assn. **46** 515 – 520 (1957).
6. WINTER. C. A., RISELEY. E. A. and NUSS. G. W. Carragenin induced edema in hind paw of the rat as an assay of anti inflammatory drugs. Proc. Soc. Exp. Biol. Med. III, 544 – 547, (1962).