

Anti inflammatory activity of *Andrographis serpyllifolia* root extract in experimental animals

K. RAVI SHANKAR^{1*} and B. GANGA RAO²

¹Aditya Institute of Pharmaceutical Sciences & Research, Surampalem (India)

²University College of Pharmaceutical Sciences, Visakhapatnam (India)

(Received: January 20, 2008; Accepted: May 21, 2008)

ABSTRACT

The ethanolic extract of *Andrographis Serpyllifolia* root has been evaluated for anti-inflammatory activity against Oedema produced by carrageenan and histamine. The effect was compared with the activity of diclofenac sodium against the two types of inflammation. The ethanolic extract at doses of 50mg, 100 and 200mg/kg exhibited significant ($P < 0.001$) anti inflammatory activity in inflammatory models. At 200mg/kg the ethanolic extract showed maximum inhibition of 38-95% in carrageenan-induced rat paw oedema while the standard diclofenac sodium inhibited 57-80% after 3 hr of carrageenan injection. The ethanolic extract (50,100, and 200mg/kg) significantly ($P < 0.001$) at dose dependent inhibited histamine induced rat paw oedema. The results obtained suggest marked anti inflammatory activity of the extract at the dose levels examined.

Key words: *Andrographis Serpyllifolia*, Anti-inflammatory, Carrageenan, Histamine.

INTRODUCTION

Andrographis Serpyllifolia is a trailing and rooting procumbent herb widely distributed throughout deccan and carnatic regions of South India belong to the family Acanthaceae. Previous chemical examination of the leaves and stems of *Andrographis Serpyllifolia* was reported¹ but not much Pharmacological work on the plant root is yet to be reported. This plant is distributed in the University Campus and chamundi hill area of Mysore, Karnataka. The present study has been planned to investigate the anti inflammatory activity of ethanolic extract of *Andrographis Serpyllifolia* root using experimental animal models of inflammation.

MATERIAL AND METHODS

Collection and extraction of root

The plant was collected during the month of Feb 2007, from University Campus of Mysore at

chamundi hills Mysore, Karnataka. The plant was authenticated by Prof. G. Shiva Murthy of Botany department, Manasa Gangothri University Mysore. The root of the plant was removed, dried under shade and powdered in a mechanical grinder. The root powder was extracted with ethanol and the ethanolic extract was used for pharmacological studies. All chemicals and reagents used for the study are of analytical grade.

Preparation of the extract

The powdered roots were extracted with ethanol at room temperature for 72 hrs. The extract was prepared using suitable solvent system by continuous extraction in a soxhletator and the extract was concentrated under reduced pressure at 50-55°C. The extract obtained 50, 100 and 200 mg/kg was suspended in 1% (w/v) of aqueous carboxymethyl cellulose for administration to animals.

Phytochemical Study of the extract

Phytochemical screening was carried out to ascertain the qualitative chemical composition of *Andrographis Serpyllifolia*. The extract tested positive for terpenes, sterols, phenols, flavanoids and carbohydrates.

EXPERIMENTAL

Animals

Albino wistar rats (160-200g) of either sex were used for experimental study. The animals were procured from National Institute of Nutrition, Hyderabad. The animals were housed in cages and are provided with light. All the animals were acclimatised to laboratory environment for 1 week to 10 days before the experiment. They were provided with free access to food (Supplied by Natural Institute of Nutrition Hyderabad) and water ad libitum.

Carrageenan Induced rat paw Oedema

Oedema was induced by sub plantar injection of 0.1 ml of 1% freshly prepared suspension of λ -carrageenan (Supplied by Tablets India, Chennai). The paw volume was measured using a plethysmometer before 0 and 3 hr after the injection of carrageenan².

The ethanolic extract of *Andrographis Serpyllifolia* (50,100 and 200 mg/kg) and diclofenac sodium 25mg/kg were orally administered to

different groups of rats. All the treatments were given orally 1 hr. prior to the injection of carrageenan.

Histamine Induced rat paw Oedema

The paw oedema was produced by sub plantar administration of 0.1 ml of a 0.1% freshly prepared solution of histamine in to the right hand paw of rats. The paw volume was recorded before 0 and 1 hr after histamine injection³. Different groups of animals were pretreated with ethanolic extract (50,100 and 200mg/kg) and with 5 ml/kg of 1% w/v carboxymethylcellulose and diclofenac sodium 25mg/kg standard drug. The doses were administered orally 1 hr before eliciting paw oedema. The percentage inhibition of oedema was calculated for all above models as described by T Sai and Lin⁴ (1999).

RESULTS AND DISCUSSION

The ethanolic extract at doses 50,100 and 200mg/kg exhibited significant ($P < 0.001$) anti inflammatory activity in all the animal models. The ethanolic extract (200mg/kg) exhibited maximum inhibition of 38.95% in carrageenan induced rat paw oedema where as diclofenac sodium produced 57.80% of inhibition after 3hr of carrageenan injection Table 1. The ethanolic extract (50,100 and 200mg/kg) significantly ($P < 0.001$) and dose dependently inhibited histamine induced rat paw oedema 38.76% respectively and this was compared with the activity produced by diclofenac sodium.

Table 1: Effect of ethanolic extract of *Andrographis serpyllifolia* on carrageenan induced rat paw oedema

Treatment	Dose (mg/kg)	% increase in paw volume	% inhibition
Carrageenan control		56.55±1.38	-
Diclofenac Sodium standard	25	23.86±1.58 ^a	57.80
Ethanolic extract of <i>Andrographis Serpyllifolia</i>	50	44.36±1.52 ^a	21.55
	100	39.86±1.72 ^a	29.51
	200	34.52±1.30 ^a	38.95

Each value represent the mean \pm SEM n = 6
a.p<0.001

Table 2: Effect of ethanolic extract of *Andrographis serpyllifolia* on histamine induced rat paw oedema

Treatment	Dose (mg/kg)	% increase in paw volume	% inhibition
Histamine control	-	52.86±1.68	-
Diclofenac sodium standard	25	30.28±1.63 ^a	42.71
Ethanolic extract of <i>Andrographis</i>	50	43.27±1.71 ^a	18.14
<i>Serpyllifolia</i>	100	38.56±1.88 ^a	27.05
	200	32.47±1.94 ^a	38.76

Each value represent the mean ± SEM n = 6

a.p<0.001

Inflammation is the response of living tissues to injury. It involves a complex array of enzyme activation, mediator release, extravasations of fluid, cell migration, tissue break down and repair. It is also known that anti inflammatory effects can be elicited by variety of chemical agents and that there is little correlation between the pharmacological activity and chemical structure⁵. This associated with the complexity of the inflammatory process, makes the use of different experimental models essential when conducting pharmacological trials.

The present study establishes the anti inflammatory activity of the ethanolic extract of *Andrographis serpyllifolia* in number of experimental rat models. This study demonstrates the efficacy of *Andrographis serpyllifolia* as an anti inflammatory agent and also justifies the use of the plant as an anti inflammatory agent in folk medicine.

ACKNOWLEDGEMENTS

The authors wish to thank vice-president Tablets India Ltd for providing standard reference drug samples and lyla impex vijayawada for providing facilities to carry out the work.

REFERENCES

- Govinda Chari T.R, Parthasaradhi.P., Pai. B.R. and Kalyana Raman P.S., Chemical investigations of *Andrographis serpyllifolia* isolation and structure of serpyllin. A new flavone. *Tetrahedron*, **24**: 7027 (1968).
- GunaKunru.A, Padmanabhan.K, Thirumal.P, Vengatesan.N, Gnan Sekhar.N, Raja.S, Raja rajan.A.T, Vijay Kumar.S.G., Chemical Investigation and anti inflammatory activity of fixed oil of *Butea monosperma* seeds. *Natural Products Science*, **10**: 55-58 (2004).
- Parmar N.S., Ghosh M.N., Anti inflammatory activity of gossypin a bioflavonoid isolated from *Hibiscus vitifolius* Linn. *Indian Journal of Pharmacology* **10**: 277-293 (1978).
- Tsai.C.C, Lin, C.C., Anti Inflammatory effects of Taiwan folk medicine 'Teng-Khia- U' on Carrageenan and adjuvant Induced paw oedema in rats. *Journal of Ethnopharmacology* **64**: 85-89 (1999).
- Serlie,J.A, Basile, A.C., Ponizza.S. Matida.A.K., Zelink.R. Anti Inflammatory activity and sub acute toxicity of artemitin *Planta Medica*. **56**: 36-40 (1996).