

Anti-arthritic activity of *Gymnema sylvestre* root extract

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ABSTRACT

The ethanolic extract of *Gymnema sylvestre* root was studied 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 100mg, 150 and 200mg/kg exhibited significant ($P < 0.001$) anti inflammatory activity in inflammatory models. At 200mg/kg the ethanolic extract showed maximum inhibition of 39-75% in carrageenan-induced rat paw oedema while the standard diclofenac sodium inhibited 52-19% after 3 hr of carrageenan injection. The ethanolic extract (150, and 200mg/kg) significantly ($P < 0.001$) inhibited histamine induced rat paw oedema and the percentage inhibition is found to be 37.33% and 41.08% respectively all the results obtained suggest significant anti inflammatory activity of the extract.

Key words: *Gymnema sylvestre*, Anti-inflammatory, Carrageenan, Histamine.

INTRODUCTION

Gymnema Sylvestre is a herb native to the tropical forest of southern and central India where it has been used as a naturopathic treatment for diabetes for nearly two millennia. The plant *Gymnema sylvestre* is familiar as madhunashini and commonly known as gurmar in Hindi. It is an important medicinal climber belonging to the James Asclepiadaceae. The plant is extremely used in Indian system of medicine for the treatment of various ailments like rheumatism, cough, ulcers etc. It is also useful in inflammation, dyspepsia, constipation and jaundice. Roots have been used as a remedy for snake bite in native medicine. Leaves of *Gymnema sylvestre* are active against glycosuria and many other disorders^{1,2}. The active ingredient is thought to be gymnemic acid which as the structure similar to saccharose. Extracts of *Gymnema sylvestre* is not only claimed to curb the sweet tooth but also for treatment of hyperglycemia.

MATERIAL AND METHODS

Collection and extraction of root

The plant was collected in Tanjavur and was authenticated by Prof. G. Shiva Murthy of Botany department, Manasa Gangothri University Mysore. The root was removed, and dried under shade and powdered in a mechanical grinder. The root powder was extracted with ethanol and the ethanolic extract is 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 100, 150 and 200 mg/kg was suspended in 1% (w/v) of aqueous carboxymethyl cellulose for administration to animals.

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 National 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 carrageenan⁹.

The ethanolic extract of *Gymnema Sylvestre* (100, 150 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.

Table 1: Effect of ethanolic extract of *Gymnema sylvestre* on carrageenan induced rat paw oedema

Treatment	Dose (mg/kg)	% increase in paw volume	% inhibition
Carrageenan control		52.88±1.28	-
Diclofenac Sodium standard	25	25.28±1.60 ^a	52.19
Ethanolic extract of <i>Gymnema sylvestre</i> root	50	40.50±1.30 ^a	12.29
	100	36.36±1.10 ^a	31.24
	200	31.86±1.72 ^a	39.75

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

Table 2: Effect of ethanolic extract of *Gymnema sylvestre* on histamine induced rat paw oedema

Treatment	Dose (mg/kg)	% increase in paw volume	% inhibition
Histamine control	-	48.67±1.72	-
Diclofenac sodium standard	25	25.42±1.38 ^a	47.69
Ethanolic extract of <i>Gymnema sylvestre</i> root	50	37.12±1.39 ^a	23.73
	100	30.50±1.42 ^a	39.33
	200	28.43±1.63 ^a	41.08

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

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 injection⁴. Different groups of animals were pretreated with ethanolic extract (100, 150 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 Lin⁵ (1999).

DISCUSSION

The ethanolic extract at doses 100, 150 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 39.75% in carrageenan induced rat paw oedema where as diclofenac

sodium produced 52.19% of inhibition after 3hr of carrageenan injection (Table 1). The ethanolic extract (100, 150 and 200mg/kg) significantly ($P < 0.001$) inhibited histamine induced rat paw oedema. Surprisingly with (150 & 200mg/kg) the inhibition activity found to be very encouraging percentage inhibition are 37.33% & 41.08% respectively.

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

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