Evaluation of anti-inflammatory activity of *Gymnema sylvestre* leaves extract in rats

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The aqueous extract of *Gymnema sylvestre* leaves was investigated for evaluation of anti-infl ammatory activity in rats at a dose 200,300 and 500 mg/kg in carrageenin-induced paw oedema and cotton pellet method. Results of *in vivo* activity led to the conclusion that the aqueous extract of *Gymnema sylvestre* showed predominantly significant activity, which is comparable to the standard drug Phenybutazone.

Key words: Anti-inflammatory, aqueous extract, *Gymnema sylvestre* leaves

INTRODUCTION

Gymnema sylvestre R.Br. (*Asclepiadaceae*), commonly known as Gudmar is a large woody, much branched climber with pubescent young parts in dry forest up to 600 m height.[1] *Gymnema sylvestre* leaf has been widely used in Ayurvedic traditional medicine and is bitter, acrid, thermogenic, anti-inflammatory, anodyne, digestive and liver tonic.[2] Tannins and saponin are the chief chemical constituents present in *Gymnema sylvestre* and are known to possess anti-inflammatory property.[3]

MATERIALS AND METHODS

Plant Material

The leaves of *Gymnema sylvestre* were collected in August 2004 from local market of Belgaum and authenticated by Dr. G.R. Hegde, Professor and Head, P.G. Department of Botany, Karnataka University, Dharwad. The voucher specimen (KCP/PC/205) is preserved in the laboratory for reference.

Preparation of Extract

The shade dried leaves were subjected to physical evaluation. The standardized coarse powder of the leaves was subjected to water extract and solvent was completely removed under reduced pressure using rotary flash evaporator.

Toxicity Studies

Wister albino mice of either sex weighing (18-26 g) were used for acute toxicity studies. All animals were maintained in the animal house at ambient temperature with food and water available *ad libitum*. Study protocol was approved by the Institutional Animal Ethics Committee (IAEC).

Procedure

Toxicity and gross behavioural studies[4] of water extract were carried out in oral doses of 100 to 2000 mg/kg weight using albino mice. After the extract administration, the animals were kept under observation for 2 hour to note the behavioral changes.

Evaluation of Anti-inflammatory Activity

Carrageenin-induced rat paw oedema

The rats were divided into five groups (n = 5). Acute inflammation was induced by the sub-plantar administration of 0.1 ml of 1% carrageenin in normal saline in the right hind paw of the rats. The paw volume was measured at 0 h and 4 h after carrageenin injection, using Plethysmometer.[5]

Group - 1 Receiving normal Saline (3 ml/kg p.o.).
Group - 2 Receiving Phenylbutazone (100 mg/kg p.o.).
Group - 3 Receiving aqueous extract (200 mg/kg p.o.).
Group - 4 Receiving aqueous extract (300 mg/kg p.o.).
Group - 5 Receiving aqueous extract (500 mg/kg p.o.).

The animals were pre-treated with the drug 1 h before the administration of carrageenin.

Cotton pellet-induced granuloma

The rats were divided into five groups (n = 5). After shaving the fur, the rats were anaesthetized under light ether and 10 mg of sterile cotton pellets were inserted, one in each axilla of the rats. Extract (200, 300 and 500 mg/kg), Phenylbutazone (100 mg/kg) and to group control vehicle were administered orally for seven consecutive days from the day of cotton pellet implantation. The animals were anaesthetized on the eighth day and cotton were removed surgically. The pellets were dried at 60°C.[6]

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Received: 02-12-2007; **Accepted:** 04-02-2007

Table 1: Anti-inflammatory activity of water extract

Treatment	Dose	Carrageenin-induced paw oedema		Cotton pellet-induced granuloma	
		Paw volume (ml)	% inhibition	Weight of the cotton pellet	% inhibition
Control	3 ml/kg	0.684 ± 0.006*	-	39 ± 0.46*	-
Extract	200 mg/kg	0.584 ± 0.016*	15.95	35.41 ± 0.16*	10.6
Extract	300 mg/kg	0.425 ± 0.009*	36.84	29.87 ± 0.34*	24.19
Extract	500 mg/kg	0.368 ± 0.016*	48.53	24.31 ± 0.23*	38.61
Phenylbutazone	100 mg/kg	0.290 ± 0.004*	57.6	19.19 ± 0.43*	51.5

P-value was calculated by comparing with control by ANOVA followed by Dunnett's test, Values are expressed as mean ± SEM* Significant at $P < 0.01$

Statistical analysis

The results were expressed as mean ± S.E.M. The significance statistical analysis was performed by ANOVA followed by Dunnett's test and $P < 0.01$, implied significance.[7]

RESULT AND DISCUSSION

The aqueous extract 300 mg/kg decreased the paw oedema volume by 48.5% within 4 h after administration, while standard drug decreased the paw oedema volume by 57.6% [Table 1] when compared with the paw oedema volume of the control. The aqueous extract at the dose of 200 mg/kg and 300 mg/kg produced significant reduction in granuloma weight, when compared to control group.

ACKNOWLEDGEMENT

The authors are thankful to K.L.E. Society, Belgaum, Karnataka, India for providing necessary facilities to carry out this work.

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Source of Support: Nil, **Conflict of Interest:** None declared.