



AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: <http://www.ajptr.com/>

Anti-Inflammatory Activity of Ethanolic Extract of *Barleria Gibsoni* in Carrageenan Induced Albino Wistar Rats

Lakshman kumar. D*¹, Siva sankar. S², N. Vasudeva reddy³, Sai Saran. S⁴

1. Department of Pharmacognosy, P. Rami reddy Memorial College of Pharmacy, Kadapa, Andhra Pradesh, India

2. Department of Material sciences and Nanotechnology, Yogi Vemana University, Kadapa, Andhra Pradesh, India

3. Department of Botany, Sri Venkateshwara University, Tirupathi, Andhra pradesh, India.

4. Department of pharmacology, Nirmala College of Pharmacy, Kadapa, Andhra Pradesh, India.

ABSTRACT

Barleria gibsoni belonging to the family Acanthaceae is commonly known as Neel Koranti. Several species of *Barleria* are reported for treatment of inflammation associated diseases like Gout, Rheumatism and swelling etc. So, the present work has been taken for phytochemical screening and to investigate anti-inflammatory activity. Anti-inflammatory activity was done by Carrageenan induced hind paw edema method using a plethysmometer. Ibuprofen was used as a standard drug and control receives saline. The test groups received 200 mg/kg and 400 mg/kg of Ethanolic extract of *Barleria gibsoni*. Phytochemical screening of EEBG revealed the presence of phytoconstituents like carbohydrates, tannins and flavonoids. In acute oral toxicity study it was observed that there was no mortality at any doses up to 2 mg/kg. The EEBG shows significant anti-inflammatory activity in carrageenan induced rats.

Keywords: *Barleria gibsoni*, Anti-inflammatory activity, Carrageenan.

*Corresponding Author Email: lakshman13@gmail.com

Received 03 June 2014, Accepted 08 July 2014

Please cite this article as: Lakshman D. *et al.*, Anti-Inflammatory Activity of Ethanolic Extract of *Barleria Gibsoni* in Carrageenan Induced Albino Wistar Rats. American Journal of PharmTech Research 2014.

INTRODUCTION

The demand for plant based medicines is increasing in both developing and developed countries, due to the growing recognition that the natural products are non-toxic, have less side effects, easily available at affordable prices and sometimes the only source of health care available to the poor. Inflammation is associated with many diseases like Rheumatoid arthritis and Gout etc. The drugs which are used in the treatment of inflammatory conditions are steroids and non steroids¹. Both are having adverse effects. Because of such adverse effects, the search for natural constituents effective in treating inflammatory conditions has been increased. *Barleria gibsoni* is a dicot plant belonging to the family Acanthaceae². The root infusion of this plant is used in the treatment of acidity³. The other species of *Barleria* are reported as useful in Gastric problems⁴, Diabetes mellitus⁵, Oxidative stress⁶, Inflammation⁷, Microbial attacks⁸, Hepatic disorders⁹, Immunomodulatory¹⁰, Malarial fevers¹¹, Glandular swellings and boils¹² etc.

MATERIALS AND METHODS:

Collection and Authentication: The aerial parts of the plant were collected from Tirumala forest, Chittor district, Andhra Pradesh. The plant was authenticated by Dr. K. Madhava Chetty, Assistant Professor, Dept. of Botany, Sri Venkateshwara University, Tirupati, Andhra Pradesh.

Preparation of Ethanolic extract:

The plant material was dried under shade. The dried material is grind into powder by using mixer grinder. Then this powder is passed through sieve no. 40 to get uniform powder. This plant powder was used for extraction. Extraction was carried out in soxhlet extractor by using 80% ethanol as solvent for 24 hr. The contents of round bottom flask evaporated under reduced pressure at 40⁰ C to get the extract. Then the extract is transferred to sterile container and labeled.

Phytochemical investigations:

The ethanolic extract was subjected to qualitative chemical screening^{13, 14} to detect the presence of various plant constituents.

Experimental animals:

Wistar rats of either sex selected from animal house, supplied by Sri Venkateshwara Enterprises, Bangalore, India. The animals were fed with standard pellet diet (Hindustan lever Ltd. Bangalore) and water *ad libitum*. All the animals were housed in polypropylene cages. The animals were kept under alternate cycle of 12 hours in darkness and light. The animals were acclimatized to the laboratory condition for 1 week before starting the experiment. The animals were fasted for 12 hours before the onset of activity.

Acute toxicity studies:

The acute oral toxicity test of the extract was determined according to OECD (Organization for economic co-operation and development) guideline 425.

Methodology¹⁵:

The anti-inflammatory activity of Ethanolic extract of *Barleria gibsoni* evaluated in rats using carrageenan induced hind paw edema method.

Carrageenan induced hind paw edema method:

The anti-inflammatory activity was determined in wistar rats weighing 200-250gm. The animals were divided into four groups consisting of 6 animals in each group. Grouping was done as follows.

Grouping of animals:

Group I: Control group treated with 0.09% w/v sodium chloride. (Normal saline)

Group II: Treated with standard Ibuprofen. (15 mg/kg)

Group III: Treated with Ethanolic extract of *Barleria gibsoni* (200mg/kg).

Group IV: Treated with Ethanolic extract of *Barleria gibsoni* (400mg/kg).

After 1hr of administration of the extract and the drug, 0.1ml of 1% w/v carrageenan was injected in subplantar region of the left hind paw to all the groups. The paw volumes were measured at 1, 2, 3, 4, 5 hours respectively by using plethysmometer. The average swelling of paws in the groups of extract treated was compared with control group and standard. The percentage inhibition of edema was calculated for each group with respect to control group.

Statistical Analysis:

All the values were expressed as Mean±S.E.M of six animals from each group. The data were evaluated by one way ANOVA followed by TUKEY'S multiple comparison test.

RESULTS AND DISCUSSION:

The plant *Barleria gibsoni* is an indigenous herb which was chosen for this study. The attempt is made to study the phytoconstituents present in the aerial parts of the plant and the pharmacological activities of the aerial parts of the plant. The study can be categorized into two major sections viz,

- Phytochemical screening
- Pharmacological studies

Phytochemical screening:

The phytoconstituents present in the plant were extracted by using ethanol 80%. The phytoconstituents were identified by various chemical tests which showed the presence of various

phytoconstituents like glycosides, alkaloids, flavonoids, tannins, carbohydrates.

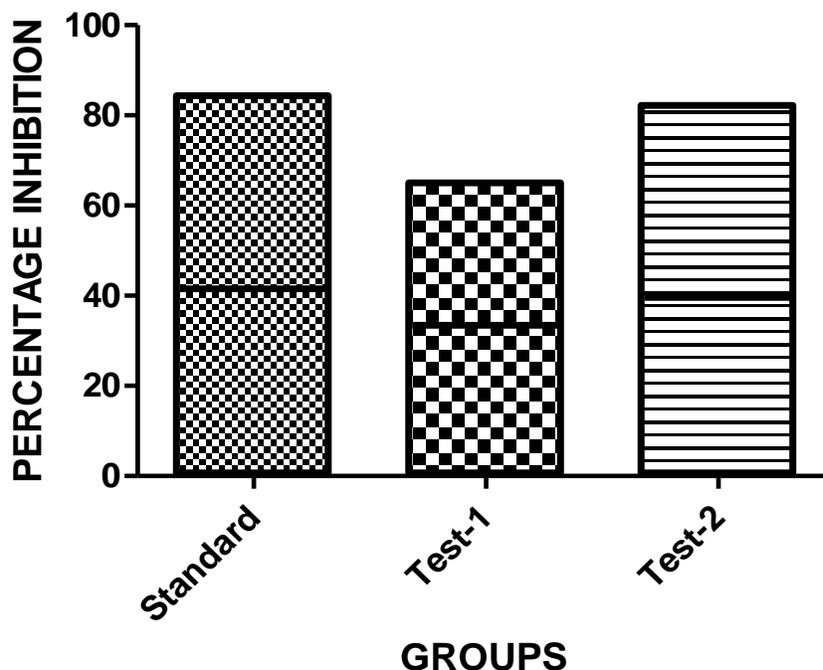


Figure-1: Anti-inflammatory activity of Ethanolic extract of *Barleria gibsoni*

Table-1: Results of Preliminary Phytochemical screening.

Plant constituent	Ethanolic extract
Flavonoids	+
Carbohydrates	+
Tannins	+
Glycosides	+
Alkaloids	+
Steroids	-
Saponins	-

Table-2: Anti-inflammatory activity of Ethanolic extract of *Barleria gibsoni*

S.No.	Groups	Dose (mg/Kg body weight)	Volume of paw edema (Mean \pm SEM) in ml				
			1 hr	2hr	3hr	4hr	5hr
1	Control	-	0.95 \pm 0.007	1.13 \pm 0.02	1.34 \pm 0.007	1.73 \pm 0.01	1.8 \pm 0.007
2	Standard	15	0.95 \pm 0.003	0.93 \pm 0.008	0.85 \pm 0.005	0.53 \pm 0.01	0.28 \pm 0.007
			(NI)	(17.6)	(36.5)	(69)	(84.4)
3	Test-1	200	0.95 \pm 0.003	0.93 \pm 0.004	0.91 \pm 0.004	0.82 \pm 0.004	0.63 \pm 0.008*
			(NI)	(17.6)	(32)	(52.6)	(65)
4	Test-2	400	0.95 \pm 0.003	0.93 \pm 0.004	0.87 \pm 0.006	0.63 \pm 0.008*	0.32 \pm 0.007
			(NI)	(17.6)	(35)	(63.5)	(82.2)

All the values are expressed as Mean \pm SEM, analysis by one way ANOVA.

n = 6; * P<0.008 compared to Control. Values in parenthesis represent percentage inhibition of edema. NI = No inhibition.

Pharmacological studies

Results of acute toxicity studies:

The Ethanolic extract of *Barleria gibsoni* was evaluated using mice. The LD₅₀ was calculated by using karber's method. The ED₅₀ value was found to be 1500 mg/kg body weight.

Results of anti-inflammatory activity:

By performing anti-inflammatory activity on male wistar rats, it can be concluded that the aqueous leaf extract of *Barleria gibsoni* has a significant anti-inflammatory activity at 200 mg/kg dose and 400 mg/kg dose.

CONCLUSION:

The plant has been selected based on its traditional uses. The phytochemical and pharmacological studies were performed on the aerial parts of *Barleria gibsoni* belonging to the family Acanthaceae. The phytochemical constituents were extracted and the constituents were identified by performing various chemical tests. Then tests clearly indicated the presence of numerous active constituents like alkaloids, glycosides, tannins, carbohydrates and flavonoids. The results of the pharmacological studies clearly demonstrates that the ethanolic extract of leaves of *Barleria gibsoni* has significant anti-inflammatory activity in carrageenan induced rats.

ACKNOWLEDGEMENTS:

We are thankful to the management of P. Rami Reddy memorial College of Pharmacy, Kadapa, A.P for providing all the facilities to carry out this work

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