

ANTIULCER ACTIVITY OF AQUEOUS EXTRACTS OF *ARISTOLOCHIA BRACTEOLATA* LEAVES

Mohamed Niyas K · , Rupesh Kumar M, Tamizh Mani T, Fsalu Rahiman O.M, Surendra Bodhanapu, Pasumarthi Phaneendra , Sathya Kumar B.

*** Author for correspondence:**

Mohamed Niyas. K
Dept. of Pharmacology,
Bharathi College of pharmacy,
Bharathinagara, Mandya,
Karnataka, India – 571422
Email: niaznasu@gmail.com
niyas_k97@yahoo.com

Summary

Peptic ulcer is a chronic and recurrent disease, and is the most predominant of the gastrointestinal diseases. It is an excoriated area of the gastric or duodenal mucosa caused by action of the gastric juice. This study focuses on the anti ulcer activity of aqueous extract of the plant *Aristolochia bracteolata*, a perennial herb, the leaves of which are used by the native tribals and villagers of the Chittoor District of Andhra Pradesh in India for the rapid healing of cuts and wounds. The aqueous extract of the shade dried leaves of *Aristolochia bracteolata* was studied for its antiulcer activity in rats, using ethanol induced and pylorus ligation induced models, at two different dose levels of 400 and 800 mg/kg/body wt/day. The activity was compared with standard drug Ranitidine. Pretreatment with the extract resulted in a significant decrease of the ulcerated area. The volume and acidity of the gastric juice decreased in the pretreated rats. Among the two dose assessed, 800 mg/kg was found to have the significant activity than the lower dose.

Key words: *Aristolochia bracteolata*, antiulcer activity, aqueous, ranitidine.

Abbreviations: Aqueous extract of *Aristolochia bracteolata* (AEAB)

Introduction

Peptic ulcers are a deep gastrointestinal erosion disorder that involves the entire mucosal thickness, penetrating the muscular mucosa [1]. For decades it was believed that gastrointestinal ulcerations were caused by the excessive secretion of gastric acid, but many patients presenting such ulcerations had normal acid secretion rates. Then, researchers reported that peptic ulcers were been caused by an imbalance between the aggressive factors and a number of known defense mechanisms [2]. It is a chronic and recurrent disease, and is the most predominant of the gastrointestinal diseases [3].

Aristolochia bracteolata is a shrub distributed throughout India. It belongs to the family Aristolochiaceae. In the indigenous system of medicine, the plant was used for the treatment of skin diseases, inflammation and purgative [4]. Root extract was reported to have anti bacterial activity [5]. It has insecticidal properties. Its leaves are bitter and antihelminthic, and are medicinally important. Almost every part of the plant has medicinal usage. *Aristolochia bracteolata* is proved to have antioxidant property [6]. The antiulcer activity of *Aristolochia bracteolata* has not yet been studied. Hence the aim of the present investigation was to evaluate the antiulcer activity of aqueous extract of *Aristolochia bracteolata* leaves.

Materials and methods

Plant material: The fresh leaves of *Aristolochia bracteolata* was collected from Tirupati, Chittoor district, Andhra Pradesh. The plant was identified, confirmed and authenticated by comparing with voucher specimen available at Calicut university herbarium, Department of botany, university of Calicut, Emerald by Botanist Dr. Pradeep AK and voucher specimen was deposited in institutional herbarium.

Preparation of extract: The fresh leaves of *Aristolochia bracteolata* was dried under shade. The dried leaves were powdered using a grinder. The coarse powder was used for extraction. Powdered leaves of *Aristolochia bracteolata* was extracted by maceration technique for 7 days.

Animals: Healthy adult albino rats of Wistar strain weighing 150-200g of either sex were used for this study. The animals were obtained from animal house, Bharathi College of Pharmacy, Bharathinagara, Karnataka, India. The animals were maintained under controlled conditions of temperature ($23 \pm 2^\circ\text{C}$), humidity ($50 \pm 5\%$) and 12-h light-dark cycles. All the animals were acclimatized for seven days before the study. The animals were randomized into experimental and control groups and housed individually in sanitized polypropylene cages containing sterile paddy husk as bedding. They had free access to standard pellets as basal diet and water *ad libitum*. Animals were habituated to laboratory conditions for 48 h prior to experimental protocol to minimize if any of non-specific stress.

Experimental Design

a) Ethanol induced ulcers:

Four groups of albino Wistar rats (n=6) were selected. In this model, Group 1 served as normal control received 0.5 ml of vehicle, p. o., and group 2 received Ranitidine (80 mg/kg, p.o), whereas groups 3 and 4 animals received aqueous extract of *Aristolochia bracteolata* (400 and 800 mg/kg, p.o. respectively). Animals were fasted overnight prior to start of the experiment, and water *ad libitum* 30 min after treatment, all rats received 1ml of absolute ethanol to induce gastric ulcer. After 1 h the animals were sacrificed by cervical dislocation, the stomachs were removed and opened along the greater curvature. Stomachs were gently rinsed with water to remove gastric contents and the mean ulcer index was calculated [8].

b) Pylorus ligation induced ulcers:

Four groups of albino Wistar rats (n=6) were selected. In this model, Group 1 served as normal control received 0.5 ml of vehicle, p. o., and group 2 received Ranitidine (80 mg/kg, p.o), whereas groups 3 and 4 animals received aqueous extract of *Aristolochia bracteolata* (400 and 800 mg/kg, p.o. respectively). Animals were fasted overnight prior to start of the experiment, and water *ad libitum* Pyloric ligation was applied by ligating the pyloric end of the stomach of rats under Phenobarbital anaesthesia (35 mg/kg) after 30 min of aqueous

extract of *Aristolochia bracteolata* or ranitidine treatments. Animals were allowed to recover and stabilize in individual cage and were deprived of water during postoperative method. After 6 h of surgery, rats were sacrificed with excess ether and gastric juice was collected for performing gastric secretion study and ulcer scoring was done in stomach [7].

Statistical analysis: The data of results obtained were subjected to statistical analysis and expressed as mean \pm SEM. The data were statistically analyzed by one-way analysis of variance (ANOVA) and $p < 0.01$ was considered to be significant and $p < 0.001$ was considered to be more significant.

Results and discussion

Ethanol induced ulcer model

The effect of *Aristolochia bracteolata* on ethanol induced gastric ulcers is given in table no.1 and fig. no.1 to fig. no. 4. Ethanol (80%, 1 ml) induced ulcers in normal control animals was evidenced by the ulcer index (UI) 13.117 ± 0.641 , high acid volume 8.43 ± 0.084 ml, low pH 2.1 ± 0.118 , high total acidity 111.5 ± 1.176 mEq/l, low glutathione 0.418 ± 0.009 $\mu\text{g/g}$ and high total protein 0.372 ± 0.012 g/dl. When aqueous extracts of *Aristolochia bracteolata* was given along with ethanol (80%, 1 ml) at two dose levels, 400 mg/kg and 800 mg/kg b.w. caused a significant reversal of all the above parameters when compared to control rats indicating its potent antiulcer activity. Among the two doses *Aristolochia bracteolata* at 800 mg/kg b.w. was found to be more effective than the lower dose.

Table No.1 Effect of *A.bracteolata* on ethanol induced gastric ulcers

No.	Treatment	Dose mg/kg	Parameters					
			Ulcer Index	Acid Volume (ml)	pH	Total acidity (mEq/l)	Glutathione ($\mu\text{g/gm}$)	Total Protein (gm/dL)
1	control	80%	13.117 ± 0.641	8.43 ± 0.084	2.1 ± 0.118	111.5 ± 1.176	0.418 ± 0.009	0.372 ± 0.012
2	Standard	80	$4.167 \pm 0.154^{***}$	$2.68 \pm 0.079^{***}$	$6.067 \pm 0.14^{***}$	$58.67 \pm 0.72^{***}$	$0.892 \pm 0.012^{***}$	$0.15 \pm 0.01^{***}$
3	AEAB	400	$11.63 \pm 0.102^*$	$8.00 \pm 0.146^*$	$2.9 \pm 0.139^*$	$107.16 \pm 0.792^*$	0.457 ± 0.02	0.368 ± 0.009
4	AEAB	800	$11.317 \pm 0.209^{**}$	$7.93 \pm 0.084^{**}$	$3.08 \pm 0.164^{**}$	$106.33 \pm 1.02^{**}$	$0.523 \pm 0.023^*$	$0.325 \pm 0.012^*$

Values are expressed as Mean \pm SEM from 6 rats. $P < 0.01^{**}$ and $P < 0.001^{***}$ as compared to control group.

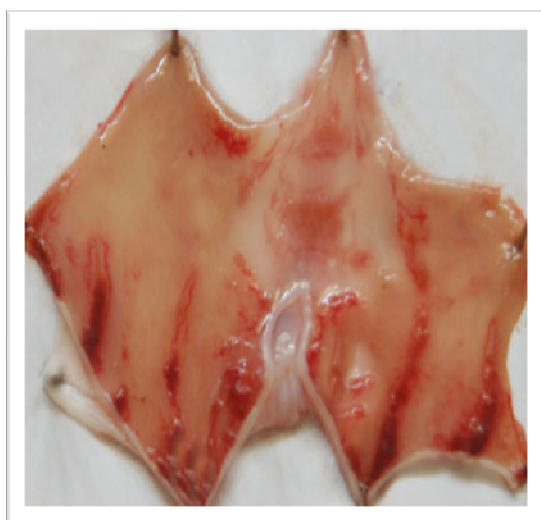
Pylorus ligation induced ulcers:

The effect of *Aristolochia bracteolata* on pylorus ligation induced gastric ulcers is given in Table No.2. Pylorus ligation induced ulcers in control animals are evidenced by the ulcer index 11.717 ± 0.179 , high acid volume 8.683 ± 0.654 ml, low pH 2.53 ± 0.076 , high total acidity 41.67 ± 0.615 mEq/l, low glutathione 0.383 ± 0.048 $\mu\text{g/g}$ and high total protein 0.367 ± 0.022 g/dl. When aqueous extracts of *Aristolochia bracteolata* was given at two dose levels, 400 mg/kg and 800 mg/kg b.w. caused a significant reversal of all the above parameters when compared to normal control rats indicating its potent antiulcer activity.

Table No.2 Effect of *A.bracteolata* on pylorus ligation induced gastric ulcers

No.	Treatment	Dose mg/kg	Parameters					
			Ulcer Index	Acid Volume (ml)	pH	Total acidity (mEq/l)	Glutathione ($\mu\text{g/gm}$)	Total Protein (gm/dL)
1	control (Ethanol)	80%	11.717 ± 0.179	8.683 ± 0.654	2.53 ± 0.076	41.67 ± 0.615	0.383 ± 0.048	0.367 ± 0.022
2	standard	80	$3.283 \pm 0.13^{***}$	$2.32 \pm 0.075^{***}$	$6.417 \pm 0.08^{**}$ *	$11 \pm 0.577^{***}$	$1.017 \pm 0.079^{***}$	$0.13 \pm 0.02^{***}$
3	AEAB	400	$11.05 \pm 0.163^{**}$	8.467 ± 0.062	$3.0 \pm 0.085^*$	40.16 ± 0.946	0.533 ± 0.033	0.317 ± 0.031
4	AEAB	800	$9.4 \pm 0.097^{***}$	$8.267 \pm 0.076^{**}$	$3.05 \pm 0.134^{**}$	$37.5 \pm 0.563^{**}$	$0.7 \pm 0.026^*$	$0.217 \pm 0.031^*$

Values are expressed as Mean \pm SEM from 6 rats. $P < 0.05^*$, $P < 0.01^{**}$ and $P < 0.001^{***}$ as compared to normal control group.

Effect of *A.bracteolata* on ethanol induced gastric ulcers**Fig.1 Control (Ethanol)****Fig.2 Standard (Ranitidine)**

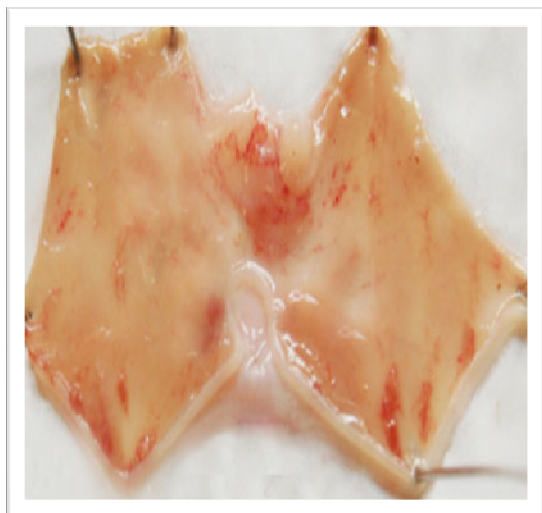


Fig.3 AEAB (400 mg/kg)



Fig.4 AEAB (800 mg/kg)

Conclusions

From the data of results obtained it is evaluated that aqueous extract of the plant *Aristolochia bracteolata* possesses a significant antiulcer activity compare to the standard drug. The study also helped us to identify the therapeutic values of the common plants present around us.

Acknowledgements

The author is thankful to, Bharathi College of pharmacy, Bharathinagara, Karnataka, India for providing necessary facilities throughout this work.

References

1. Tarnawski AS. Cellular and molecular mechanisms of gastrointestinal ulcer healing. *Digest Dis Sci* 2005; 50: 24-33.
2. Wallace JL, Granger DN. The cellular and molecular basis of gastric mucosal defense. *FASEB J* 1996; 10: 731-740.
3. Guyton and Hall. *Textbook of Medical Physiology*, 10, Philadelphia, 2000; 397-398.
4. *Wealth of India, Raw Materials Vol. IA*, CSIR, New Delhi, 1982; 88.
5. Negi, P.S., Anantharamakrishnan, C, Jayaprakasha, G.K. *J Med Food* 2003; 6: 401.
6. Shirwaikar A, Somashekar AP, Antiinflammatory activity and free radical scavenging studies of *Aristolochia bracteolata* Lam. *Indian J. Pharm Sci* 2003: 67-69.
7. Vogel HG, *Drug Discovery and Evaluation*, 2, Spinger-Verlag Berlin Heidelberg, New York; 2002: 867-71.
8. Hussain R, Turaifi A, Ahmed AM, Effect of Clotrimazole on Chemically and Stress Induced Peptic Ulcer, *Scientific Journal of King Faisal University* 2007; 8: 1-15.