European Journal of Biological Sciences 3 (1): 22-24, 2011
ISSN 2079-2085

Antiulcer Activity of Leaf Extract of *Piliostigma thonningii in Albino Rats*

[1]*G. Venkateshwarlu,* [2]*D. Sathis Kumar,* [3]*M. Sravan Prasad,* [1]*K. Vijay Bhasker,*
[4]*N.L Gowrishankar,* [1]*J. Bhaskar, Ch.* [5]*Dhanalakshmi and* [2]*A. Harani*

[1]Department of Pharmacognosy, Venkateshwara Institute of Pharmaceutical Sciences, Charlapally, Nalgonda andhra Pradesh, India, 508001
[2]Nalanda College of Pharmacy, Charlapally, Nalgonda andhra Pradesh, India, 508001
[3]GBN Institute of Pharmacy, Ghatkesar, RR District andhra Pradesh, India
[4]Department of Pharmacognosy, Swami Viveka nanda institute of pharmaceutical sciences, Bhuvanagiri, Nalgonda Andhra Pradesh, India, 508001
[5]Holy Mary Institute of Technology and sciences, RR District andhra Pradesh, India

Abstract: The present work evaluated the anti-ulcer potential of the ethanol extract of leaf of P*iliostigma thonningii* against *in vivo* indomethacin- induced gastric ulcer using pylorus ligation method. All the doses of the leaf extract (100, 200 and 400 mg/kg) significantly ($P<0.01$) reduced the ulcer index in this experiment. In conclusion, the present study provides preliminary data on the antiulcer potential of *piliostigma thonningii leaf* and supports the traditional uses of the plant for the treatment of gastric ulcer.

Key words: *Piliostigma thonningii leaf* · Ethanol extract · Gastric ulcer · Pylorus ligation · Indomethacin · induced gastric ulcers · Ulcer index

INTRODUCTION

In traditional medicine, treatment of ulcer has been intensified after the implication of *Helicobacter pylori* in the pathogenesis of most resistant ulcer**.** Gastric acid is produced by parietal cells (oxyntic cells) in the stomach [1]. The pH of gastric acid is 1.35 to 3.5 in the human stomach lumen, the acidity being maintained by the proton pump H^+/K^+ ATPase. The parietal cell releases bicarbonate into the blood stream in the process, which causes a temporary rise of pH in the blood, known as alkaline tide [2]. *Piliostigma thonningii* belongs to the family caesalpiniaceae and it is a shrubby tree with alternate compound leaves. The fruits are often pod-like with pods containing one to many seeds. The tree is perennial in nature and its petals are white to pinkish colour produced between November and April. The fruits, which are produced between June and September 1999 are hairy, hard, flattish pod, turn rusty brown, woody and wisted which splits at ripening and usually persistent on the tree[3]. P. thonningii rows in open woodland and savannah regions that are moist and wooded grassland in low to medium altitudes. It is widely distributed in Africa. A warm infusion of the bark and leaves traditionally is used to relieve fever and toothache. The powdered bark or the young inner bark and the scurf scraped from the surface of the pods are applied as dressing for wounds. The bark is also chewed for the relief of cough. The leaves and bark are believed to have expectorant property and are used in infusions or chewed for chest complaints, intestinal troubles, diarrhoea and dysentery [4]. The present work has been carried out to evaluate the antiulcer effect of petroleum ether, alcoholic and aqueous extracts of Piliostigma thonningii, leaves using experimental animal models.

MATERIALS AND METHODS

Collection of Plants: The leaves of the plant *piliostigma thonningii* were freshly collected in Yogivemana University Campus, Kadapa, A.P, India during January-february- 2011. It was authenticated by Prof. Dr.K. Raju, Head of Department of Botony, Kakatiya University, Warangal, India.

Corresponding Author: Mr. Venkateshwarlu Goli, Department of Pharmacognosy, Venkateshwara Institute of Pharmaceutical Sciences,Charlapally, Nalgonda, Andhra Pradesh, India - 508001, Tel: +91-9985189859, E-mail: pharmgroup2011@gmail.com.

Preparation of Extract: The plant materials were washed thoroughly to remove the dirt and shade dried at room temperature. The dried leaves were coarsely powdered (500g) and extracted with methanol (ME) using Soxhlet apparatus. The extracts were concentrated under vacuum to obtain a dry residue. The percentage of yield was calculated. This dry residue (5.46 %) was diluted with saline for pharmacological studies.

Experimental Animals: Albino Wistar rats (180-230 g) of either sex were fed with a standard diet and water *ad libitum.* The animals were housed in spacious polypropylene cages bedded with rice husk. The animal room was well ventilated and maintained under standard experimental conditions (Temperature 27°C and 12 hours light / dark cycle) throughout the experimental period. Animal experiments were carried out following the guidelines of the animal ethics committee of the institute.

Evaluation Method: The antiulcer activity of the crude methanolic extracts of *Piliostigma thonningii* was evaluated using indomethacin (SRL Company, Vijayawada, A.P. India) 40 mg/kg in rats. The methanolic extracts were administered to different groups at 50,100 and 200 mg/kg and 3% tween 80 (5 ml/kg) were received by control group. Sucralfate Suspension (100 mg/kg b.w.) served as the reference drug was given orally to standard group. After 30 minutes of administration, the ulcer was induced to all the groups by Indomethacin (40 mg/kg). Eight hours later, the rats were sacrificed and stomach was isolated. The greater curvature was separated from the stomach region and rinsed with tap water. Ulcer craters were observed and ulcer index were calculated by using the following formula[5]. Ulcer Index = ((mean ulcer index (control group) – mean ulcer index (test group) / (mean ulcer index (control group))) * 100.

Statistical Analysis: The results of ulcer indices were expressed as mean ± SEM while ulcer inhibition expressed as a percentage. Differences in mean ulcer index in comparison with control was done using the one way ANOVA followed by the Dunnett's multiple comparison with statistical significance considered at and $P<0.01$.

RESULTS AND DISCUSSION

Table 1 expressed the results of anti ulcer activity of methanolic extracts of *Piliostigma thonningii* in the ulcer induced rats by indomethacin. Figure 1 was shown the anti ulcer activity of different treated groups. There was an absolute production of severe ulcers in all the rats using the methanolic extracts of *Piliostigma thonningii* and ulcer inhibition was observed in all the treatment groups. Compare than standard Sucralfate Suspension,

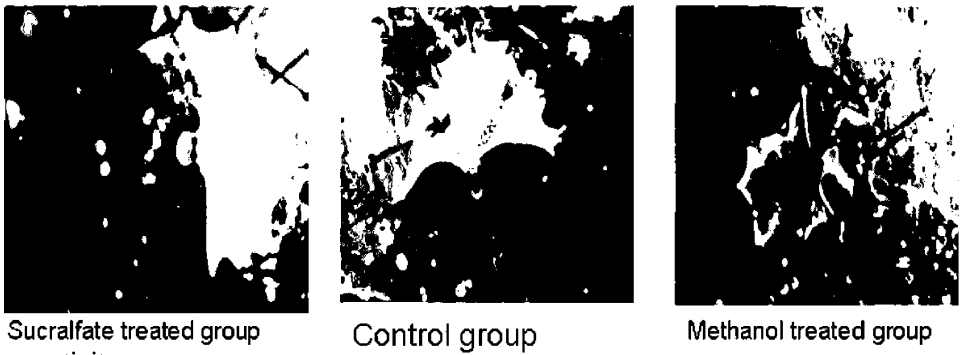

Fig.1: Anti ulcer activity

Table 1: Anti ulcer activity of methanolic extracts of piliostigma thonningii

Treatment	Dose (mg/kg)	No. of animals used	Percentage of animals with ulcers (%)	Meanulcer index± SEM	(%) of ulcer inhibition
3%Tween 80	5	6	100	3.5±0.6	-
Sucralfate	100	6	100	1.7±0.7	51.4
Methanol extract of *P.thonningii*	50	6	100	1.4±0.5	57.1*
Methanol extract of *P.thonningii*	100	6	100	1.2±0.1	65.7
Methanol extract of *P.thonningii*	200	6	100	0.7±0.2	80.0*

* $P<0.01$ for Dunnett's test vs. control

50, 100 and 200 mg/kg doses of leaf extract of *Piliostigma thonningii* showing more inhibition in dose dependent manner and among those 200mg/kg dose have 80% ulcer inhibition ($P<0.01$) which was highest than other doses of extracts and standard. Standard sucralfate suspension was shown 51.4% inhibition in ulcer. The pathogenesis of ulcer remains controversial but its cause is known to be aggravated by an imbalance between the aggressive factors (i.e. acid and pepsin) and factors that maintain mucosal integrity (i.e. mucus, bicarbonate and prostagladins) [6]. The use of sucralfate in this study was due to its increasing prescription in ulcer patients in this country and specifically due to its non antisecretory but mucoprotective nature. It is known to act by several mechanisms which include physical protection of stomach, synthesis of prostaglandins and stimulate mucus and bicarbonate secretion [1]. It has been documented to be effective in uncomplicated NSAID induced ulcers [7-9] but it does not cure ulcers. The extracts produced a relatively potent antiulcer activity against methanol induced ulcer which may suggest that the plant possesses some cytoprotective actions against methanol induced ulcer. The dose dependent ulcer inhibition of piliostigma thonningii leaf extract further corroborates its possible cytoprotective actions in this model. The effect was more pronounced that those of sucralfate.

REFERENCES

1. Siepler, J.K. and C. Smith-Scott 2005. Upper gastrointestinal disorders. In: Koda- kimble, M.A, L.Y.Young, W.A.Kradjan and B.J. Guglielmo. Applied therapeutics. The clinical use of drugs. 8th ed.: Lippincott Williams and Wilkins, pp: 27-30.
2. Marieb, E.N. and K. Hoehn, 2010. Human anatomy & physiology. San Francisco: Benjamin Cummings.
3. Thonningii, P., (Retrieved 2010, 12th December) available from www.plantzafrica.com.
4. Dalziel, J.M., 1937. The Useful Plants of West Tropical Africa, pp: 174.
5. Parmar, N.S. and J.K. Desai, 1993. A review of the current methodology for the evaluation of gastric and duodenal antiulcer gents. Indian J. Pharmacol., 25: 120-35.
6. Berardi, R.R. and S.L. Welage, XXXX. Peptic Ulcer Disease. In: Dipiro, T.J, R.L.Talbert, G.C.Yees, G.R.Matzke, G.B.Wells and M.L. Posey. Pharmacotherapy: a pathophysiologic approach. 6 ed.: McGraw-Hill, pp: 632-648.
7. Del Valle, J., W.D. Chey, J.M. Scheiman, *et al*. 2003. Acid peptic disorders. In: Yamada, T., D.H. Aplers and N. Kaplowitz, *et al*, (eds). Textbook of Gastroenterology. 4th ed.: Philadelphia, Lippincott Williams & Wilkins, pp: 1321-1376.
8. Laine, L., 2001. Approaches to nonsteroidal anti-infl ammatory drug use in the high-risk patient. Gastroenterol., 120: 594-606.
9. Wolfe, M.M., D.R. Lichtenstein and G. Singh, 1999. Gastrointestinal toxicity of nonsteroidal anti-infl ammatory drugs. N Engl J. Med., pp: 340.