

Investigation of antiulcer activity of *Pergularia extensa* Linn

Pavani CH*

Department of Pharmaceutical analysis, Guru Nanak Institutions Technical Campus, Nagarjuna Sagar Highway Ibrahimpatnam, Ranga Reddy -501506, Telangana, India

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ABSTRACT

This study was based on the determination of the anti-ulcer activity from methanol extract was prepared by using barks of *Pergularia extensa* linn. Preliminary investigations showed the presence of saponins, terpenes, cardiac glycosides, alkaloids and sterols. Based on OECD-423 Guidelines, the pharmacology and acute oral toxicity studies were conducted by using the methanolic extract. Tannins prevented ulcer development because of their vasoconstriction effects and due to protein precipitation. Similarly, the Methanolic extract of *Pergularia extensa* Linn shows triterpenoids and saponins. The phytoconstituents are present in the extract and these could be possible agents who are involved in preventing gastric lesions induced by Aspirin. When compared to ulcerative control groups, this *Pergularia extensa* Linn. shows a dose-dependent curative ratio. The extracts exhibited an inhibition percentage of 27.18, 45.47 and 61.28 at doses of 100, 200 and 400mg/kg doses respectively.



*Corresponding Author

Name: Pavani CH

Phone:

Email: pavani.pharma64@gmail.com

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INTRODUCTION

The stomach was held in between the oesophagus and the duodenum (small intestine's first part). This is present on the upper side of the abdominal cavity and the top part of the stomach pushes up through the diaphragm. One of this oesophageal sphincter divides the tract above and then the small intestine was divided by the other pyloric sphincter. Parasympathetic, ortho sympathetic plexuses surround the stomach which regulates both activities of its muscle such as secretion. In the newborn human baby, the stomach was available only to retain about 30ml. In several disorders of upper G.I.T., one of the disorder is a peptic ulcer which was partially

caused by gastric acid. Patients who are affected by the peptic ulcer disease are involved with a range of symptoms from mild abdominal discomfort to catastrophic perforation and even leads to bleeding [1].

MATERIALS & METHODS

Plant Profile:

Plant name: *Pergularia extensa*

Family: Asclepiadaceae

PROCEDURE

Determination of LD₅₀ values of *Pergularia extensa* linn

The procedure followed was conducted based on OECD guidelines-423. The defined doses were used in this method (5,50,300,2000mg/kg body weight) and the results which may allow classifying the drug dose and toxicity.

To conduct studies, Six animals (Albino mice, 25-75gm) were selected. From *Pergularia extensa* Linn., the methanolic extracts are given through oral route. In the used animal, most of the crude extracts possess LD₅₀ value more than 2000 mg/kg of the body weight. Dose-volume was administered in an animal through the oral route that is about 0.1 ml /

100 gm body weight. Within 3-4 hours, the sign of toxins was observed after the given dose.

INVESTIGATION OF ANTI-ULCER ACTIVITY

Male Albino rats weigh about 150-200g which are used in this study. In the animal house, All the rats were kept at room temperature of about 22°C and All the animals were held in the house and these animals are treated with care in the laboratory according to internationally accepted ethical guidelines.

Before the experiment, standard food was used to feed the rats and were acclimatized to the conditions of the laboratory [2].

ASPIRIN INDUCED ULCER

Albino rats were segregated into six groups and each group consisting of 6 animals as follows:

Group A - received 1% Methylcellulose (1.0 ml/ kg p.o) as control.

Group B - received 1% Methyl cellulose (1.0 ml/ kg p.o)

Group C - received(100mg/kg, p.o) Methanolic extract of *Pergularia extensa* Linn.,

Group D - received(200mg/kg, p.o) Methanolic extract of *Pergularia extensa* Linn.,

Group E - received(400mg/kg, p.o) Methanolic extract of *Pergularia extensa* Linn.,

Group F - received(20mg/kg, p.o) Pantaprazole as standard.

To induce ulcers, animals were treated with absolute Aspirin of about 500mg after one hour of drug treatment. After completion of one hour, the animals were sacrificed after 1hr and their stomach was opened and then inhibition of ulcer percentage was determined.

Measurement of gastric juice volume and pH

According to induced ulcer rats, from Aspirin gastric juice was collected. After collecting gastric juice, it was centrifuged at 3000 rpm for 10 min. The supernatant volume was measured and expressed as ml/100g body weight while the supernatant of pH was measured using digital P.H.

Ulcer index (U.I.)

Calculate the Percentage inhibition by the following formula.

$$\% \text{ inhibition} = \frac{U_{\text{Ulcer control}} - U_{\text{Ulcer test}}}{U_{\text{Ulcer control}}} \times 100$$

Statistics

All the values were in the form of mean \pm S.E.M. for each group of 6 animals and are analyzed by using

one way ANOVA and are in comparison by using Tukey- Kramer multiple comparison test. At three levels. The significance was given at ***p <0.001. **p <0.01. *p <0.05. But ns if p > 0.05.

RESULTS & DISCUSSION

By using methanol as solvent, *Pergularia extensa* Linn. was subjected for continuous hot extraction. The percentage yield of methanolic extract was found as 12.75% w/w.

Acute oral toxicity studies

This study revealed LD 50 > 2000mg/kg for the extract. So, for the extract, the dose was fixed at 100, 200 and 400mg/kg of body weight [3].

Anti-ulcer potential in Aspirin-induced ulcer

In *Pergularia extensa* Linn., the methanolic extract effects on ulcer index in the rats induced by Aspirin are shown in Tables 1 and 2.

Gastric damage was induced by Aspirin and showing gross mucosal lesion, along with the long haemorrhage bands and petechial lesion. Methanolic extract of *Pergularia extensa* Linn has conducted pretreatment in the animals. After administration of standard drug Pantoprazole, it shows mild lesions and few more times no lesion have been seen when compared to the ulcer control group.

In comparison to the control, *Pergularia extensa* Linn shown a dose based curing ratio. The extracts exhibited an inhibition percentage of 23.16, 43.93 and 63.01 at doses of 100,200 and 400mg/kg doses respectively. At different doses, the extracts of ulcer protective action were better as that of standard drug, pantoprazole drug exhibited with 78.73%.

Aspirin produced severe gastric haemorrhagic Lesions. The pathogenesis of Aspirin is complicated due to the induction of the gastric destruction. Also, it involves casing of peripheral cellular level of necrosis and the releasing of tissue mediators like the leukotriene and histamines C4. These mediators were acted on gastric microvasculature, which triggers a series of events leads to the mucus and submucosal layer damage. Thus the tissue-protective system of the *Pergularia extensa* Linn., a drug which may lead to the mechanisms that neutralize the acid secretion [4].

Table 1: Effect of Pergularia extensa Linn., on Ulcer Index in Aspirin-induced gastric ulcer

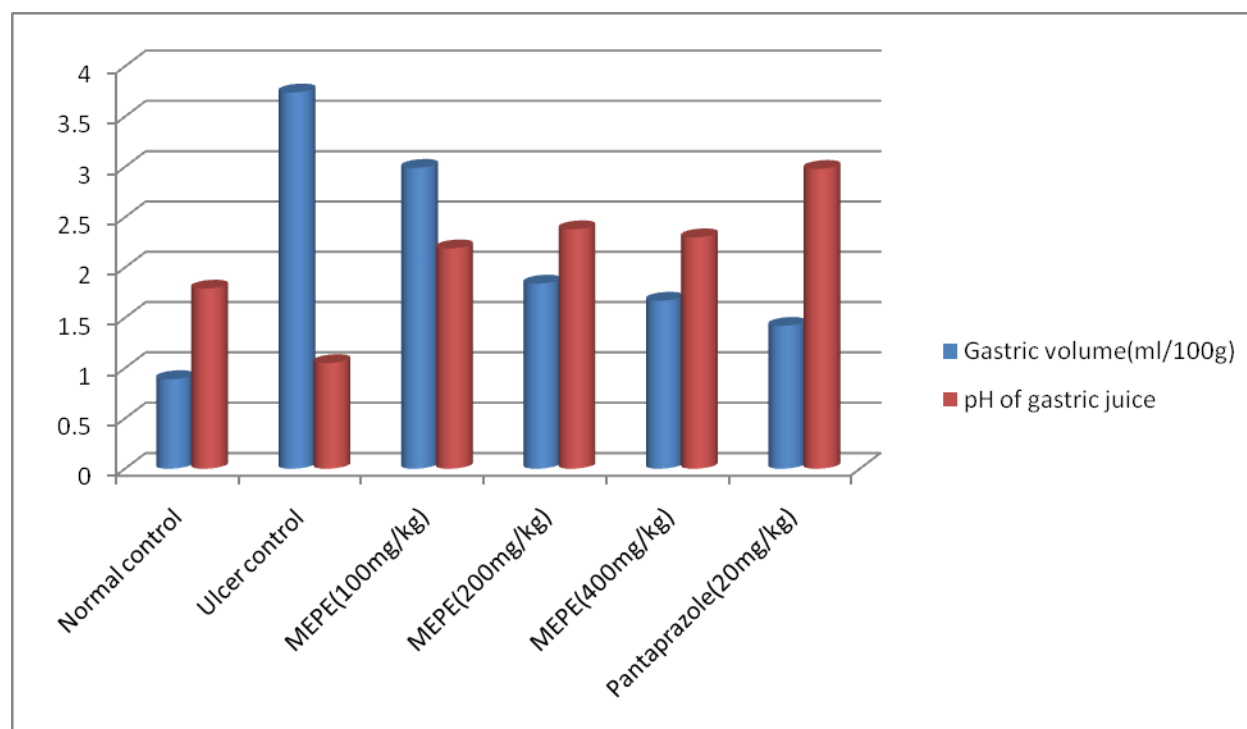
GROUP	ULCER INDEX (U.I.)	INHIBITION (%)
Normal Control	—	—
Ulcer Control	10.7 ± 1.53***	—
Pergularia extensa Linn., (100mg/kg)	8.52 ± 1.61*	27.18
Pergularia extensa Linn.,(200mg/kg)	6.38 ± 1.07	45.47
Pergularia extensa Linn., (400 mg/kg)	4.53 ± 1.63	61.28
Pantaprazole (20 mg/kg)	2.51+ 0.83	78.54

**P <0.001, *P <0.01, Ulcer group in comparison to Normal control group.

Table 2: Effect of Pergularia extensa Linn., on Gastric secretion, pH using Aspirin-induced ulcer

Group	Gastric volume (ml/100g)	pH of gastric juice
Normal	0.89 ± 0.08	1.79 ± 0.06
Ulcer group	3.74 ± 0.71***	1.05 ± 0.39
Pergularia extensa Linn. (100 mg/kg)	2.99 ± 0.45	2.19 ± 0.61
Pergularia extensa Linn. (200 mg/kg)	1.84 ± 0.30	2.38 ± 0.23
Pergularia extensa Linn. (400 mg/kg)	1.67 ± 0.35	2.30 ± 0.54
Pantaprazole(20mg/kg)	1.42+0.22	2.98+0.68

**P <0.001, *P <0.01, Ulcer group in comparison to Normal control group.

**Figure 1: Effect of Pergularia extensa Linn., on Ulcer Index in Aspirin-induced gastric ulcer**

CONCLUSION

This study was based on the determination of the anti-ulcer activity from methanol extract was prepared by using barks of *pergularia extensa* linn. Preliminary investigations showed the presence of saponins, terpenes, cardiac glycosides, alkaloids and sterols. Based on OECD-423 Guidelines, the pharmacology and acute oral toxicity studies were conducted by using the methanolic extract. Tannins prevented ulcer development because of their vasoconstriction effects and due to protein precipitation. On the ulcer site, micro proteins were precipitated due to their astringent action and therefore formed an impenetrable layer over lining.

Similarly, the Methanolic extract of *Pergularia extensa* Linn shows the presence of flavonoids. These phytoconstituents are present in the extract and these could be possible agents who are involved in preventing gastric lesions induced by Aspirin. When compared to ulcerative control groups, this *Pergularia extensa* Linn. shows a dose-dependent curative ratio. The extracts showed 27.18, 45.47 and 61.28 at doses of 100,200 and 400 mg/kg doses, respectively. The extract of ulcer protective action is about 400mg/kg was good to that of standard drug pantoprazole, which showed 78.54.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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