



INVESTIGATION OF ANTIULCER ACTIVITY OF POLYHERBAL PREPARATION ON EXPERIMENTALLY INDUCED ULCER IN RATS

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ARTICLE

ABSTRACT

Key words:

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The poly-herbal preparations of *Buchanania angustifolia* and *Pouzolziaweightii* have been evaluated for anti-ulcer activity in rats using different models of gastric ulcers such as pylorus ligation and ethanol induced ulcers. Effectiveness was estimated by determination of ulcer index and percentage of ulcer protection. Oral administration of polyherbal preparation crucially reduced the formation of ulcers in the stomach both in pylorus ligation and ethanol induced ulcers when compared to that in control group animals. So, from this we can conclude that the poly-herbal preparation has good antiulcer activity.

INTRODUCTION

Peptic ulcer is a chronic disease and is the most predominant of the serious gastrointestinal diseases. It is a damaged area of the gastrointestinal tract caused by action of the gastric juice (1). It is generally recognized that peptic ulcer is caused by imbalance between the gastric aggressive factors(2) such as acid, pepsin, parietal cell, mucosal barrier, mucus secretion, blood flow, cellular regeneration and the mucosal defensive factors(3) such as mucin, prostaglandin, bicarbonate, nitric oxide and growth factors. Some other factors such as improper and inadequate dietary habits,

Irregular routine, excessive intake of drugs like non-steroidal anti-inflammatory agents, stress, hereditary predisposition and infection by *Helicobacter pylori* (4) are also responsible for the development of peptic ulcer (5).

Naturally occurring herbs *Buchanania angustifolia* (leaves), *Pouzolzia weightii* (leaves) were selected because of traditional value and abundant availability in the household and local market. As they are known to act on digestive system and already having mild anti-ulcer activity these drugs were selected for evaluating antiulcer activity in combination (6).

Director of National Institute of Herbal Science, W.Tambaram Chennai.

Preparation of herbal preparation

All the extracts were macerated with a mortar and pestle in double distilled water containing gum acacia (2%w/w) to provide the drug

MATERIALS AND METHOD

The leaves of *Buchanania angustifolia*, and *Pouzolzia weightii* were collected from Talakona forest, Chittoor district of Andhra Pradesh, India. The plant was authenticated by Prof. P. Jayaraman,

Material and drugs

Male albino Wistar rats, Omeprazole and poly-herbal preparation.

Experimental animals

Experimental animals Albino wistar rats (150-180gm) were used for the study. The animals were housed under standard conditions of temperature (23±1°C), relative humidity (55±1%), 12h: 12h light/dark cycle and fed with standard rat pellet diet and water ad libitum.

Preliminary Phytochemical Screening:

The aqueous extract of polyherbal was analyzed for the presence of various constituents. Different tests were performed on aqueous extract of poly-herbal for the evaluation of presence of alkaloids, carbohydrate, glycoside, saponins, phytosterols, steroids, flavonoids, tannins, phenolic compounds and proteins (7).

Acute toxicity studies

Acute toxicity studies were performed as per the OECD guidelines 423.

Antiulcer activity

The animals were grouped into four groups each consisting of six rats to verify the antiulcer activity.

Pylorus ligation induced ulcer model

The antiulcer activity of the poly-herbal preparation was evaluated using the method of pylorus ligation. Group 1 animals received distilled water which served as control. Group 2 & 3 animals received poly herbal preparation at doses of 200 & 400 mg/kg p.o respectively. Group 4 animals received standard drug omeprazole at the dose of 20mg/kg p.o and served as standard group. One hour after the administration of drug, under light anesthesia at a dose of 35 mg/kg b.w, the abdomen was opened and pylorus end was ligated without causing damage to the blood vessels (8). The stomach was replaced carefully and the animals were deprived of water during post-operative period. Six hours after surgery, all the animals were sacrificed and stomachs were excised, dissected and ulcer score was noted (9).

Ethanol Induced Ulcer Model:

Animals were divided into four groups each containing 6 animals. All groups were kept fasting for 36 hrs. Group 1

served as a control group and received only water, the animals of group 2 received the poly herbal preparation at the dose of 200 mg/kg body weight and the group 3 received the poly herbal preparation at the dose of 400 mg/kg body weight. Group 4 served as standard and received Omeprazole at the dose of 20 mg/kg body weight. Ethanol was administered orally to the animals. After 6 hours animals were sacrificed and the stomach was excised, cut along the greater curvature, washed carefully with 0.9% sodium chloride and the ulcers were scored (10).

Calculation of Ulcer Index:

The ulcer index was calculated by summing up the total number of ulcers per stomach and total severity of ulcers per stomach using the following formulae

$$U_i = U_n + U_s + U_p \times 10^{-1}$$

Where

U-ulcer,

i - index

U_i -ulcer index,

U_n-average no. of ulcers per animal,

U_s-average no. of severity score,

U_p-percentage of animals with ulcers

The severity of ulcers was calculated as per the values given in table no: 1

Severity of ulcer	Ulcer score
Normal coloured stomach	0
Spot ulcer	1
Hemorrhagic streak	1.5
Deep ulcer	2
Perforations	3

RESULTS

The Phytochemical studies of aqueous extract of the poly-herbal preparation revealed the presence of carbohydrates, glycosides, flavonoids and tannins., therefore poly-herbal preparation was chosen for further studies. The poly-herbal preparation showed no signs of mortality during acute toxicity studies till 2000mg/kg p.o. The present study revealed that the poly-herbal preparation has reduced the ulcerations induced by pylorus ligation and ethanol induced models.

DISCUSSION

The preliminary phytochemical tests revealed the presence of various phytoconstituents. The poly-herbal preparation showed the significant antiulcer activity by decreasing the gastric volume in pylorus ligation model and also by reducing the formation of ulcers in both pylorus ligation and ethanol induced ulcer model in test groups when compared to that in control group animals. The poly-herbal preparation

reduced the ulcer index and protected the animals from affecting to ulcers. The poly-herbal preparation also increased the mucous secretion in pylorus ligation method in test animals. The aqueous extract of the poly-herbal preparation of *Buchanania angustifolia*, *Pouzolzia weightii*, has shown the effective antiulcer activity when compared to that in control.



Fig no.1: *Buchanania angustifolia* leaves



Fig .no.2: *Pouzolzia weightii* leaves

Table no: 2 Effect of PHP (200mg/kg and 400mg/kg) on % ulcer inhibition in pylorus ligation induced gastric ulcers in rats

Groups	Treatment	Dose	Ulcer Index	% Ulcer Protection
Group 1	Control (Distilled water)	1mL/Anima	4.34 ±0.38	0.0
Group 2	Poly-herbal preparation	200 mg/kg	3.17±0.64	26.95
Group 3	Poly-herbal preparation	400 mg/kg	1.08±0.08 ***	75.11
Group 4	Standard (Omeprazole)	20 mg/kg	0.80±0.20 ***	81.56

Values are the mean ± S.E.M. of six rats / treatment Significant *** P<0.001 Vs Control

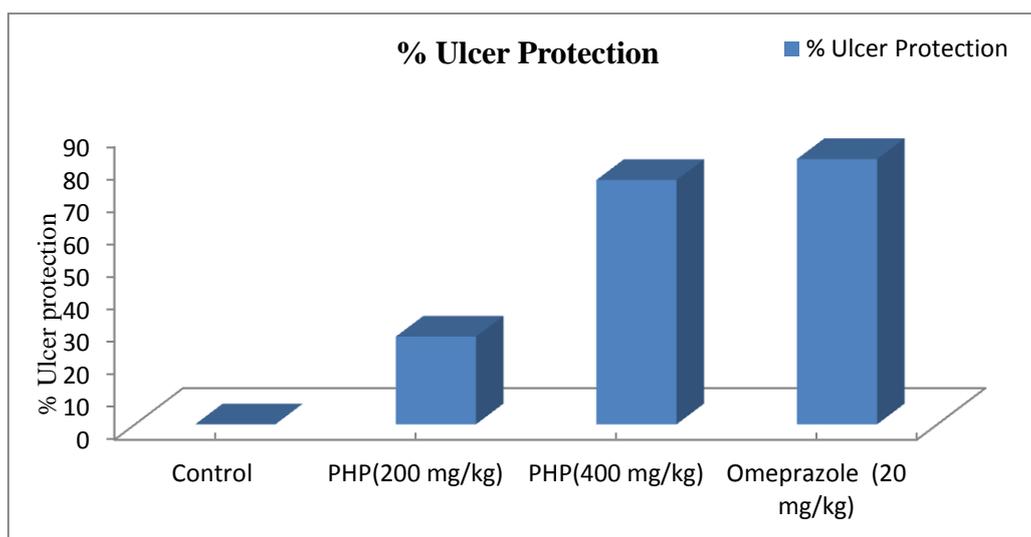


Fig no: 3. Effect of PHP (200mg/kg and 400mg/kg) on % ulcer inhibition in pylorus ligation induced gastric ulcers in rats

Table no: 3 Effect of PHP (200mg/kg and 400mg/kg) on % ulcer inhibition in ethanol induced ulcer model

Groups	Treatment	Dose	Ulcer Index	% Ulcer Protection
Group 1	Control (Distilled water)	1mL/Anima	0.92±0.03	0.0
Group 2	Poly-herbal preparation	200 mg/kg	0.52±0.18	43.47
Group 3	Poly-herbal preparation	400 mg/kg	0.32±0.01***	65.21
Group 4	Standard (Omeprazole)	20 mg/kg	0.30±0.030 ***	67.39

Values are mean ± SEM; N = 6 in each group P ***< 0.001 Vs. Control

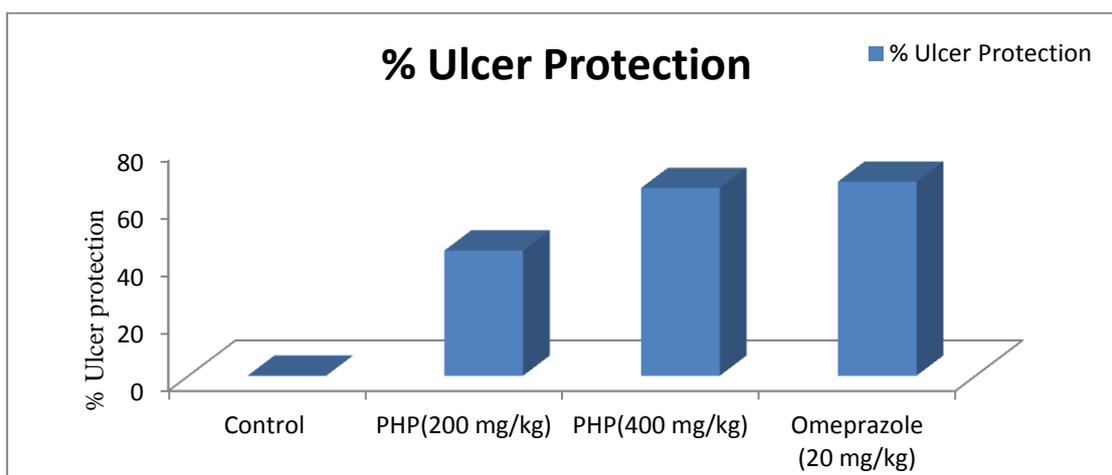


Fig no: 4. Effect of PHP (200mg/kg and 400mg/kg) on % ulcer inhibition in Ethanol induced ulcer model

CONCLUSION

The above results showed the fact that the poly-herbal preparation is a potential antiulcer agent. The activity could be due to the presence of phytochemicals such as flavonoids, alkaloids, terpenoids etc. which are well known for their antioxidant activity. We propose here that the preparation having constituents *Buchanania angustifolia*, *Pouzolzia weightii*, has a potential antiulcer activity as well as therapeutic activity in the treatment and management of diseases caused by oxidative stress.

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