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Research Article

ANTIULCER ACTIVITY OF *AMARANTHUS SPINOSUS* LEAF EXTRACT AND ITS COMPARISION WITH FAMOTIDINE IN SHAY RATS

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ABSTRACT

Anti-ulcer activities of petroleum ether, chloroform, Ethanolic extract of Amaranthus spinosus leaf were tested for anti-gastric ulcer activity in Shay rat model. Oral dose of 400mg/kg of ethanolic extract reduced the ulceration and with 800mg/kg body weight ethanolic extract there is the complete absence of ulceration. The anti-gastric activity of ethanolic extract of *A.spinosus* 800mg/kg body weight was found to be equal to the effect produced by 2mg/kg of Famotidine orally. The reduction in gastric activity was more with Famotidine and the reduction in peptic activity is more with ethanolic extract of *A.spinosus*. All extracts are safe up to 4000mg/kg. The result of petroleum ether, chloroform and aqueous extract in respect of anti-ulcer activity are less prominent.

Key words: Amaranthus spinosus, Shay rat model, Famotidine, Peptic activity

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INTRODUCTION

Famotidine is found to be useful in healing gastric ulcer and are used in the treatment of gastric ulcer and duodenal ulcer [1]. According to Ayurveda ulcer formation occurs due to improper digestion of food, excess of stress, excess secretion of HCl [2]. It is experimentally found that Famotidine 2mg/kg body weight has shown to complete cure of ulcer and reduces the peptic activity. Aerial parts of *Amaranthus spinosus* extract are widely used by tribal's of south Odisha to heal peptic ulcer and relief from stomach pain without precipitating any side effects but there is no scientific proof to prove this in literature. The present research was conducted to evaluate anti-ulcer activity of aerial parts of *Amaranthus spinosus* extract to establish a scientific proof against such traditional utility compared with Famotidine in Shay rat model.

MATERIALS AND METHODS:

Amaranthus spinosus leaf as test plant, Famotidine used as standard drug. The other reagents used were Topfer's reagent, 0.01N Sodium hydroxide, Tyrosine, Folin's phenol reagent, 1% Carboxy methoxy cellulose, phenolphthalein indicator etc.

Studies in Shay rat[3]

Albino rats of either sex were taken weighing around 150-200 gm. Rats weighing 150gm or above were fasted for 72 hr and below the weight of 150 gm were fasted for 48 hr. the rats were allowed to take water ad libitum

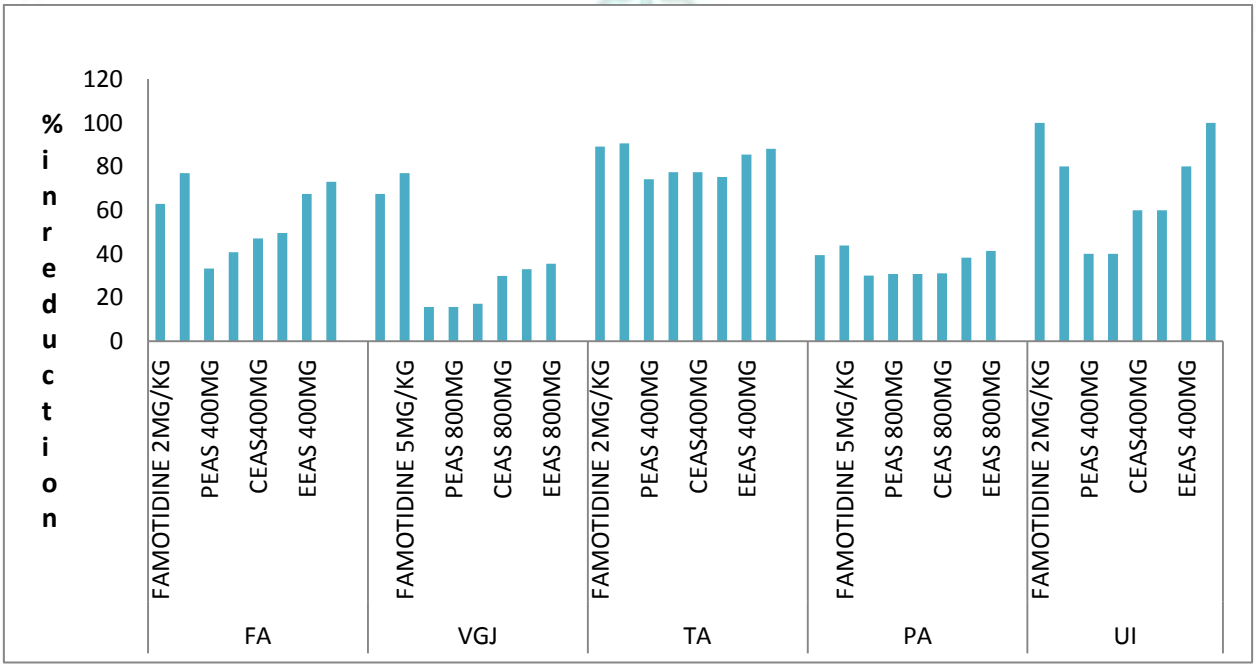
Under ether anaesthesia The pylorus ligation was made. Different doses of drugs (Famotidine) were administered to groups containing six rats each. Soon after recovery from anaesthesia the animals are kept in separate cages and care was taken to avoid coprophagy. Control group was treated with 1% CMC and kept for 24 hrs without food and water after pyloric ligation. The animals were sacrificed after 24 hrs by means of spinal traction. The rat was kept on its back, the viscera was opened. The oesophagus end of the stomach was also ligated and then stomach was isolated by dissecting it beyond pyloric ligation. Then the stomach was cut open through its greater curvature and the contents were drained into a 50ml beaker and the stomach mucosa was washed with 1ml of distilled water. Into this beaker containing gastric juice (1ml), 9ml distilled water was added and then the contents were centrifuged for 10 min at 2000 rpm. Then the volume of the supernatant layer was measured. From these supernatant layer aliquots were taken for the determination of free acidity, total acidity and peptic acidity. The gastric mucosa was examined for ulcers by magnifying lenses.

Table 1: Effect of various extracts of Amaranthus spinosus in pyloric ligated ulcer model in rat (VGJ: Volume of gastric juice, TA: Total Acidity, FA: Free acidity, PA: Peptic activity)

Group	Treatment	VGJ (ml/100gm)	FA (mg/100gm)	TA (mg/100gm)	PA µmolTyrosine/100gm	Ulcer Index
I	Vehicle control	5.22±0.01014	2.7±0.0601[a]	12.4±0.0557[a]	2277.85±57.72[c]	5
II	PEAS 400mg/kg	4.32±0.654[a]	1.43±0.06[b]	2.8±0.042[b]	1576.03±0.049[c]	3
III	PEAS 800mg/kg	3.66±0.049[b]	1.47±0.049[a]	3.07±0.065[a]	1568.73±0.461[c]	3
IV	CEAS 400mg/kg	4.4±0.057[a]	1.8±0.057[b]	3.2±0.057[b]	1593.63±1.236[c]	3
V	CEAS 800mg/kg	4.4±0.06[a]	1.51±0.04[b]	2.63±0.049[b]	1575.62±1.001[c]	3
VI	EEAS 400mg/kg	4.15±0.042[a]	0.88±0.06[b]	1.8±0.057[b]	1406.65±1.148[c]	1
VII	EEAS800mg/kg	3.37±0.042[a]	1.0±0.062[a]	1.48±0.047[b]	1336.9±1.473[c]	0
VIII	Famotidine (2mg/kg)	1.7±0.036[a]	1.0±0.051[a]	1.35±0.061[a]	1378.55±0.96[c]	0

Results are expressed mean±SEM of six readings; Significance evaluated by one way analysis of variance(ANOVA) followed by dunnett's t-test versus control group

[a]P< 0.001, [b]P<0.005, [c]P<0.05, (n=6)



PEAS- Petroleum ether extracts of Amaranthus spinosus CEAS- Chloroform extract of Amaranthus spinosus EEAS- Ethanolic extract of Amaranthus spinosus

Figure 1: Graph showing effect of various extracts of A.spinosus on pyloric ligation ulcer model in rats % reduction of VGJ, TA, PA, FA, UI.

Total Acidity (TA)

A volume of 5ml diluted gastric juice was titrated with 0.01N Sodium hydroxide run from a micro burette using phenolphthalein as an indicator and the acidity was expressed as mg HCl/100 gm body weight of rat.

Free acidity (FA)

It is determined by using Topfer's reagent as an indicator and titrating with sodium hydroxide (0.01N) which was run until canary colour was observed. The free acidity was expressed as mg/100gm body weight.

Peptic activity (PA)

The method as followed by the Lowry et al 1951 was followed to estimate peptic activity and was expressed as µ mol Tyrosine/100gm body weight [4].

Ulcer Index (UI)

The method of Anderson and soman (1965) was followed for scoring the ulcer index.

RESULT AND DISCUSSION

Results are interpreted in table and figure. Famotidine significantly reduces the total acidity, free acidity, peptic activity and ulcer index by 90.56%, 70.37%, 43.79%, and 100% respectively at a concentration of 2mg/kg. In case of preliminary study with 200mg/kg, 400mg/kg, 800mg/kg of petroleum ether, chloroform and aqueous extracts of leaves of *Amaranthus spinosus* didn't show any remarkable inhibition of free acidity, total acidity, peptic activity, volume of gastric juice and ulcer index. The ethanolic extract at a dose of 800mg/kg body weight reduces the volume of gastric juice, free acidity, total acidity, peptic activity and ulcer index. Ulceration was inhibited by 60%, 80%, 100% in the concentration 200,400,800mg/kg respectively. Similarly percentage of inhibition of volume of gastric juice was estimated 25.67%, 32.94%, 35.44% respectively. Free acidity was reduced by 54.44%, 67.4%, 72.96% respectively. Likewise, total acidity 86.04%, 85.48%, 88.06% and peptic activity 34.4%, 38.24%, 41.3% reduces in concentration of 200, 400, 800 mg/kg body weight respectively. On the basis of observation it was confirmed that the active principle present in ethanolic extract of Amaranthus spinosus is responsible for reducing total acidity, free acidity, volume of gastric juice, peptic activity, ulcer index. As ethanolic extract of reduces the ulceration as compared to Famotidine. So, it may be inferred that there is reduction in HCl secretion as conformed by reducing acidity ($p<0.05$) and peptic activity ($p<0.01$). The active constituents present in 800mg/kg of ethanolic extract of Amaranthus spinosus completely inhibited the ulceration and gives protection as given by 2mg/kg body weight of Famotidine in Shay rat.

CONCLUSION

The ethanolic extract of *Amaranthus spinosus* completely inhibited the ulceration in Shay rat model as compared to results of Famotidine 2mg/kg. So, it may be inferred that inhibition of ulceration and acidity is may be due to reduced HCl secretion that is reducing acidity ($p<0.05$) and peptic activity ($p<0.01$).

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