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Use of *Astilbe rivularis* Buch.-Ham. ex D. Don as anti-peptic ulcer agent

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Abstract

Anti- peptic ulcer activity of the Eastern Himalayan plant *Astilbe rivularis* Buch.-Ham. ex D. Don (Saxifragaceae), was studied in peptic ulcer models in rats. Gastric and duodenal ulcers were induced by ethanol and cysteamine respectively. Results were compared with omeprazole, a known drug for peptic ulcer. It was found out that the species exerted anti-peptic ulcer activity against ethanol and cysteamine induced peptic ulcerations but the activity was less than that of omeprazole.

Keywords: *Astilbe rivularis*, peptic ulcer, ethanol, cysteamine, omeprazole

INTRODUCTION

Astilbe rivularis Buch.-Ham. ex D. Don (Saxifragaceae), is widely used in local and traditional medicines in Darjeeling and Sikkim parts of Eastern Himalaya and known as *Buro-okahti* in Nepalese and as *Pango* in Lepcha languages. The plant is commonly available in temperate Himalayas between 1700 – 2900 m altitude. Ethnically, this tall perennial herb is generally used against Dysentery, menstrual disorder, internal haemorrage and abdominal pain during childbirth by Das & Mandal (2003). Gurung (2002) also reported its use in peptic ulcer from Sikkim.

Tempted on the ethnic use of *Astilbe rivularis* it was thought to evaluate its anti-peptic ulcer activity scientifically in ethanol induced gastric ulcer as well as cysteamine induced duodenal ulcer models in albino rats.

Anti-ulcer activities of vegetables and herbs were known in literature (Sanyal *et al.* 1961; Mitra 1980, 1981; Akah *et al* 1999; Shetty et *al* 2000; Sairam *et al* 2001; Maity *et al* 2003). Mitra (1982, 1985, 2001) and Mitra & Mitra (2005) also reported the anti-ulcer activities of few other medicinal plants of Darjeeling and Sikkim Himalayas in different experimental ulcer models.

MATERIAL AND METHODS

***Experimental animals*:** Wistar strain albino rats (180 - 200 g) of either sex were used for the study. Rats were housed in colony cages (5 rats / cage) and were kept for at least a week in the experimental wing of the animal house (room temperature 25 – 28 degree centigrade and humidity 60 – 65% with 12 h light and dark cycle) before experimentation. Animals were fed on laboratory diet with water *ad libitum*. 8 rats were used for each set of experiment. The animal experiment was approved by the ethics committee of the Institute.

***Chemicals and drugs*:** Ethanol (Baroda Chemical ndustries Ltd., Dabhoi), cysteamine (Sigma Chemical Co., USA) and omeprazole (Kopran Pharma Ltd., Mumbai) were used in the study.
***Preparation of the test drug*:** Roots of *Astilbe rivularis* were collected from the traditional herbal practitioners. Roots were sundried and powdered. The powdered root was used as the test drug.

***Production of peptic ulcer*:**

(a) Ethanol induced gastric ulcer (Sairam *et al* 2001): Rats were fasted for 18 h when no food but water was supplied *ad libitum*. Gastric ulcers were induced by administering ethanol (95%, 1 mL/200 g body weight) orally. 1 h after administration of ethanol, animals were sacrificed by cervical dislocation and the stomach was taken out and incised along the greater curvature. Stomach was then examined for the presence of ulcers.

(b) Cysteamine induced duodenal ulcer (Parmar & Desai, 1993): To 18 h fasted rats (water was supplied *ad libitum*) cysteamine hydrochloride (400 mg/kg, p.o. in 10% aqueous solution) was administered in two doses at an interval of 4 h to produce duodenal ulcers. After 24 h of the first dose of cysteamine animals were sacrificed by cervical dislocation and the duodenum was excised carefully and opened along the antimesenteric side. Duodenum was then examined for the presence of ulcers.

Anti-ulcer study: Rats were divided into 3 major groups.

i. Drug treated control: In this group either ethanol or cysteamine was given.

ii. *Astilbe rivularis* and drug: Powdered root of *Astilbe rivularis* was given to the rats orally 30 minutes prior to administration of ethanol and 30 minutes before each dose of cysteamine hydrochloride. *Astilbe rivularis* was used in two doses, 1.0 and 2 g/kg.

iii. Omeprazole and drug: Omeprazole was given in the dose of 8 mg/kg p.o. 30 minutes prior to administration of ethanol and 30 minutes before each dose of cysteamine hydrochloride

Evaluation of ulcer index (Szelenyi & Thiemer, 1978): Gastric/ duodenal lesions were counted and the mean ulcerative index was calculated as follows :

I. Presence of edema, hyperemia and single sub mucosal punctiform hemorrhage.
II. Presence of sub mucosal hemorrhagic lesions with small erosions.
III. Presence of deep ulcer with erosions and invasive lesions.

Ulcer index = (number of lesion I) x 1 + (number of lesion II) x 2 + (number of lesion III) x 3.

Statistical analysis: Statistical analysis of the results was done by the method of Das & Bhattacharya (1974). P values less than 0.05 were considered significant.

RESULTS

Pretreatment of rats with *Astilbe rivularis* (1, 2 g/kg) produced dose dependant reduction of ulcer index in ethanol as well as in cysteamine treated rats when compared to control. Omeprazole produced significant protection in ulcer formation. The anti-ulcer activity of *Astilbe rivularis* was, however, less than that of omeprazole (Table 1).

Table 1: Showing effects of *Astilbe rivularis* and omeprazole against ethanol induced gastric ulcer and cysteamine induced duodenal ulcer in rats.

Group & Dose	**Ethanol (1 mL/200 g) Ulcer index (mean ± SEM)**	**Cysteamine(400 mg /kg) Ulcer index(mean ± SEM)**
Drug treated control	30.5 ± 1.51	22.6 ± 1.06
Astilbe rivularis (1 g / kg)	20.1 ± 0.90*	12.8 ± 0.64*
Astilbe rivularis (2 g / kg)	15.5 ± 0.75*	9.6 ± 0.44*
Omeprazole (8 mg / kg)	8.6 ± 0.33*	3.3 ± 0.20*

Values were mean ± SEM of 8 animals in each group. * $p < 0.001$ when compared to drug control.

DISCUSSION

Results showed that powdered root of *Astilbe rivularis* could protect significantly ($p < 0.001$) the animals from formation of gastric ulcers induced by ethanol and duodenal ulcers induced by cysteamine. The anti- peptic ulcer activity of this species was, however, less than that of omeprazole.

It is generally accepted that peptic ulcer results from an imbalance between aggressive factors (gastric acid) and the maintenance of mucosal integrity through the endogenous defense mechanisms (Piper & Stiel 1986). The role of *Astilbe rivularis* on gastric acidity and on gastric mucus in ethanol and cysteamine induced peptic ulceration in rats are under investigation in order to explain the possible mechanism of anti-peptic ulcer activity of the plant.

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