

Antiulcer Properties of Alcoholic Extract of *Cynodon dactylon* in Rats

M.B. Patil, S.S. Jalalpure and N.S. Prakash
K.L.E.S's College of Pharmacognosy
Belgaum, 590010 Karnataka
India

C.K. Kokate
Dept. of Pharmacognosy
Univ. College of Pharmaceutical Sciences
Kakatiya University
Warangal, 506009
India

S.S. Patil
Dept. of Pharmacognosy
K.M. Kundnani College of Pharmacy
Worli Sea Face, Worli, Mumbai
India

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Abstract

Alcoholic extract of Bermuda grass (*Cynodon dactylon*) was evaluated for preliminary identification of phytoconstituents and screened at 200, 400, and 600 mg/kg b.w given orally for pylorus ligated and indomethacin induced gastric ulcer models in albino rats. Results showed the presence of flavonoids and proteins. Alcoholic extracts at 400 mg/kg and 600 mg/kg showed significant ($p < 0.001$) antiulcer activity, comparable to the standard drug ranitidine, which may be due to the presence of flavonoids.

INTRODUCTION

Bermuda grass (*Cynodon dactylon*, Graminae) grows throughout India. The expressed juice of the plant is applied to bleeding cuts and wounds (Anonymous, 1959). It is used in bronchial pneumonia, meningitis and gastroenteritis (Karnick and Kulkarni, 1990). Aerial parts of Bermuda grass were reported to contain flavonoids (Nair, 1995) and demonstrated anticonvulsant (Odenigbo and Awochie, 1993), and antimicrobial (Ahmed et al., 1994) activities. The antiulcer activity of the alcoholic extract of herb was investigated in this study.

MATERIALS AND METHODS

Plant Material

Bermuda grass was procured from Pragati Pharma, Khade Bazaar of Belgaum and authenticated by Shri A.V. Kulkarni, Dept. of Biological sciences, G.S.S. College, Tilakwadi, Belgaum. Fresh green plants without roots were collected and made into a paste with water and transferred to round bottom flask fitted with a reflux condenser. It was then refluxed with alcohol (95%) for 3 h, filtered the solvent removed by distillation and the concentrate was evaporated to dryness on a water bath. The dried alcoholic extract was used for both preliminary phytochemical and pharmacological studies. [Test solution with few fragments of magnesium ribbon and Concentrated HCl shows pink to magenta red color confirming the presence of flavonoids (Kokate, 1999)].

Animals

A total of 36 Wistar albino rats (150-200 g) of either sex used in the establishment of the LD₅₀ and for screening study (Dept. of Live Stock production, Govt. Veterinary college, Hebbal, Bangalore, India) were kept in polypropylene cages in an air-conditioned area (25±2°C and 10/14 h light/dark cycle). They were provided with balanced feed (Amrut, Venkatesh Enterprises, Bangalore, India) and tap water *ad libitum*.

Indomethacin Induced Gastric Ulcers in Rats

Healthy male albino rats were divided into five groups (each group consisted of

six animals), for each pharmacological testing. Group (1) treated with vehicle saline (2 mL/kg p.o.); Group (2) treated with plant extract (200 mg/kg p.o.) and ulcerogenic materials; Group (3) treated with plant extract (400 mg/kg p.o.) and ulcerogenic materials; Group (4) treated with plant extract (600 mg/kg p.o.) and ulcerogenic materials; Group (5) treated with Ranitidine (30 mg/kg p.o.) and ulcerogenic materials.

Rats fasted for 24 h were given indomethacin (20 mg/kg p.o., Somogyi et al., 1969). The animals were treated with plant extract, control vehicle, or ranitidine 30 min. prior to the indomethacin treatment. The animals were sacrificed 7 h later and ulcer index calculated (Main and Whittle, 1975).

Pylorus Ligated Ulceration

Under light ether anaesthesia, pyloric ligation was made as described earlier (Shay et al., 1945; Sanyal et al., 1971) and ranitidine (30 mg/kg p.o.), vehicle saline (2 mL/kg p.o.) and alcoholic extract 200, 400 and 600 mg/kg were administered orally. After 4 h the animals were sacrificed, the cardiac end of the stomach ligated and the abdomen opened. The gastric juice was collected and the volume was measured. Total acidity was measured by titration following a standard method (Lowery et al., 1951). Each stomach was graded using the scoring system as given by Kunchandy et al. (1985).

Statistical Analysis

Data were analyzed using Student's 't' test (Kulkarni, 1989).

RESULTS AND DISCUSSION

Indomethacin Induced Gastric Ulcers in Rats

Presence of Flavonoids was confirmed by the Shinod's test in the alcoholic extract. The animals, which received 600 mg/kg alcoholic extract, exhibited maximum protection ($p < 0.001$), and those that received 200 and 400 mg/kg showed moderate protection ($p < 0.01$) compared to control. The results were comparable to that of the standard drug (ranitidine 30.0 mg/kg), which also offered maximum protection ($p < 0.001$).

Pylorus Ligated Ulceration

The ulcer score for alcoholic extracts at 400 and 600 mg/kg were 1.0 ± 0.3 and 0.6 ± 0.1 ; ($p < 0.001$), 200 mg/kg 1.4 ± 0.4 ($p < 0.001$), and the control 3.0 ± 0.0 .

The total acidity values (mEq/L) for alcoholic extract treated groups at 200, 400 and 600 mg/kg reduced ulcers ($p < 0.001$). There was also drastic reduction in gastric volume for all alcoholic extract treated groups, the parametric values were comparable to that of reference group (ranitidine 30 mg/kg p.o.).

CONCLUSION

Indomethacin is a non-steroidal anti-inflammatory drug (NSAIDS) known to induce ulcers during the course of action, i.e. prostaglandin synthesis inhibition through cyclooxygenase pathway and on production of leukotriens and other products of 5-lipoxygenase activity (Rainsford, 1987) or by back diffusion of H^+ ions into the mucosal cells (Devenport, 1969). The alcoholic extract inhibited ulceration by inhibiting output volume and total acidity. The ulcer healing activity of the plant extract may be due to antisecretory property associated with an enhancement of the local healing process, which was comparable with the standard drug ranitidine (H_2 -antagonist). Flavonoids are reported to have antiulcer activity. Aerial parts of Bermuda grass herb are reported to contain flavonoids (Nair, 1995). In the present study the preliminary phytochemical investigation of the alcoholic extract of Bermuda grass showed the presence of flavonoids, which may be responsible for the antiulcer property.

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Tables

Table 1. Effect of alcoholic extract of *Cynodon dactylon* on indomethacin induced gastric lesions in rats. All values are mean \pm SE, (n=6).

Group (n)	Dose	Ulcer index (mm)
Control	2 mL/kg of saline	1.50 \pm 0.13
Alcoholic extract	200 mg/kg	1.09 \pm 0.15*
Alcoholic extract	400 mg/kg	0.91 \pm 0.06*
Alcoholic extract	600 mg/kg	0.63 \pm 0.37**
Ranitidine	30 mg/kg	0.46 \pm 0.02**

** P<0.001, * P<0.01. Values are obtained by (vs. Control) Student's 't' test.

Table 2. Effect of alcoholic extract of *Cynodon dactylon* herb on gastric secretion and ulcer index in pylorus-ligated rats. All values are mean \pm SE, (n=6).

Group (n)	Dose	Volume (Gastric juices mL/100g)	Total acidity (m Eq/L)	Ulcer index (mm)
Control	2 mL/kg of saline	5.8 \pm 0.11	18.2 \pm 1.6	3.0 \pm 0.0
Alcoholic extract	200 mg/kg	3.0 \pm 0.20*	8.2 \pm 1.3**	1.4 \pm 0.4*
Alcoholic extract	400 mg/kg	2.4 \pm 0.15*	7.7 \pm 1.6**	1.0 \pm 0.3**
Alcoholic extract	600 mg/kg	2.0 \pm 0.22**	6.0 \pm 1.1**	0.6 \pm 0.11**
Ranitidine	30 mg/kg	1.6 \pm 0.12**	5.1 \pm 0.21**	0.5 \pm 0.0**

** P<0.001, * P<0.01. Values are obtained by (vs. Control) Student's 't' test.