



## EVALUATION OF THE ANTIULCER ACTIVITY OF LYOPHILIZED POWDER OF *CYNODON DACTYLON* IN PYLORIC LIGATION INDUCED GASTRIC ULCERS IN MALE ALBINO RATS

Veerabhadra Gowda\*<sup>1</sup>, Rajendra Holla<sup>1</sup>, Padma GMR<sup>2</sup>

<sup>1</sup>Department of Pharmacology, Melaka Manipal Medical College, Manipal, India.

<sup>2</sup>Department of Pharmacy Practice, College Of Pharmaceutical Sciences, Manipal, India.

### ABSTRACT

Evaluation of antiulcer effect of *Cynodon dactylon* was done in pyloric ligation induced gastric ulcers in rats. Animals were divided into 3 groups with 8 animals in each. After making an abdominal incision pyloric ligation was done. One hour before the procedure, normal saline, famotidine, and solution of lyophilized powder of *Cynodon dactylon* were administered orally to Group I, Group II, Group III and respectively. Animals were sacrificed 22 hours after pyloric ligation. Stomach was cut opened. Contents of the stomach were drained into a graduated centrifuge tube. Parameters observed are: Ulcer index, volume, pH, and free & total acidity of gastric juice. In this study *Cynodon dactylon* produced a significant reduction in the mean ulcer number, ulcer index & volume of gastric acid secretion, whereas reduction in mean ulcer size, free & total acidity were not statistically significant. Results of the study indicate that *Cynodon dactylon* has antiulcer effect.

**Key words:** *Cynodon dactylon*, Gastric ulcer & Pyloric ligation.

### INTRODUCTION

*Cynodon dactylon*, which belongs to *Cynodon* genus, is a hardy perennial plant with slender stems and green narrow slender leaves (Kirthikar & Basu BD, 1975; Nadkarni AK, 1976). This plant is distributed throughout India and worldwide by readily taking possession of any uncultivated area. It is a valuable pasture grass for fodder purpose. It has various names in different languages (Varier PS, Arya V, 1994) viz. Bahama or Bermuda grass in English, Durva in Sanskrit & Duba in Hindi.

This plant has various medicinal uses (Kirthikar & Basu BD, 1975). Expressed juice has astringent property, applied to bleeding cuts and wounds. It is found to be helpful in hysteria, insanity & epilepsy (Akah PA & Nwambie AI, 1993). Chloroform extract has potent antimicrobial action (Ahmed S *et al.*, 1994). Europeans use this plant for heartburn. Juice of this plant is being

used for peptic ulcer since ages (personnel communication). This plant is found to be effective in dyspeptic conditions in which established drugs fail to show any improvement. Based on these findings the first ever-scientific study is undertaken to evaluate the antiulcer property of juice of *Cynodon dactylon* in pyloric ligation induced gastric ulcers in rats.

### METHODS

#### Selection of animals

After approval by the institutional ethical committee, the study was conducted in healthy, male albino rats of wistar strain (150-200g). Animals were selected from an inbred colony maintained under controlled conditions of temperature (23±2<sup>o</sup>c), humidity and light in the animal house of Pharmacology department, Kasturba Medical College, Manipal. Animal care and handling was done according to the guidelines set by WHO, Geneva, Switzerland and INSA. Animals were allowed to fast by withdrawing food and water for 48 hours.

Corresponding Author

**Veerabhadra Gowda**

Email: [veera\\_gouda@yahoo.com](mailto:veera_gouda@yahoo.com)

**Source of Drugs** Famotidine (3.6 mg/kg, p.o.) was obtained from Sun pharmaceuticals, India.

### Preparation of the lyophilized powder of *Cynodon dactylon*

Fresh green Bahama grass was collected from the college campus garden in the month of September during the rainy days. Grass was cleaned and dried at room temperature and the juice was collected by a mixer. Approximately 25 ml of juice was obtained from 100g of the processed grass, which on lyophilization has yielded 1.25 g of dry powder.

### Toxicity studies

Toxicity studies were conducted to find out the maximum tolerated dose of *Cynodon dactylon* in rats. One tenth (1/10<sup>th</sup>) of the maximum tolerated dose i.e. 300mg/kg was used to study the antiulcer property of *Cynodon dactylon*.

### Antiulcer study in Pyloric ligation model

Animals were starved for 48 hours. Throughout the experimental period, the animals were housed individually in cages to prevent fighting, mutilation and contamination. Animals were divided into 3 groups with 8 animals each. Group-1 (control group) was administered 1ml normal saline, Group-2 Famotidine & Group-3 was administered freshly prepared solution of lyophilized powder of *Cynodon dactylon*, one hour before pyloric ligation.

Under light ether anesthesia, a midline abdominal incision was made extending from the xiphoid for a distance of about one-inch. The pyloric portion of the stomach was slightly lifted out and ligated. The

stomach was replaced carefully and the abdominal wall closed with interrupted sutures. Food and water were deprived after the postoperative period. The animals were sacrificed twenty-two hours after the pylorus ligation. The abdomen was opened, a ligature placed around the esophagus and stomach removed. The stomach contents were drained into a graduated centrifuge tube and stomach was isolated.

Parameters observed are:

1. Ulcer index.
2. Volume of gastric juice.
3. pH of gastric juice.
4. Free acidity & total acidity.

After opening the stomach, ulcer scoring was done by measuring the mean ulcer size, number and ulcer index. The graduated tube was centrifuged at 300 rpm for 10 minutes and the centrifuged sample was decanted and analyzed for the volume of gastric juice. pH of the centrifuged sample of gastric juice was measured using a digital pH meter, type DPH-100 (Dalal instrument). The free and total acidity were measured by titrating 0.1 ml of gastric juice with 0.01 N NaOH using topfer's reagent and phenolphthalein as indicators.

### RESULTS

In this study with comparison to control group, *Cynodon dactylon* has produced a significant reduction in mean ulcer number (5.37±0.42), ulcer index(49.75±5.04) & volume of gastric acid secretion (5.23+/-0.18). However reduction in ulcer size (8.5±0.87), free acidity (2.61+/-0.08) & total acidity (5.01+/-0.22) was not statistically significant. There was also a significant raise in pH(2.89+/-0.08)

**Table 1. Effect of Cynodon Dactylon On Ulcer Produced By Ibuprofen Values Represent Mean (±) SEM (Standard error of mean)**

GROUPS	DRUGS	DOSE (mg/kg)	MUN±SEM	MUS±SEM	MUI±SEM
I	Normal saline	—	13±1.637	28.5±4.29	409.88±93.80
II	Famotidine	3.6	2.38± 0.73 a ,b	3.25±1.05 a ,b	12.5±5.46 a
III	Misoprostol	0.072	1.0±0.37 a ,b	1.63±0.68 a ,b	3.37±1.96 a
IV	Cynodon dactylon	300	7.5±1.45 a	17±3.317	160.5±56.01 a

a-p < 0.05 v/s Group-1; b-p < 0.05 v/s Group-4; MUN-Mean ulcer number; MUS-Mean ulcer size; MUI-Mean ulcer index.

Famotidine produced a significant reduction in mean ulcer size (0.75±0.37), ulcer number(0.63 ±0.26) and ulcer index (1.0±0.5). Volume of gastric acid secretion (2.25+/-0.01), total acidity (0.85+/-0.04) and free acidity (2.56+/-0.19) were also reduced significantly with raise in pH (4.13+/-0.07).

### DISCUSSION

In this present study *Cynodon dactylon* has shown significant antiulcer effect in alcohol induced gastric ulcers. Of the several mechanisms involved, it is known that alcohol induces gastric ulcer predominantly. In addition several evidences implicate the role of free radicals and lipid peroxidation in gastric mucosal damage

caused by alcohol resulting in gastric ulcers [6-7]. Ibuprofen depresses gastric mucosal blood flow via the inhibition of prostaglandin synthesis. This leads to tissue hypoxia and ischemia, that in turn results in the production of superoxide radical (O<sub>2</sub><sup>-</sup>) and extensive free radical mediated tissue damage (Andrew H & Soll MD, 1990; Davies GR & Simmonds NJ, 1994).

In the present study, therefore the antiulcer activity of *Cynodon dactylon* could be due to the free radical scavenging activity or cytoprotection of gastric mucosa. In this study, in comparison to Misoprostol, *Cynodon dactylon* has reduced the gastric ulcer less effectively, indicating a little cytoprotection action on gastric mucosa. Therefore, to the larger extent antiulcer effect observed in this study is possibly due to its free radical scavenging activity.

In a recent study it is indicated that *Cynodon dactylon* inhibits lipid peroxidation significantly in certain tissues viz. liver, brain, lung & kidney (Chandraprabha D *et al.*, 1996). A study also has been done to isolate flavonoids apigenin and luteolin and their glycosides orientin, vitexin, isoorientin, and isovitexin from *Cynodon dactylon* plant leaves (Nair GA, 1995). Studies have shown that flavonoids have antiulcerogenic property

## REFERENCES

- Ahmed S, Reza MS, Haider SS and Jabbar A. Antimicrobial activity of *Cynodon Dactylon*. *Fitoterapia*, 6, 1994, 463-464.
- Akah PA & Nwambie AI. Nigerian plants with anticonvulsant property. *Fitoterapia*, 64, 1993, 42-44.
- Andrew H & Soll MD. Pathogenesis of peptic ulcer and implication of therapy. *N. Engl. J. Med.*, 322(13), 1990, 407-419.
- Chandraprabha D, Annapoorni S & Nirmala KM. Inhibition of lipid peroxidation by the selected medicinal plants. *The Ind J. Nutr. Dietet.*, 33(6), 1996, 128-132.
- Davies GR & Simmonds NJ. *Helicobacter pylori* stimulates antral mucosal reactive oxygen metabolite production *in vivo*. *Gut.*, 35, 1994, 179-185.
- Desai JK, Goyal RK and Parmar NS. Pathogenesis of peptic ulcer disease and current trends in therapy. *Indian.J.Physiol.Pharmacol.*, 41(1), 1997, 3-15.
- Kirthikar & Basu BD. *Cynodon dactylon*. *Indian medicinal plants*, 1975, 2689-2691.
- Mc Cord JM. Oxygen-derived free radicals in post ischemic tissue injury. *N.Engl.J.Med.*, 312, 1985, 159-163.
- Nadkarni AK. *Cynodon*. *Indian Materia Medica*, 1976, 425-426.
- Nair GA. Flavonoids of C.D. Seminar research in Ayurveda & Siddha. CCRAS, New delhi, 1995, 20-22.
- Reyes M, Martin C, Toro MV. Antiulcerogenicity of the flavonoid fraction from *Erica andevalensis* Cbezudo-Rivera? *Z Naturforsch [C]*, 51(7-8), 1996, 563-569.
- Varier PS, Arya V. *Cynodon dactylon* Pers. *Indian medicinal plants. A compendium of 500 plants*, 2, 1994, 289-290.

(Reyes M *et al.*, 1996).

## CONCLUSION AND SUMMARY

To conclude, the present study indicates that *Cynodon dactylon* has antiulcer effect in Ibuprofen-induced ulcer. This is possibly due to its flavonoid contents (Nair GA, 1995; Reyes M *et al.*, 1996). In consistence with previous study this effect can be ascribed to its antioxidant property also (Chandraprabha D *et al.*, 1996). However to substantiate the observed effect, further studies in different ulcer models are required.

## ACKNOWLEDGEMENTS

Authors would like to thank all the staff and Dr. K.L. Bairy, Professor and Head of Pharmacology, Kasturba Medical College, Manipal for providing all the materials and space to carry out this research work.