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Research Article

Evaluation of antiulcer activity of various aerial parts extracts of *Cynodon dactylon* on Paracetamol induced ulcers in albino rats

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ABSTRACT

The present study was aimed to evaluate the antiulcer activity of various extracts of aerial parts of *Cynodon dactylon* on paracetamol induced ulcers in Albino rats. The preliminary phytochemical studies were performed for various various extracts prepared from n-hexane, chloroform and methanol extracts in order to determine the various secondary metabolites. This study was undertaken to investigate the antiulcer potential of the different extracts (n-hexane, chloroform and methanol) of aerial parts of *Cyanodon dactylon* at 200, 400mg/kg b.w given orally for paracetamol induced gastric ulcer models in albino rats and ulcer index was calculated. Extracts of 400 mg/kg were showed significant antiulcer activity, comparable to the standard drug Pantoprazole.

Keywords: *Cynodon dactylon*; phytochemical; paracetamol; pantaprozole length of ulcers; ulcer index.

INTRODUCTION

Medicinal plants are the rich sources of many potent drugs and they are considering as a safer alternatives to the synthetic drugs. *Cynodon dactylon* (L.) Pers commonly called as a Doob in India, is a perennial grass belonging to the family of Poaceae (Singh et al., 2009). It has different pharmacological actions like antidiabetic, antioxidant, antidiarrheal, hepatoprotective, immunomodulatory, CNS depressant, antimicrobial, germicidal activities (Abhishek and Anita, 2012), anti - inflammatory (Gouri et al., 2013), cardioprotective, antitumor, antibacterial, anthelmintic, antiarthritic, analgesic and antipyretic activities. Ulcers are one of the commonest set of disorders characterized by well circumscribed mucosal defects, found in the portions of GIT that exposed to acid and pepsin component of gastric juice in the stomach and duodenum (Saroja and Annapoorani, 2012).

Literature reports revealed that the research has been done on antiulcer activity against pyloric ligation induced gastric ulcers (Suresh et al., 2012; Veerabhadra et al., 2015), ethanol, indomethacin (Ramesh, 2013), aspirin induced gastric ulcers using *Cynodon dactylon* extracts (Suresh et al., 2012). Hence, the present study was undertaken to evaluate the antiulcer activity of different extracts of *Cynodon dactylon* against the paracetamol induced gastric ulcers.

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MATERIALS AND METHODS

Experimental animals

Albino rats of weighing between 150-200 gm were obtained from National Institute of Nutrition, Hyderabad, India and were used in this study. The animals were maintained under standard conditions in animal house (Venkateswarlu et al., 2015).

Preparation of plant extract and Preliminary Photochemical screening

The aerial parts of the collected plant material was sun dried, pulverized by a mechanical grinder, sieved through 40 mesh. About 40gm of powdered material was extracted with the solvents like n-hexane, petroleum ether, chloroform, ethyl acetate and methanol using soxhlet apparatus. The extraction was carried out until the extractive becomes colorless. The extract was then concentration by distillation process and dried under reduced pressure. The free powdered mass thus obtained was used for further study.

One gram of the powdered plant material of aerial parts of *Cynodon dactylon* was dissolved in 100ml of its own mother solvents to obtain a stock of concentration 1% (v/v) and it was subjected to preliminary phytochemical screening by following the standard procedure (Venkateswarlu et al., 2015).

Acute toxicity study

Adult healthy male and female albino rats were obtained from the National Institute of Nutrition, Hyderabad, India. The albino wistar rats (150-200 gm) were maintained in a 1 h light/dark cycle at a constant temperature of 25°C with free access to feed and water. The animals were assigned equally each into three groups labeled as vehicle (CMC); 0.5 gm/kg body

Table 1: Phytochemical evaluation

Test	n-Hexane	Petroleum ether	Chloroform	Ethyl acetate	Methanol
Carbohydrates	+	+	+	+	-
Proteins	+	+	+	+	+
Amino acids	-	+	+	+	-
Glycosides	-	-	-	-	-
Alkaloids	-	-	+	+	+
Tannins	-	-	-	-	+
Volatile oils	-	-	-	-	-
Flavonoids	+	+	+	+	+
Steroids	+	+	+	-	+
Saponins	+	-	+	+	+

(+) Presence, (-) Absence

Table 2: Ulcer index of Group I animals

Rat No.	No. of Ulcers	Length of ulcers (cm)	Ulcer index (UI)
1	10	1.12	11.79
2	12	1.19	12.77
3	11	1.21	11.17
4	10	1.18	10.16
5	10	1.22	10.36
6	11	1.17	9.35

Table 3: Ulcer index of Group II animals

Rat No.	No. of Ulcers	Length of ulcers (cm)	Ulcer index (UI)
1	9	0.82	11.23
2	11	0.79	9.43
3	10	0.81	10.01
4	12	0.76	9.61
5	8	0.84	9.09
6	10	0.81	9.80

Table 4: Ulcer index of Group III animals

Rat No.	No. of Ulcers	Length of ulcers (cm)	Ulcer index (UI)
1	8	1.3	10.52
2	9	1.2	9.83
3	11	1.2	10.41
4	10	1.3	11.10
5	10	1.1	10.30
6	8	1.2	10.30

Table 5: Ulcer index of Group IV animals

Rat No.	No. of Ulcers	Length of ulcers(cm)	Ulcer index (UI)
1	10	1.3	10.30
2	11	1.2	9.91
3	8	1.1	9.87
4	9	1.0	10.28
5	10	1.1	9.88
6	9	1.2	10.28

weight and 2 gm/kg body weight of *Cynodon dactylon* extract preparation, respectively. The animals were fasted overnight (food but not water) prior to the dosing and also food was withheld for a further 3-4 h after dosing. Initially the animals were observed for 30 min and 2, 4, 8, 24, 48 h after the administration for the onset of clinical or toxicological symptoms. **Ulcer induction and antiulcer activity**

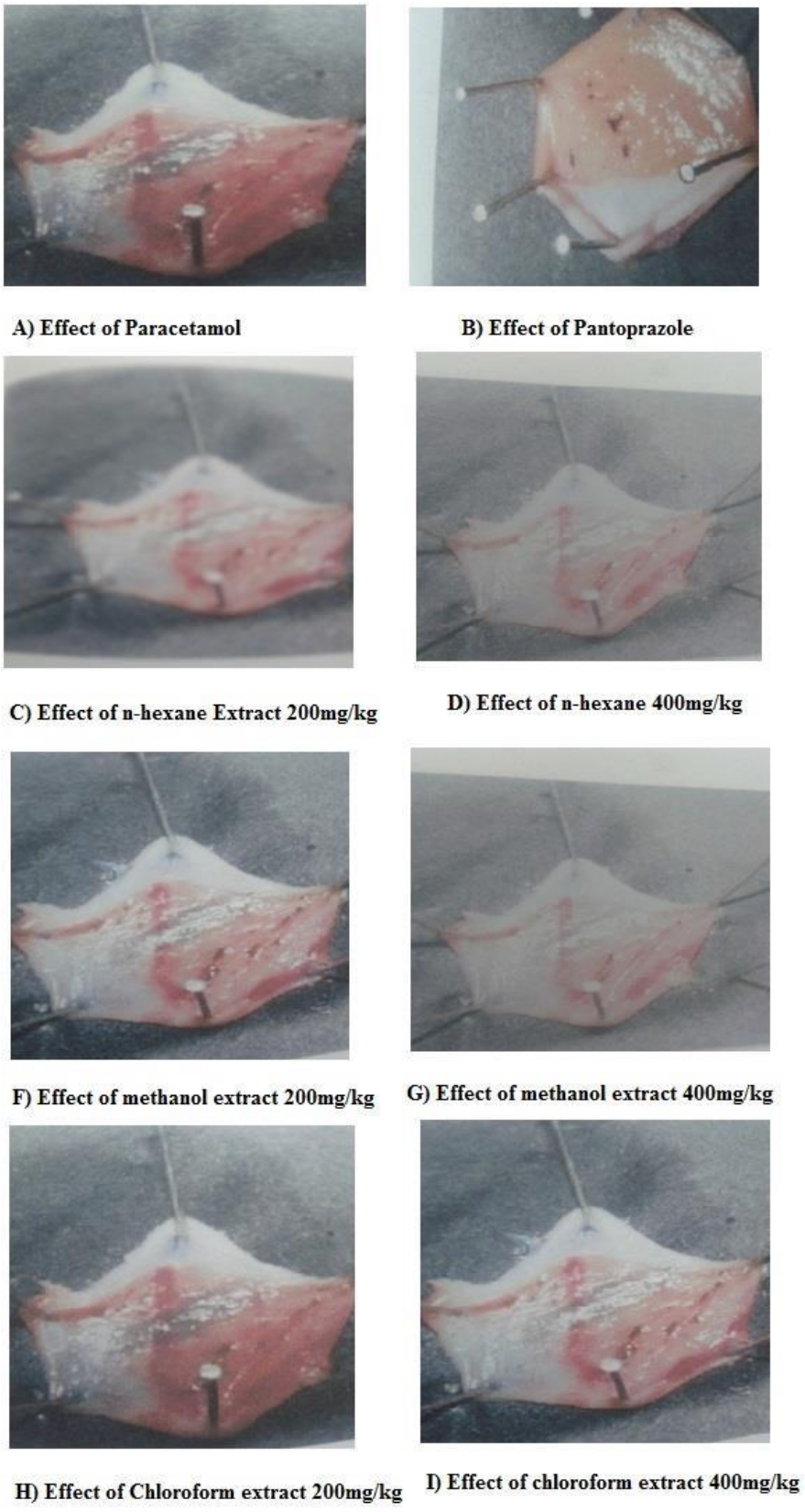

Figure 1: Effect of different treatments on albino rats

Pantoprazole (240 mg/kg body weight) and Paracetamol (200 mg/kg body weight) were used as standard and control drugs respectively. The test samples were suspended in 1% CMC. The entire sample was administered through oral route using oral feeding needle.

Experimental design

In the paracetamol induced ulcer experiments, eight groups of wistar rats (150-200gm) with each group consisting of six animals were used.

Table 6: Ulcer index of Group V animals

Rat No	No. of Ulcers	Length of ulcers(cm)	Ulcer index(UI)
1	9	1.2	9.80
2	11	1.1	10.52
3	10	1.2	11.1
4	11	1.1	9.98
5	8	1.0	10.49
6	12	0.9	10.33

Table 7: Ulcer index of Group VI animals

Rat No.	No. of Ulcers	Length of ulcers(cm)	Ulcer index(UI)
1	11	1.1	10.32
2	10	1.0	9.9
3	8	.9	10.21
4	9	1.1	9.85
5	11	1.0	9.77
6	12	1.2	10.35

Table 8: Ulcer index of Group VII animals

Rat No.	No. of Ulcers	Length of ulcers(cm)	Ulcer index(UI)
1	11	1.1	10.5
2	12	1.2	9.87
3	9	1.0	10.32
4	10	0.9	10.21
5	11	1.1	9.9
6	10	1.0	9.6

Table 9: Ulcer index of Group VIII animals

Rat No.	No. of Ulcers	Length of ulcers(cm)	Ulcer index(UI)
1	10	0.89	10.5
2	9	0.76	9.8
3	10	0.85	10
4	9	0.79	9.85
5	8	0.84	9.61
6	10	0.77	9.23

Group 1: Control CMC group – 1% Solution 1ml/kg

Group 2: Standard Pantoprazole (240mg/kg BW) in 1% CMC solution

Group 3: Paracetamol (200 mg/kg BW) and n-hexane extract (200 mg/kg BW)

Group 4: Paracetamol (200 mg/kg BW) and n-hexane extract (400 mg/kg BW)

Group 5: Paracetamol (200 mg/kg BW) and chloroform extract (200 mg/kg BW)

Group 6: Paracetamol (200 mg/kg BW) and chloroform extract (400 mg/kg BW)

Group 7: Paracetamol (200 mg/kg BW) and methanolic extract (200 mg/kg BW)

Group 8: Paracetamol (200 mg/kg BW) and methanolic extract (400 mg/kg BW)

The first group was received the control drug Paracetamol (200 mg/kg BW) as a suspension in 1% CMC and the second group received the standard drug Pantoprazole (240mg/kg BW) as a suspension in 1% CMC. The 3, 4, 5, 6, 7 and 8 groups received the different doses of extracts as suspension in 1% CMC (200mg/kg and 400mg/kg). Ulcer was produced by administration of suspension of paracetamol (a dose of 200 mg/kg orally). The animals were sacri ficed 4 h later and stomach was opened and length of ulcers, number of ulcers formed, ulcer score and ulcer index were measured.

Determination of Ulcer Index (UI)

Each lesion of the stomach was measured along its greatest length and breath. For circular lesions, diameter was measured and finally area was calculated. In case of **petechies,** five of them considered to be equivalent to 1 mm^2 of ulcerated area. The total area of the stomach and that of ulcerated mucosa were calculated.

$$Ulcer\ Index = \frac{10}{X}$$

Where, X = Total mucosal area / Total ulcerated area

RESULTS

The preliminary phyochemical screening of *Cyanodon dactylon* extracts showed the presence of flavonoids, steroids/ triterpenoids, carbohydrates, fixed oils, fats, and alkaloids, which indicates that this extract will have a different pharmacological actions (Table 1). In this study, effect of n-hexane, chloroform and methanolic extracts of *Cynodon dactylon* pers on ulcerogenic potential of paracetomol was studied. The extracts exhibited antiulcer potential showed dose dependant increase in reducing the ulcers that was comparable to the standard drug Pantoprazole. It was evident from the present study that the n-hexane, chloroform and methanolic extracts at a dose of 400 mg/kg BW exhibited a greater ulcer protective activity than the dose of 200 mg/kg BW (Table 2-9 & Figure 1).

DISCUSSION

Plants have been widely used as curative agents for variety of ailments. Pharmacognostical properties and phytochemistry in different extracts of *Cynodon dactylon* reveals the presence of different phytochemical constituents which might provide incentive for the proper evaluation of the use of the plant in medicine. The preliminary screening of *Cynodon dactylon* extracts showed the presence of flavonoids, steroids/triterpenoids, carbohydrates, fixed oils, fats, alkaloids and phenolic glycosides. It was reported that the presence of flavonoids is known to be bioactive for the management of ulcer.

The results obtained from the present study show that the aerial parts of *Cynodon dactylon* appears to be an attractive material for further studies, leading to possible drug development for ulcer. Development of phytomedicine is relatively less expensive and less time consuming. Hence, it is more suited to our economic conditions than allopathic drug development which is more expensive and spread over several years and several lives.

From the results, it was observed that the *Cynodon dactylon* has the potential in management of ulcer. These results give a path for the further use of *Cynodon dactylon* in folklore medicine for the treatment of ulcers.

CONCLUSION

From the results, it has been concluded that the n-hexane, methanol, Chloroform extracts of *Cynodon dactylon* aerial parts have a potential in management of ulcers and have beneficial effects in reducing the gastric acid secretion levels in ulcerated rats. Hence, it appears to be an attractive material for further studies, leading to possible drug development for ulcers.

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