INDIGENOUS EFFECT OF CYNODON DACTYLON IN EXPERIMENTAL INDUCED ULCERS AND GASTRIC SECRETIONS
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ABSTRACT
Cynodon dactylon is a perimneal grass, the plant is a rich source of metabolites such as proteins, carbohydrates mineral constituents, β-sitosterols, flavinoids, alkaloids, glycosides and triterpenoids the plant has been long used in traditional medicines to treat various ailments it also has antiviral and antimicrobial properties but none has proved its efficacy in evaluating gastro protective activity so we had made an attempt to evaluate the gastroprotective effect of extract of Cynodon dactylon in albino rats. The experiment was set up using male albino wistar rats weighing 150-180gms. These were further divided evenly into different treatment groups. The extract of Cynodon dactylon was investigated for its anti-ulcer activity against pylorus ligation, aspirin induced and ethanol induced gastric ulcer in rats at 100,200, 300mg/kg body weight. Histopathological assessment of rat stomach was carried out. A significant reduction (p<0.01) in ulcer index was seen in Cynodon dactylon extract treated rats of pylorus ligation, aspirin induced and ethanol induced gastric ulcer models. The gastroprotective effect was further confirmed by histopathological examination of rat stomach. Thus the present study concludes the Cynodon dactylon extract having potential gastroprotective effect in the three models tested.

Key words: cynodon dactylon, ulcer, gastric secretion, ulcer index

INTRODUCTION
Plants have been a source of inspiration for medicinal property with novel drug compounds, as they possess derived medicines and have made contributions to human health and well being. As India being developing country we are still utilising crude plant extracts as medicine since Vedic period. A majority of the population in developing countries still uses traditional folk medicine obtained from plant resources1. Among numerous plant species growing in India, Doob Ghas, or Durva or taxonomically the Cynodon dactylon (L.) Pers. family (Graminaceae/ poaceae) occupies its unique place and key position in ethnomedicinal practices and traditional medical (Ayurvedic, Unani, Nepalese, and Chinese) knowledge systems. The herbal preparations of this grass based on folklore was used in traditional system in India.2 According to Ayurveda, Cynodon plant is pungent, bitter, fragrant, heating, appetizer, vulnerary, anthelmintic, antipyretic, alexiteric. It destroys fowlness of breath, useful in leucoderma, bronchitis, piles, asthma, tumors, and enlargement of the spleen. This plant also posses antimicrobial, and antiviral activity,3 and has also been used to treat urinary tract infection, calculi and prostatitis, aqueous plant extract is used as anti-inflammatory, diuretic, antimicrobial and purifying agent.3 It also has significant application in treating dysentery, dropsy and secondary syphilis.5 Cynodon dactylon has been used as an antidiabetic agent in traditional system of medicine in India6. The objective of this investigation was to ascertain the scientific basis of Cynodon dactylon and its use in treatment of ulcer. The present investigation reports the antiulcer activity of the extract of Cynodon dactylon on which there is no previous data available.

Ulcers are one of the commonest set of disorders characterized by well circumscribed mucosal defects, found in portions of gastrointestinal tract that exposed to acid and pepsin component of gastric juice in the stomach and duodenum.7. The identification of H. pylori infections in virtually all patients with duodenal ulcers and about 70% of those with gastric ulcers were seen8.

Preparation of Cynodon dactylon extract
Clean dry plant samples were collected in a cotton bags. The materials were grinded to fine powder with the help of mixer grinder. Then these powdered materials were used for Preparation of extract. Bermuda grass was procured from the local area of Sri Andavan College of Sciences, Thiruvanaiakaval, Trichy and authenticated by, Prof & H.O.D, Dept. of Botany. Fresh green leaf blade without roots were collected shade dried and made into a dry powder and transferred to round bottom flask fitted with a reflux condenser. It was then refluxed with alcohol (95%) for 3 hrs, filtered the solvent removed by distillation and the concentrate was evaporated to dryness at room temperature. 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 colour confirming the presence of flavonoids7.

Acute toxicity test LD 50
Albino rats of Wistar healthy adult male weighed in between 150 - 180 g. The animals were given standard rat pellets and tap water and libitum. The acute toxic study was used to determine a safe dose for the Cynodon dactylon extract. Thirty rats (6 males) in each group were assigned equally each into 5 groups (0.25% w/v, 5 ml/kg); 100,200 and 300 mg/kg of Cynodon dactylon leaf extract preparation,
respectively. The animals were fasted overnight (food but not water) prior to dosing. Food was withheld for a further 3 to 4 h after dosing. The animals were observed for 30 min and 2, 4, 8, 24 and 48 h after the administration for the onset of clinical or toxicological symptoms. Mortality, if any was observed over a period of 2 weeks. The acute toxicity LD50 was calculated as the geometric mean of the dose that resulted in 100% lethality and that which caused no lethality at all. The animals were sacrificed on the 15th day. Hematological and serum biochemical parameters were determined following standard methods.\textsuperscript{10}

**MATERIALS & METHODS**

The present study was conducted at Sri Andavan college of sciences, Thiruvanaikaval, Trichy after obtaining permission from the Institutional animal ethics committee (Regd. No. SACAS 1058/PO/ac/10/CPCSEA) before carrying out experiments.

**Animals model**

Albino male wistar rats variety 30 in number weighing 150-180gms were used in the experiment. The rats were evenly divided into different treatment groups. The present study followed three approaches of antiulcerogenic mechanism of plant extracts

1) Pylorius ligation  
2) Aspirin induced  
3) Ethanol induced

**Pylorius ligation method**

Animals were divided into 5 groups with 6 animals in each group. All the animals in group I received normal saline & group II receives omeprazole (20mg/kg) as standard & group III was further divided into three groups A,B,C receives Cynodon dactylon (100,200,300mg/kg) for 7 days along with standard diet before pylorus ligation.\textsuperscript{11} On the seventh day, half an hour after saline or drug treatment in 36 hours fasted rats, pylorus was ligated under light ether anaesthesia as per the method.\textsuperscript{12} Post operative period was deprived of food and water and after 6 hours animals were sacrificed by ether overdosing and stomach was dissected out after ligating its cardiac end and cut open along the greater curvature, stomach contents are collected and measured for volume, centrifuged and subjected to analysis for total acidity and inner surface is examined for any ulceration both macroscopically and microscopically. The ulcer index was calculated as by the method.\textsuperscript{13} The gastric juice was collected after 6 hours of pyloric ligation as described by.\textsuperscript{14} The total acidity of the gastric juice was determined as per.\textsuperscript{15}

\[
\text{Acidity} = \frac{\text{volume of NaOH} \times \text{Normality} \times 100 \text{ m Eq/L} \times 100 \text{gm}}{0.1}
\]

**Aspirin induced method**

Aspirin is suspended in 1% carboxy methyl cellulose in water (20 mg/ml) and administered orally (gavage) in a dose of 100,200,300 mg/kg in 36 hours fasted rats in all the 3 groups. Along with aspirin Group I receives normal saline as control, Group II receives omeprazole (20mg/kg) as standard & Group III was further divided into three groups A,B,C receives Cynodon dactylon (100,200,300mg/kg). Four hours later the animals are sacrificed. The stomachs are removed and opened along the greater curvature to determine the ulcer index.\textsuperscript{16}

**Ethanol induced method**

Group I received 1ml ethanol (99.9%) and was taken as control; Group II received omeprazole 20mg/kg once daily orally for six days and 30min prior to ulcerogen on the seventh day. Group III received Cynodon dactylon extract (100,200,300mg/kg) once daily for seven days and 30min prior to ulcerogen on seventh day. The animals in all the groups were fasted for 24hrs prior to the administration of ulcerogen, with water ad libitum. Animals were sacrificed one hour after the administration of ethanol and stomach was dissected out and examined for ulceration. Ulcer indices were calculated as described.\textsuperscript{16}

**Statistical Analysis**

Results were analysed by one way analysis of variance (ANOVA), followed by Dunnet’s multiple comparison test. All the results are expressed as Mean ± SD. Significance was established when the probability value was less than 0.05.

**Histopathology**

After macroscopic examination, the stomachs were immersed in 10% formalin solution for 24 hours. A strip of gastric wall was cut from the fore stomach to the pylorus through the entire glandular mucosa, necessarily including red streaks or sites of ulceration. This sample was subsequently processed for the preparation of sections (4-5mm thick) after embedding in paraffin wax and staining with haematoxylin and eosin using routine techniques.

**RESULTS**

In pylorus ligation induced gastric ulcer Cynodon dactylon has shown significant reduction in ulcer index when compared to that of the control. Whereas the decrease in gastric secretion volume & total acidity are not significant. It is also observed that ulcer index is significantly high in aspirin induced & ethanol induced peptic ulcer group as compared to the Cynodon dactylon extract treated group which shows marked reduction(p<0.01) in gastric lesions. In histopathological examination of stomach specimens of control group from all the models it was seen that there was extensive gastric damage, even involving all the layers of the stomach wall in some regions. The mucosal epithelial cells were completely eroded and there was severe infiltration by inflammatory cells. The submucosal layer was edematous and enlarged blood vessels could be seen. The muscular layer was also edematous. However the groups treated with Cynodon dactylon extract and Omeprazole did not show any such findings of that extensive gastric damage.

**DISCUSSION**

In the present study there is significant reduction (p <0.01) in ulcer index in all the three models of gastric ulcer induction namely pylorus ligation, aspirin induced and ethanol induced models.

Increased vascular permeability as a result of endothelial lesions occur very early (within 1min) in ethanol induced injury.\textsuperscript{17} Further, gastric lesions caused by ethanol have been attributed to free radical damage which results in lipid peroxidation products.\textsuperscript{18}

Cynodon dactylon has shown significant protection against ethanol induced gastric lesions. Cynodon dactylon has been shown to inhibit lipid peroxidation by scavenging superoxide and hydroxyl radicals as seen in a study.\textsuperscript{19} Cynodon dactylon extract might have protected the gastric mucosa probably by the above mechanism.

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 Omeprazole (H2-antagonist). Flavonoids are reported to have antiulcer activity. Aerial parts of Bermuda grass herb are reported to contain flavonoids.\textsuperscript{20} In the present study the preliminary
Conclusions

Thus the present study concludes the Cynodon dactylon extract have potential gastro protective effect in ulcerative colitis & gastro protective effect. Most of the anti-secretory drugs reduce acid secretion, thus giving immediate symptomatic relief, but there are reports of adverse effects and relapses in the long run. On the contrary natural drugs reduce acid secretion, thus giving immediate symptomatic relief, but there are reports of adverse effects and toxicity. Cynodon dactylon & gastro protective effect in rats. gastroprotective effect in rats. The Indian medicinal plants deserve special attention as they have long history of use in traditional and Ayurvedic medicinal systems and are largely devoid of adverse effects and toxicity. Cynodon dactylon is one such plant with multitude of medicinal properties giving us reason to cheer and engage in more such studies.

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References

FIG–II

OBSERVATIONS

Table –I

Effect of *cynodon doctylon* extract on gastric secretion, total acidity & ulcer index in Pylorus ligated rats, aspirin induced method & ethanol induced methods:

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Gastric secretion Mean ± SD</th>
<th>Total acidity (mEq/l/100gm)</th>
<th>Ulcer Index Mean ±SD (By aspirin induced method)</th>
<th>Ulcer Index Mean ±SD (By ethanol induced method)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Normal saline</td>
<td>3.633 ± 0.62</td>
<td>89.53 ± 4.35</td>
<td>0.1809 ± 0.048</td>
<td>0.4305 ± 0.06</td>
</tr>
<tr>
<td>II</td>
<td>Omeprazole (20mg/kg)</td>
<td>1.816 ± 0.360 *</td>
<td>54.26 ± 4.68 *</td>
<td>0.0274 ± 0.0045*</td>
<td>0.0736±0.01*</td>
</tr>
<tr>
<td>IIIA</td>
<td><em>cynodon doctylon</em> (100mg/kg)</td>
<td>2.343 ± 0.210 *</td>
<td>78.6 ± 3.325 *</td>
<td>0.0316 ± 0.0019*</td>
<td>0.0625± 0.01*</td>
</tr>
<tr>
<td>B.</td>
<td><em>cynodon doctylon</em> (200mg/kg)</td>
<td>2.683 ± 0.286 *</td>
<td>79.6 ± 3.55 *</td>
<td>0.0416 ± 0.0049*</td>
<td>0.0654± 0.01*</td>
</tr>
<tr>
<td>C.</td>
<td><em>cynodon doctylon</em> (300mg/kg)</td>
<td>2.983 ± 0.491 *</td>
<td>83.6 ± 4.35 *</td>
<td>0.0516 ± 0.0089*</td>
<td>0.0797± 0.01*</td>
</tr>
</tbody>
</table>

Values are mean ± SD; (n = 6)

* p < 0.01 when compared with control
+ p > 0.05 when compared with control

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