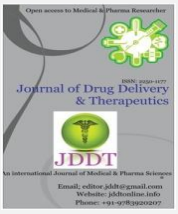
Available online on 25.12.2017 at http://jddtonline.info

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research



Open Access Research Article

Evaluation of Antidiarrheal Activity of Methanolic Extract of *Daemia extensa* R. Br. Seeds

Praveen Sharma, Sachin Kumar Jain, Neelam Balekar

IPS Academy College of Pharmacy, Rajendra Nagar, AB Road, Indore, MP, India, 452012

E-mail address: praveensharmacop@gmail.com

ABSTRACT

Diarrhea is one of the most general causes for thousands of deaths each year. Consequently, identification of new source of antidiarrheal drugs becomes one of the most prominent focuses in modern research. Our aim was to investigate the antidiarrheal activity of methanolic extract of *Daemia extensa* R. Br. (MEDE) leaves in rats. Antidiarrheal effect was evaluated by using castor oil-induced diarrhea at 200 mg/kg and 400 mg/kg body weight in rats where the extract showed considerable antidiarrheal effect by inhibiting 49.47% and 62.85% of diarrheal period at the doses of 200 and 400mg/kg, correspondingly These observed effects are comparable to that of standard drug loperamide (5mg/kg). So these results indicate that bioactive compounds are present in methanolic extract of *Daemia extensa* leaves including significant anti-diarrheal activity and could be accounted for pharmacological effects.

Cite this article as: Sharma P, Jain SK, Balekar N, Evaluation of Antidiarrheal Activity of Methanolic Extract of Daemia extensa R. Br. Seeds, Journal of Drug Delivery and Therapeutics. 2017; 7(7):216-217

INTRODUCTION:

Due to unhygienic livelihood situation, peoples of the third world counties are very prone to numerous common diseases including diarrhea. According to the World Health Organization (WHO), diarrhea is the second foremost reason of death of children less than five years of age [1]. During diarrhea, the normal bowel association becomes changed, which results in an increase in water content, volume, or frequency of the stools [2]. Despite the efforts of international organizations to control this disease, still the incidence of diarrhea is very high [3, 4]. Some antibiotics are used as antidiarrheal drug, but these drugs sometimes show some adverse effects and microorganisms are tend to enlarge resistance towards them [5]. Consequently the investigation for safe and more successful agents from plant origin has continuous to be an important area of active research. Many plant species have been screened for substances with therapeutic activity. For the treatment of diarrhea, medicinal plants are a potential source of antidiarrheal drugs.

MATERIALS AND METHODS:

Collection of plant materials

Fresh seeds of *Daemia extensa* were collected locally from the Indore district of Madhya Pradesh and identified by Department of Botany, Government Degree College Indore and submitted to department. The seeds were shade dried and were crush to moderately coarse powder.

Preparation of extract

The freshly collected seed were dried under shade, sliced into small pieces, pulverized using a mechanical grinder and passed through 40 mach sieve, and preserved in air tight container for further use. The powdered seed were extracted with 95% methanol. After exhaustive extraction, the extract was concentrated by distillation procedure. A brownish black colored residue was obtained (yield 19.8% w/w), which was kept in a desiccators. This methanolic extract of *Daemia extensa* seed (DES) was used in further experiments.

Experimental Animals

Albino Wistar rats of both sex weighing between 150-250 g were used. The experimental etiquette was permitted from Institutional Animal Ethics Committee. Animals were housed under standard conditions of temperature (24 ± 2°C) and relative humidity (30-70%) with a 12:12 light: dark cycle. The animals were specified diet and water *ad libitum.*

Acute toxicity studies

Acute toxicity was carried out as per the Committee for the Purpose of Control and Supervision on Experiments on Animals (CPCSEA) and Organization for Economic Cooperation and Development (OECD). Group of three

rats weighing between 22-30 g were selected and kept for 3-4 hrs fasting with free access to water. Doses were calculated according to body weight and seed extracts were dissolved in rice bran oil and administered orally at a starting dose of 2000 mg/kg and were observed for 24 hours.

Castor Oil-Induced Diarrhea in Rats

Rats of both sexes (95–100 g) were fasted for 18 hours. The selected rats for castor oil-induced diarrheal test were separated into four groups (n = 5). Group I was given normal saline (2 mL/kg) orally as control group and Group II received loperamide (5 mg/kg) as standard group. Groups III-IV received MEDE (200 and 400 mg/kg b. wt. i.p.). After 1 h, all groups received castor oil 1mL each orally. Then they were positioned in cages lined with adsorbent papers and pragmatic for 4h for the presence of characteristic diarrheal compost. The 100% was measured as the total number of feces of control group. The activity was articulated as % inhibition of diarrhea. The percent (%) inhibition of defecation was measured.

Gastrointestinal Motility Test

This test was done according to the method of Mascolo et al. and Rahman *et al.* For this test, selected rats were divided into four groups of six rats in each. At first, 1mL castor oil was given orally in every rat of each group to produce diarrhea. After 1 h, Group I (control group) received saline (2 ml/kg) orally. Group II received standard drug (loperamide 5mg/kg b. wt. i.p) and Groups III-IV (the rest of the two groups) received MEDE (200 and 400mg/kg b. wt. i.p. resp.). After 1 h, all animals received 1mL of charcoal meal (10% charcoal suspension in 5% gum acacia) orally. One hour after following the charcoal meal administration, all animals were sacrificed and the distance covered by the charcoal meal in the intestine, from the pylorus to the caecum, was measured and expressed as percentage of distance moved.

Statistical Analysis

The data are characterized as mean ± S.E.M, and statistical significance was carried out retaining one way analysis of variance (ANOVA) followed by Dunnett t-test where $p<0.05$ was measured statistically momentous using Graph pad 5 software.

RESULTS AND DISCUSSION:

Castor Oil-Induced Diarrhea

In case of castor oil induced diarrheal test, the methanol extract of *Daemia extensa* showed a marked antidiarrheal effect in the rats (Table 1). In both doses, 200 mg/kg and 400 mg/kg, extract produced momentous ($p < 0.01$) defecation. The seed extract doses of 200 mg/kg and 400 mg/kg decrease the total amount of wet feces produced upon administration of castor oil (6.33 ± 0.93 and 5.79 ± 0.52 g) at doses 200 mg/kg and 400 mg/kg compared to the control group (5.00 ± 0.33 g) at the dose of 5 mg/kg.

Table 1: Anti diarrheal activity of ethanolic extract of *Daemia extensa* on castor oil- induced Diarrhea in rats

Treatment	Dose	Total number of feces	% inhibition of defecation	Total number of diarrheal feces	% inhibition of diarrhea
Castor oil + saline	2ml/kgp.o.	19.07±3.14	--	10.5±0.34	1.7±0.08
Castor oil + Loperamide	5 mg/kg i.p	8.05±0.74[a]	60.60	4.98±0.12	4.8±0.07
Castor oil + seed extract	200 mg/kg i.p	12.56±1.25 [a]	40.95	7.98±0.16	49.67±0.15
Castor oil + seed extract	400 mg/kg i.p	9.68±0.76 [a]	52.04	5.05±0.18	62.85±0.08

Mean ± SEM (n = 6). Significant at [a] $p<0.01$ compared to control group.

Gastrointestinal Motility Test

The methanolic extract of *Daemia extensa* lessened gastrointestinal distance (101 ± 2.82 cm to 57.2 ± 1.41 cm) traveled by the charcoal meal in the rats noticeably compared with the control group. Loperamide (5mg/kg) produced a marked (46.53%) decrease in the propulsion of charcoal meal through gastrointestinal tract (Table 2).

Table 2: Effect of MEDE leaves on small intestinal transition in rats

Group	Treatment	Total length of intestine	Distance travel by marker	% Inhibition of gut motility
I	Castor oil + Saline (2 mL/kg p.o)	107.8 ± 2.36	100 ± 2.82	50.56
II	Castor oil + Loperamide (5mg/kg i.p)	101.28 ± 1.66	42 ± 0.17 [a]	45.53
II	Castor oil + leaves extract (200mg/kg i.p)	100.18 ± 3.08 [a]	63.6 ± 1.11[a]	32.00
IV	Castor oil + Leaves extract (400mg/kg i.p)	91.7 ± 2.81[a]	54.2 ± 1.21[a]	41.36

Values were expressed as mean ± SEM. (n = 6). [a]$p < 0.01$ when compared with control group

CONCLUSION:

The conclusion of the present study offer persuasive evidence that methanolic extract of *Daemia extensa* (MEDE) seeds possesses significant antidiarrheal activity. Antidiarrheal effect is rapid, long lasting, and statistically important at both 200 and 400 mg/kg doses. Nevertheless, additional chemical and pharmacological studies are requisite to isolate the bioactive compounds and explicate the specific mechanisms responsible for the observed pharmacological activities of this plant.

REFERENCES:

1. Andrade SFD, Lemos M, Comunello E, Noldin VF, Filho VC ,Niero R, Evaluation of the antiulcerogenic activity of Maytenus robusta (Celastraceae) in different experimental ulcer models. J Ethnopharmacol,2007, 113,252-257.
2. Begum N, Mayuren C, Balaji N, Chinnapa RY,Aravind K Adv Pharmacol Toxicol,2008, 9,33-36.
3. Malairajan P, Gopala Krishnan G, Narasimhan S & Jessika-laveni K, Evalution of anti-ulcer activity of *Polyalthia longifolia* (Sonn.) Thwaites in experimental animals,Indian J Pharmacol ,2008,40:126-128.
4. Boyd WA, Text Book of Pathology Structure and Function in Disease. United Kingdom, 1978, Lea & Febiger.
5. Jude EO & Paul A, J Pharm Sci, 2009,22,384-390.