INTERNATIONAL JOURNAL OF ADVANCES IN PHARMACY, BIOLOGY AND CHEMISTRY

Research Article

ANTIDIARRHEAL ACTIVITY OF THE METHANOLIC EXTRACT OF *BUNCHANIAN LANZ* ANAGAINST CASTOR OIL INDUCTION

Sumithra M*, Anbu J and Suganya S

Department of pharmacology, School of pharmaceutical sciences, VISTAS
Vels university,Pallavaram, Tamilnadu, Chennai, India.

ABSTRACT

In this study reports the antidiarrheal potential of *Bunchanian lanzan (Fagaceae))* used in the traditional medicine system in India. The antidiarrheal efficacies of the leaves extract of bunchanian lanzan were evaluated by castor oil–induced diarrhea. The 200mg/kg and 400mg/kg dose of methanol extracts of *bunchanian lanzan* showed significant ($p < 0.001$) inhibitor activity against castor oil–induced diarrheain a dose dependent manner ,extracts also showed a significant ($p < 0.001$) reduction in the gastrointestinal motility in charcoal meal test. Acute toxicity tests did not reveal any sign of toxicity in the animals. The observed results could explain their use as antidiarrheal agents in traditional medicine.

Keywords: Antidiarrhoea, bunchanian lanzan, GIT motility, castor oil.

INTRODUCTION

Diarrhoea is one of the leading causes of mortality in developing countries and prevails as an ailment underlying 1.5–2 million deaths among children under 5 years of age[1]. Diarrhoea is the passage of 3 or more loose or liquid stools per day, or more frequently than is normal for the individual. It is usually a symptom of gastrointestinal infection, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person to person as a result of poor hygiene. Diarrhea is loose, watery, and frequent stool. Diarrhoea is considered chronic (long-term) when you have had loose or frequent stools for more than 4 weeks. Severe diarrhoea leads to fluid loss, and may be life-threatening, particularly young children and people who are malnourished or have impaired immunity[2,3].

Bunchanian lanzan (family: Anacardiaceae) is a medium-sized deciduous tree and traditionally the roots are acrid, astringent, cooling, depurative and constipating, and are useful in treatment of diarrhoea. Leaves are used in the treatment of skin diseases. Fruits are used in treating cough and asthma. Excluding root the ethanolic extract of the plant are used as anticancer drug.[4,5]The plant was and authenticated by Dr. Jayaraman, Botanical Survey of India, Chennai, Tamilnadu, India. The leaves of *Buchanania lanzan* were collected from Mirjapur region, Utter Pradesh in the month of January 2011.

Extraction procedure

The dried and powdered plant material (100 gm)were extracted successively with 600 ml, of Ethanol (1:6 w/v) by using soxhlet extractor for 48 h at a temperature not exceeding the boiling point of the solvent.

Experimental Animals

The animals were acclimatized to laboratory conditions and the protocol was approved by the Institutional Animal Ethics Committee (IAEC) Reg.No. Toxicity studies were conducted as per the OECD- 423 guidelines.

Grouping &treatment

Albino mice were divided into 5 groups of 6 animals each. Group I: distilled water (0.2 ml), Group II: MEBL (200mg/kg body weight), Group III: MEBL(400mg/kg body weight), Group IV: Loperamide 1mg/kg body weight). All groups were treated post orally and all were treated with castor oil (0.2ml)

Experimentally induced diarrhea[6]

The method proposed by Galvez et al., (1993) was modified to suit experimental needs. Adult albino mice were fasted for 18 hours .Following the administration of castor oil, the animals were placed in separate wired cages for observation. The total number of faeces and the number of wet faeces passed were recorded over a period of 4 hours after the administration of castor oil. The percentage diarrhoea inhibition was calculated as a function of the castor oil control i.e.

% Inhibition = (control – test) x 100%/control.

Upper gastrointestinal transit[7]

In this method, four groups of six mice each were selected. In the measurement of GI transit time , 'charcoal meal' used as a marker diet. The mice were given increasing doses of the extract re-dissolved in 0.2 ml of distilled water by garvage. The intestinal transit was calculated as a percentage of the distance travelled by the charcoal meal compared to the length of the small intestine.

RESULT and DISCUSSION

In the plant preliminary phytochemical studies revealed that alkaloid, gallic acid, flavonoid and glycoside were present. According to OECD guideline-423, the treatment in the different group of rats orally. No deviation was observed from any of the group within span of 24 hours.

Castor oil brings about changes in electrolyte and water transport and increases peristaltic activity These changes are associated with prostaglandins that contribute to the patho-physiological functions in the gastro intestinal tract Release of prostaglandins is also a major cause of arachidonic acid-induced diarrhoea. This is characterized by an increase in the secretion of water and electrolytes, an increase in intestinal transit time and an increase in wet faeces. Castor oil (ricinoleic acid) affects electrolyte transport and smooth muscle contractility in the intestine .The precise mechanism of action of this common laxative remains elusive, partly because of its multiple effects on the gut. It inhibits intestinal Na, K-ATPase activity interferes with oxidative metabolism [8]and has effects on adenylate cyclase or mucosal adenosine 3': 5'-cyclic monophosphate (cyclic AMP) content [9]·Castor oil is cytotoxic to intestinal epithelial cells and causes histological abnormalities with enhanced mucosal permeability[10]. These effects may be related to the release of eicosanoids and platelet activating factor (PAF) by the intestinal mucosa[11,12].Whether or not these alterations are essential for the laxative effect of castor oil or are merely epiphenomena remains to be clarified. Administration of the *Buchanania Lanzan* extract and loperamide (1mg/g) after (curative) castor oil administration, significantly ($P < 0.01$) decreased the intestinal transit time (Table 4). The reduction of the intestinal transit following administration of the *Buchanania Lanzan* extract before and after the onset of castor oil-induced gut movement demonstrated the ability of the extract to protect the gut from the adverse effect of diarrhoea and the ability to suppress establishedgut motility respectively.

CONCLUSION

The methanolic extract of *Buchanania Lanzan* leaves showed significant antidiarrhoeal activity ($P<0.01$) against castor oil induced diarrhoea in mice. It reduced the number of faeces produced by castor oil administration from16.61 to 10.79 (35.03%) when experimental animals were respectively administered 400 mg/kg plant extract (Table 3) has limited role on Diarrhoea. The extract produces dose dependent response by castor oil induced diarrhoea method and are statistically provide one way anova fallowed by dunnetts method.Further investigation has to be done to prove the prescribed phytochemicals responsible for anti diarrhoeal effect & need to be isolated to confirm the exact mechanism behind it.

Statistical data

The results were expressed as means ± standard error mean. Significance of the differences compared to the control groups was determined using the one way ANOVA follwed by Dunnetts 1.

Table 1: Effect of Bunchanian Lanzan on Castoroil Induced Diarrhoea In Mice

Treatment	Total number of faeces	Percentage of inhibition
Castor oil (0.2 ml)	16.61±0.35	-
Extract (200mg/kg)	14.04±0.39	15.47
Extract (400 mg/kg)+ Castor oil (0.2 ml)	10.79±0.31	35.03
loperamide + castor oil (0.2 ml)	8.76±0.22	48.78

Values are mentioned in mean ± sem and test of significance ($P<0.1$)
was determined using the one way ANOVA follwed by Dennett's multiple comparision test.

Table 2: Effect of Bunchanian Lanzan on intestinal transit time In Mice

Treatment	Mean length of GIT	Mean length passed by charcoal	% I testinal transit time
Charcoal meal (ml)	50	45	-
MEBL (200mg/kg)+ Castor oil (0.2 ml)	62	40	35.48
MEBL (400mg/kg)+ Castor oil (0.2 ml)	46	28	45.53
Loperamide(1mg/kg) + castor oil (0.2	38	12	68.04

Values are mentioned in mean ± sem and test of significance (P<0.1)
was determined using the one way ANOVA follwed by Dennett's multiple comparision test

REFERENCES

1. Ouyan H and Chen DH. Review 0n therapeutic roles of acupuncture in functional gastrointestinal disorders, Alimentary Pharmacology and Therapeutics. 2004;20(8):831–841.
2. Gilani GH and Rahman A. Trends in ethnopharmacology,Journal of Ethnopharmacology. 2005;100(1-2):43–49.
3. Mehmood MH, Aziz N, Ghayur MN and Gilani AH. Pharmacological basis for the medicinal use of psyllium husk (Ispaghula) in constipation and diarrhea. Digestive Diseases and Sciences. In press.
4. Venkata Krishnaiah P, Venkat Ratnam K and Venkat Raju RR. Preliminary phytochemical evaluation of certain anticancer crude drug used by Adivasis of rayalaseema region, Indian journal of Medicine.2008;(12):693-97
5. Shalini Kapoor Mehta, Swarupananda Mukherjee and Jaiprakash B. Preliminary phytochemical investigation on leaves of Buchanania lanzan. International Journal of Pharmaceutical Sciences Review and Research. 2010;3(2):55-60
6. Jafar Abbas Issa and AL-Maamori. Evaluation of the Anti-Motility Related Diarrhoeal Activity of the Sage Tea Salvia officinalis L. in Laboratory Mice, Research Journal of Biological Sciences. 2011;(1):33-36.
7. Aye-Than HJ, Kukarni and Wut-hmone Tha SJ. Antidiarrhoeal efficacy of some Burmese indigenous drug formulations in experimental diarrhoeal test models. J Crude Drug Res. (1989);27(4):195-200.
8. Heine H. cantheceae dans Flore du Gabon, Museum National d'histoire Naturelle, Paris, 13:29-32.
9. Luderer J R, Dermers LM, Nomides CT and Hayes AH. Mechanism of action of castor oil: a biochemical link to the prostaglandins. In Advances in Prostaglandin and Thrombosane Research, 1980;8:Raven Press, New York.1633-163.
10. Megens AAHP, Canters LLJ, Awouters IHL and NiemegeersCJE. Normalisation of small intestinal propulsion with loperamide like antidiarrhoeals in rats. European Journal of Pharmacology.1990;17:357-364.
11. Tan PV, Nditafon NG, Yewah M P, Dimo T and Ayafor FJ. Eremomastax speciosa: Effect of leaf aqueous extract on ulcer formation and gastric secretion in rats. J. of Ethnopharmacology.1996; 54:139-142.
12. Trease GE and Evans WC. Pharcognosy, 12th Ed. Baillieere Tindal, London Afr J Trad CAM.2006;3(1) 95 – 100.