ISSN 2249-3875

International Journal of Pharmaceutical Erudition

Research Article

Antidiarrhoeal activity of fruit extract of Ziziphus xylopyrus(Retz.)Willd in rats

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ABSTRACT

Preliminary phytochemical investigation of ethanlolic and aqueous extracts of fruit of *Ziziphus xylopyrus* revealed the presence of Tannin, Carbohydrates, Glycosides, Terpenes. The ethanolic and aqueous extracts showed significant reduction in the Epsom salt induced diarrhoea in rats. This plant may provide answer to several therapeutic challenges as observed in the antidiarrhoeal activity shown by different extracts of *Ziziphus xylopyrus*. The extent of activity was different for different extracts and also varied with dose. The ethanolic extract (200mg / kg) possessed significant antidiarrhoeal activity.

Keyword: Antidiarrhoeal activity, aqueous extract, ethanolic extract, Epsom salt, *Ziziphus xylopyrus*.

Introduction

Diarrhoea is characterized by an increase in frequency of bowel movements, wet stool and abdominal pains.[1] It is world's highest killer disease, contributing substantially to pediatric morbidity and mortality especially in the malnourished.[2,3] The incidence of diarrhoea is still high (about 7.1 million per year),despite the efforts of international organization to control this disease.[4] Antibiotic used as antidiarrhoeal drugs sometime provoke adverse effects and microorganisms tend to develop resistance toward them.[5]

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effective agent from plant origin has continued to be an important area of active research. *Ziziphus xylopyrus (Retz.) willd* is a large straggling shrub of small tree, armed with spines and up to four meter in hight. This plant belongs to Rhamnaceae family. Its fruits are globose, 3, rarely2or4-celled, with usually a seed in each cell. Fruits are very hard and woody and covered with short grayish tomentum. And is found in North Western India, Utterpradesh, Bihar and Central South India[6].Root bark and fruit of this plant, traditionally used to treat Bronchial Asthma, Thirst, Diarrhoea and as Aphrodisiac. Fruit and bark is used as Antimicrobial. Bark is used as an

antiinflammatory, antinoceceptive and as Anticonvulsants.[7] There is however, little scientific information regarding its general pharmacological activity. The present study was undertaken to evaluate the antidiarrhoeal activity of ethanolic and aqueous extracts of fruit parts of this plant in Epsom salt induced diarrhea models in rats.

Materials and Methods

Plant material

The fruits of *Ziziphus xylopyrus (Retz.) willd* were collected from Orakadam forest near Chennai (Tamilnadu) during the month of July 2007. Its identification was established by Prof. P.Jayaraman,Director, plant anatomy research centre, Pharmacognosy institute, Chennai, where a voucher specimen was kept for further references(voucher number of specimen:PARC/2007/104). All the collected material was then shade dried. The dried fruit part pieces were powdered by means of a wood grinder and the powder was passed through the sieve no.60.The powder was subjected for continuous hot extraction with ethanol and distill water. The solvent was evaporated from the extract under reduced pressure in a rotatory evaporator to afford the ethanolic extract (111.5 gm) with a yield of (22.5% w/w) and aqueous extract (138.0) with a yield of (27.6%w/w)[8]. Preliminory phytochemical analysis of the extracts showed the presence of tannin, terpenes, carbohydrates, glycosides[9].The suspension of ethanol and aqueous extract were prepared by using 0.5%of sodium CMC Solution.

Acute oral toxicity study

The acute oral toxicity study of aqueous and ethanolic extracts of *Ziziphus xylopyrus*. was determined in Wister Albino rats. The study was performed by using OECD guidelines 420. Fixed dose procedure (FDP).There was no mortality and no sign of toxicity was found upto 2000 mg/kg/body weight. The $LD_{50}$for ethanolic and aqueous extracts of *Ziziphus xylopyrus.* was more than 2000mg/kg .Hence the biological dose was fixed 100 and 200 mg/kg for both the extracts.[10]

In vivo assessment of Antidiarrhoeal activity

Epsom salt induced diarrhoea model

Wister Albino rats were used for this experiment. They were housed in polypropylene cages in an air-conditioned area at 25±2°C with 10:14 hour's light and dark cycle. Animals were fasted for 24 hours before study with free access to water. Mice were divided into various groups for treatment. For each treatment at least six animals were used. Drugs were

ISSN 2249-3875

International Journal of Pharmaceutical Erudition

administrated 45 minutes before cathartics ($MgSO_4$ 2g/kg. p.o). Immediately after cathartic agent, Challenge animals were kept in polypropylene cages lined with filter paper at the bottom. Animals were observed for parameter such as time of occurrence of diarrhea, number of total defecations, the numbers of defecations were noted up to 4 hr after drug administration. [11-15]

Statistical Analysis

All the results are reported as mean ± SEM. The statistical analysis was carried out using ANOVA and Duneet's t test. All the results are obtained in the study were compared with the vehicle control group. The value of significance were set at $P< 0.001$.

Table-1: Effect of test materials from *Ziziphus xylopyrus* fruits on Epsom salt induced diarrhoea in Rats

S. No.	Groups	Time(min.) Occurrence of Diarrhea	Total Number of Faeces	Total Number of wet Faeces	Total Weight Of Faeces (mg)	(%) Of Activity
1.	Control($MgSO_4$2 gm/kg)	45.20 ± 2.98	28.2±0.98	25.7± 0.82	203.62±3.86	-
2.	$MgSO_4$ + Alcoholic extract (200 mg/kg)	96.20±2.86*	7.4±0.68*	2.92±0.48*	20.6±3.22*	89.88
3.	$MgSO_4$ + Water extract (200 mg/kg)	128.02±2.24 *	22.20±0.82*	8.26±0.62*	98.04±3.82*	51.85
4.	$MgSO_4$+ Diphenoxylate (5 mg/kg)	140.6±1.32*	5.82±0.47*	2.02±0.18*	12.62±1.82*	93.80

N=6; P*<0.001 Vs control Results are expressed as mean± SEM

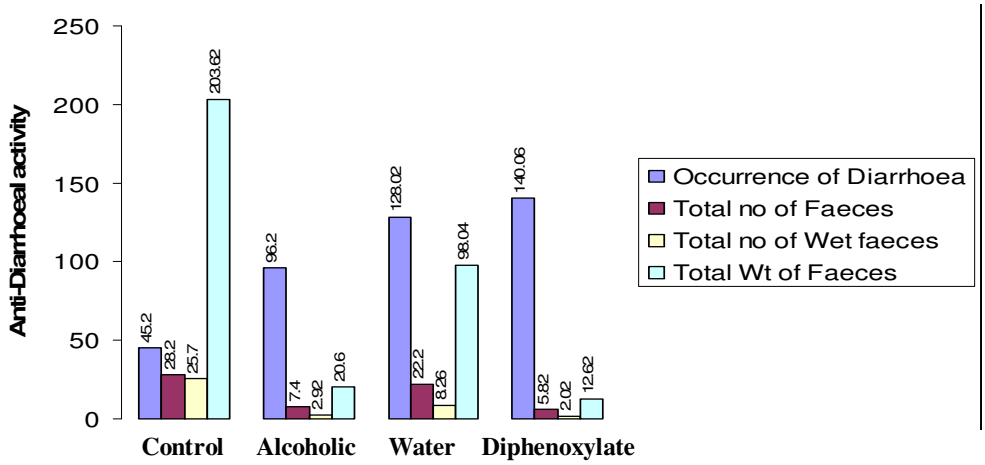

Fig. 1: Effect of test materials from *Ziziphus xylopyrus* fruits on Epsom salt induced diarrhoea in Rats

Results

The Antidiarrhoeal activity of aqueous and ethanolic extracts has been shown in Table-1 and in Fig.-1, which shows that orally administered dose of 200 mg/kg body weight of both extracts of fruits of *Ziziphus* xylopyrus showed significant Antidiarrhoeal activity, which was 89.88% for ethanolic extract and 51.85% for aqueous extract The results were compared to standard drug Diphenoxylate (5mg/kg) which showed 93.80% protection ($P<0.001$).

Conclusion

The result of our study being reported for the first time provide clear evidence that the ethanolic and aqueus extract from *Ziziphus xylopyrus* fruit possess antidiarrhoeal activity and could be useful for the development of new antidiarrhoeal drugs. However further pharmacological and toxicological study will be necessary.

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