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ANTI-DIARRHOEAL ACTIVITY OF ETHANOLIC LEAF EXTRACT OF *PASSIFLORA EDULIS SIMS* IN ALBINO RATS

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ABSTRACT

Passiflora edulis sims are found in India this plant is used in traditional medicine. It should be used in the treatment of many types of diseases such as sedative, anti-asthmatic, anti-diarrhoeal, emetic, insomnia, antioxidant, anti-inflammatory, lower the high blood pressure, diabetes. In this study we investigated the property of ethanol crude extract which is obtained from passiflora edulis sims in albino rats for their use in traditional and its phytochemical constituents. The plant extract which is evaluated form plant extract was used in anti-diarrhoeal activity in castor oil- induced diarrhoea model in rat. It is been compared with loperamide. The administration of charcoal meal and castor oil was determined by extract effect. These may show gastrointestinal motility by the inducing the intestinal fluid accumulation. In dose dependent anti-diarrhoeal EEPR may show some remarkable evidence. It may reduce the frequency defecation and also changes the consistency. Extract at 200 and 400 mg/kg body weight may reduce the diarrhoeal faces. At 200 and 400 mg/kg the EEPR may inhibit the gastrointestinal motility and castor oil induced enterpooling. In phytochemical screening, tannins, polyphenols, flavonoids and reducing sugar is been present in the leave of Passiflora edulis sims. No mortality and any kind of weakness were shown or observed by the administration of crude extract dose up to 3000mg/kg body weight in toxic study. these extracts did not show any hepatotoxic and nephrotoxic effects and very well used for traditional medicine.

KEYWORDS: *Passiflora edulis sims, Diarrhoea, Anti-diarrhoeal activity; Castor oil-induced rat model*

1. INTRODUCTION

In developing countries diarrhoea is the most leading cause of death. It's around 5 to 10millions death in each year. It was generally caused in infant and children which are below or under 5 years.[1,2] Africa is the most leading country in death rate. Around 2.3 million peoples are dead in India due to diarrhoea in every year.

Rotavirus may provoke the diarrhoeas in infants and in children under 5 year.[3,4] In diarrhoea, the semi-solid is been discharged and watery faecal matter from the bowels. It was done for three or more times per day. The fluidity, volume and frequency of bowel movement, increases and decrease absorption of fluid, abdominal pain and loss of electrolytes and water.[5,6] Treatment is been done for the reduction in discomfort and inconvenience in bowel mobility and faeces frequency. Many countries around 90% of population may used medicinal plants for their treatment of diarrhoea.[7,8] Medicinal plants are used for the discovery of new anti-diarrhoea agents. *Passiflora edulis sims* may be found in India. Investigation shows that the ethanolic leave extract of

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Passiflora edulis sims may show anti-diarrhoeal properties.[9,10]

2. MATERIALS AND METHODS

2.1 Preparation of Plant Extract

The plant were collected from local farm behind NCP, Erode District, Tamil nadu. The plant material was identified as *Passiflora edulis sims* (family Passifloraceae). The leaves were washed and air dried for five days and pulverized into coarse powder. The coarse powder was packed tightly in the Soxhlet apparatus and extracted with 500 ml 95% ethanol at 55 ˚C for 72 hours by continuous hot percolation method.

2.2 Experimental Animal

All experimental animals used were male albino rats (*Rattus novergicus*) weighing between 180-250g and were obtained from the animal house of Nandha College of pharmacy and Research Institute. They were fed using standard laboratory rodent chow diet feed and given water *ad libitum*.

2.3 Experimental Design For Animal Study

Twenty-four (24) albino rats were used for every model of anti-diarrhoea. The anti-diarrhoeal activity of *Passiflora edulis sims* were studied by castor oil induced diarrhoea method. The *wistar albino* rats of either sex were divided into four groups of six each and were treated as per the following regimen. Group I: 0.5%w/v CMC vehicle control (10 ml/kg, p.o), Group II: Loperamide (5mg/kg, p.o.) Group III: EEPE (200 mg/kg, p.o), Group IV: EEPE (400 mg/kg, p.o). Animals in each group received castor oil at dose level of 2 ml/kg body weight by oral route after 30 min of drug administration. The animals were placed separately in cages with filter paper, which was changed every hour. All the animals were observed for defaecation up to 4 hrs. The frequency of defaecation and number of diarrhoeal faeces excreted in the recorded time were scored and compared with control group.

PHYTOCHEMICAL SCREENING

The prepared extract was screened for the presence of tannins, flavonoids, alkaloids, sterols, saponins, polyphenols, anthraquinones and polyterpenes.

GASTROINTESTINAL MOTILITY TEST

24 rats were divided into six group of four animals each. These animals were fastening up to 18 to 20 hours. the control group treated with normal saline water orally, while the rest of second, third and fourth group is been treated with plant extract orally with a dose of 200, 400 and 600mg/kg body weight. Fifth and sixth group may receive the standard drug of Loperamide (5mg/kg body weight). After the completion of one hour, the rat were given a charcoal meal through oral route. These rats are been sacrificed after one hours by opening of abdomen. Distance is been measured from pylorus to caecum in intestinal and percentage were expressed. These are calculated by:

Percentage of transit inhibition= $(T_0 – T_1/T_0) \times 100$

Where T_0= intestinal length

T_1= test group charcoal distance

Castor oil-induced enteropooling

24 rats were divided into six group of four animals each. After the completion of one hour the castor oil administered group is received normal saline orally. This controlled group. Second and third group may contain the standard drug loperamide (5mg/kg). Fourth, fifth and sixth group may contain 200, 400 and 600mg/kg body weight. After the completion of experiment these rats are sacrificed and the part of small intestine (pylorus to caecum). The intestinal content were recovered and their volume was measured.

ACUTE TOXICITY STUDY

24 rats were divided into six group of four animals each. The ethanolic extract of *Passiflora edulis sims* was orally administered at a dose of 200, 400 and 600mg/kg body weight. Normal saline water is been received by controlled group. Every 48 hours the symptoms of toxicity, food, water and mortality were recorded up to 14 days.

STATISTICAL ANALYSIS

Results were expressed as mean ± SEM. Statistical significance were determined by one way Analysis of Variance (one way ANOVA) followed by Dunnett's 't' test with level of significance set at $P < 0.01$ to determine the significance.

RESULT AND DISCUSSION

Physiochemical screening

Chemical constituents	Passiflora edulis sims
Sterols	-
Polyphenols	+
Flavonoids	++
Saponin	-
Tannins	++
Alkaloids	-
Anthraquinones	-
Reducing sugar	+

Figure 1. physiochemical screening

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Effect of ethanol extract on castor oil-induced diarrhoea

In castor oil induced diarrhoea experiment, the ethanol extract produces anti-diarrhoeal effect in rats. The total number of diarrhoeal faeces are 12.20±1.06 and 6.20±0.58 and 6.44±2.09 for 200, 400 and 600mg/kg. These doses may be inhibiting the diarrhoeal faeces. The highest dose of extract was similar to loperamide (5.20±1.15). In our study, the faeces of diarrhoea are with in the limit in controlled group and 4 hours in another groups after induction of diarrhoea. The effect in 200mg/kg extract group was same as in control group.

S.no	treatment	Total no of faeces	Total no of diarrhoeal faeces	% of protection
1	Control (normal saline) +castor oil	22.809±0.86	18.60±0.74	.....
2	Loperamide(5mg/kg) +Castor oil	9.80±1.65	5.20±1.15	72.04
3	EEPE (200mg/kg) +Castor oil	19.80±0.73	12.20±1.06	34.40
4	EEPE (400mg/kg) +Castor oil	15.60±1.80	6.20±0.58	67.04
5	EEPE (600 mg/kg) +castor oil	18.62±1.58	6.44±2.09	69.49

Table 1.Effect of ethanolic extract of *Passiflora edulis sims* on anti- diarrhoeal activity indicating diarrhoeal index and % of diarrhoeal protection

Effect of ethanol extract on gastro-intestinal of charcoal meal

The ethanol extract of *Passiflora edulis sims* was decreases the charcoal meal in rat gastrointestinal tracts by 19.82±0.75 and 15.62±1.98 at 200 and 400mg/kg to the control (89.59 ±16.84). reduction in gastrointestinal transit of charcoal meal in rats were achieved by Loperamide (9.80±1.65).

Groups	Diarrhoeal faeces			
	D1	D2	D3	D4
Control	1.1±2.5	1.2±1.7	4.2±2.5	1.2±1.2
Loperamide	4.5±0.5	6.2±0.9	8.25±0.7	4.61±1.9
EEPR 200	6.5±0.6	8.15±0.6	10.29±0.8	6.91±0.5
EEPR400	8.4±0.4	9.45±0.7	12.59±0.6	8.25±0.7
EEPR600	9.1±0.9	10.25±0.6	14.5±0.6	13.96±0.8

Table 2. effect of ethanol extract of *Passiflora edulis sims* on diarrhoeal faces in albino rat over the course of 4 hours

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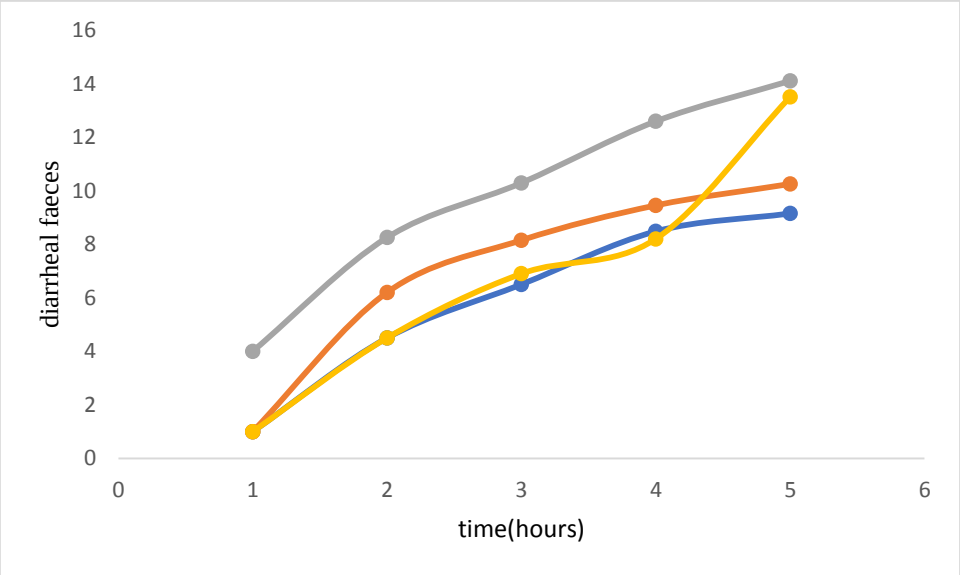

Figure 2. effects of ethanol extract of *Passiflora edulis sims* on castor oil-induced diarrhoea in albino rat over 4 hours

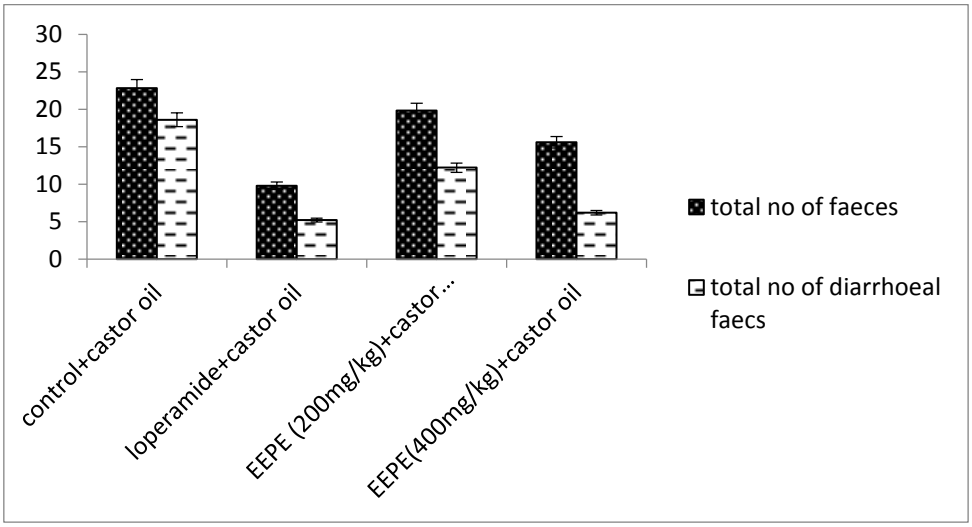

Figure 3. Effect of *Passiflora edulis sims* on castor oil induced Model Indicating total no of faeces and inhibition of diarrhoeal faeces

Effect of ethanol extract *Passiflora edulis sims* on castor oil-induced enteropooling -The ethanol extract ($P < 0.01$) inhibits the castor-oil-induced enteropooling by 34.40 % and 67.04.% at 200 and 400mg/kg compared to control. Loperamide reduces the volume of intestine contents by 72.04 % ($P < 0.01$).

Group	Total distance of intestine(cm)	Distance travel by charcoal (%)	Mobility inhibition
Control	114.15±8.25	89.08±16.59	22.15
Loperamide	112.45±5.78	46.57±28.49	61.29
EEPR 200	108.26±8.49	67.12±9.59	39.48
EEPR400	105.28±8.16	43.19±9.31	61.29
EEPR600	108.19±7.19	39.16±10.65	65.12

Table 3. effect of ethanol extract on intestinal transit of charcoal meal in rats

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Group	Volume of intestinal fluid (ml)	Inhibition of intestinal fluid (%)
Control	3.15±0.16	-
Loperamide	2.45±0.18	35.18
EEPR 200	4.26±0.17	0.89
EEPR400	3.48±0.19	20.59
EEPR600	2.15±0.02	24.19

Table 4. effect of ethanol extract on castor oil induced enteropooling in rats

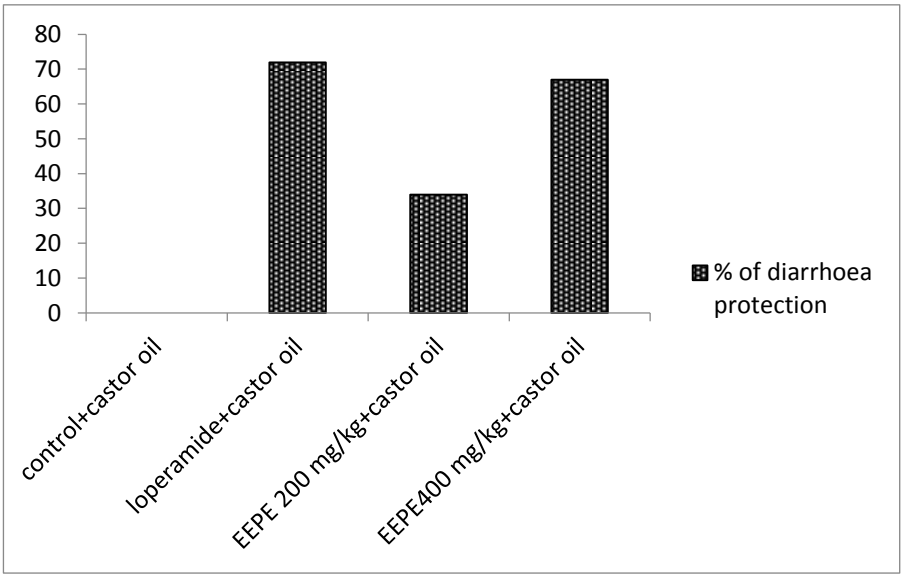

Figure 4. Effect of *Passiflora edulis sims* on castor oil induced Model Indicating Percentage Diarrhoeal Protection

Acute Toxicity Study

The behaviour and faeces of animals were normal. There is no sign of weakness or mortality in rats receiving up to 3000mg/kg body weight by oral administration of ethanol extract of *Passiflora edulis sims*. These may shows that the extract of leave of *Passiflora edulis sims* is safe or non-toxic in rats.

DISCUSSION

The present study is to explain the anti-diarrhoeal activity of ethanolic leaf extract of *Passiflora edulis sims* in albino rats. In the castor oil-induced diarrhoea experiment, the extract of *Passiflora edulis sims* produced a significantly ($p<0.01$) antidiarrheal effect in the rats. Castor oil, its active component rich in oleic acid induces permeability changes in mucosal fluid and electrolyte transport that results in a hypersecretory response and diarrhoea.

Reported anti diarrhoeal effect of extract of *Passiflora edulis sims* may be due to tannins and flavonoids and Phytochemical screening of the extracts revealed the presence of flavonoids, tannins.

CONCLUSION

The result of this study confirms the use of the ethanolic extract of leaves of *passiflora edulis sims* in traditional management of anti-diarrhoeal effect. Further study is required to isolate the active phytochemical constituents present in the extract and pharmacological studies on the healing action of drug as well as on the possible side effects. The investigation on mode of action may pave way for establishment of new anti-diarrhoea therapy regimen.

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