

Evaluation of Antidiarrhoeal Potential of *Ailanthus Excelsa* (Roxb) Bark Extract in Rats

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Abstract: The chloroform, aqueous and ethanolic extract of bark of *Ailanthus excelsa* was studied for its antidiarrhoeal properties in experimental diarrhoea, induced by castor oil and Effect on normal defecation in rats, at the doses of 100, 200 and 400 mg/kg per orally. The ethanolic extract showed significant and dose-dependent antidiarrhoeal activity in both models, when compared to standard atropine sulphate (5 mg/kg; i.m.). The results showed that the ethanolic extract of bark of *Ailanthus excelsa* have a significant antidiarrhoeal activity and supports its traditional uses.

Keywords: *Ailanthus excelsa*, Simaroubaceae, Antidiarrhoeal activity.

I. INTRODUCTION

In developing countries, a quarter of infant and child hood mortality is related to diarrhea¹. The highest mortality rates have been reported in children less than 5 year of age. During the past decade, oral dehydration therapy has reduced mortality rate of acute diarrhoeal disease, where chronic diarrhea remains a life threatening problem in those regions where malnutrition is a common co-existing complicated factor. The other factors are also affected, such as infective, immunological and nutritional position of the region has been responsible for diarrhoeal syndrome². In India many plants available and conveniently used in traditional folklore medicines for treatment of diarrhea and dysentery³. *Ailanthus excelsa* (Roxb) syn Pongelion wightii Tiegh (Simaroubaceae) is a lofty deciduous tree, commonly called "Tree of Heaven". It is found widely throughout India. It cultivated in road side and garden. It is propagated by seed⁴. The bark of plant is used traditionally as anthelmintic, febrifuge, expectorant and antiseptic. It is also used in treatment of asthma, bronchitis, diarrhea and dysentery^{5,6}. In local region of Mumbai, the bark and leaves are used as tonic and espially used in debility after child birth.

A decoction of leaves is used for washing of wounds, swelling and skin eruption. An alcoholic extract of leaf and stem bark exhibited remarkably high anti-implantation and early abortifacient activity in female albino rats^{7,8}. In present study we have evaluated antidiarrhoeal potential of *Ailanthus excelsa* (Roxb) bark extract using castor oil induced diarrhea in albino wistar rats and effect on normal defecation in rats, since there is no scientific proof justifying the traditional used of plant for the treatment of diarrhea.

II. MATERIAL AND METHODS

2.1. Plant Material

The bark of *Ailanthus excelsa* were collected during the month of June 2005 from road side at village Bhatthera, Distt. Rewari (Haryana), North India. The plant material was taxonomically identified and authenticated by Dr H.B. Singh, Head Raw Material Herbarium & Museum, Ref. No. NISCAIR/RHM/F-3/2005/Consult-590/70. A voucher specimen has been submitted in Department of Pharmaceutical Science, Guru Jambheshwar University of Science & Technology Hisar. The plant material was air-dried at room temperature and then powdered. All other chemicals used were of analytical reagent grade.

2.2. Preparation of Extract

The dried powder (3kg) of bark of *Ailanthus excelsa* was exhausted successively by pet ether, chloroform and ethanol (95%) by hot extraction process and then aqueous extract was prepared by maceration in distilled water for 18 hrs. The liquid extract so obtained was concentrated in vacuum at 40°C. These extracts were stored in refrigerator at 4°C until used for experiment reported in this study.

2.3. Animals

The either sex of albino wistar rats (170-210 g) were used for the study. They were fed with standard diet and Water ad libitum. The animals were housed in standard cages and acclimatized for a period of 14 days. The approval for the study was obtained from the Animal Ethics Committee, Guru Jambheshwar University of Science & Technology Hisar.

2.4. Castor Oil Induced Diarrhea

The method reported by Awouters et al^{9,10} with modification has been used in present study. Rats of either sex were fasted for 18 hr. They were then dividing into five groups of six animals in each group. Then extracts were administered orally at doses of 100,200 and 400 mg/kg by gavage as suspension to the first three groups of animals. The fourth groups receive atropine (0.1 mg/kg i.p). The fifth groups serve as blank, was administered with 1% w/v aqueous suspension (5ml/ kg) after 60 minutes of treatment, the animal of each groups receive 1ml of castor oil orally by gavage and consistency of fecal material and frequency of defecation was noted up to 4 hours in transparent plastic dishes place beneath the individual rats cages.

2.5. Effect on Normal Defecation In Rats

The wistar albino rats were divided into four groups of six animals in each group. They were placed in individually in polypropylene cages with plastic dishes beneath each cage. The ethanol, chloroform and aqueous extract at doses of 100, 200 and 400 mg/kg were given orally to the first three groups. While one groups served as a negative control and receive a 1% w/v aqueous carboxy methyl cellulose suspension (5 mg/kg). The number of feces in each group was counted every four hours. The percentage reduction in the number of feces in the treated groups was compared with that of the control animals for each hour.

$$\% \text{ Inhibition} = \frac{\text{Control mean} - \text{Treated mean}}{\text{Control mean}} \times 100$$

III. RESULTS

Table1. Effect of chloroform extract of *A. excelsa* on castor oil induced diarrhea in rats

Treatment	Dose	Mean no. of defecations in 4 hr	% inhibition
1% w/v aqueous carboxy methylcellulose suspension	5 mg/kg	9±0.7304	-
Atropine (Standard)	0.1 mg/ kg	3±0.3652	66.6%**
Chloroform extract of <i>A. excelsa</i>	100 mg/kg	7±0.5774	22.2%*
	200 mg/kg	5±0.3554	44.4%*
	400 mg/kg	4±0.5166	55.5%**

** $P < 0.05$, * $P < 0.001$, when compared with controls (Dunnett's t-test after analysis of variance). Result are mean ± SEM (N= 6).

Table2. Effect of aqueous extract of *A. excelsa* on castor oil induced diarrhea in rats

Treatment	Dose	Mean no. of defecations in 4 hr	% inhibition
1% w/v aqueous carboxy methylcellulose suspension	5 mg/kg	9±0.7304	-
Atropine (Standard)	0.1 mg/ kg	3±0.3652	66.6%**
Aqueous extract of <i>A. excelsa</i>	100 mg/kg	8± 0.3652	11.1%*
	200 mg/kg	6± 0.6325	33.3%*
	400 mg/kg	5±0.4473	44.4%*

** $P < 0.05$, * $P < 0.001$, when compared with controls (Dunnett's t-test after analysis of variance). Result are mean ± SEM (N= 6).

Table3. Effect of ethanol extract of *A.excelsa* on castor oil induced diarrhea in rats

Treatment	Dose	Mean no. of defecations in 4 hr	% inhibition
1% w/v aqueous carboxy methylcellulose suspension	5 mg/kg	9±0.7304	-
Atropine (Standard)	0.1 mg/ kg	3±0.3652	66.6%**
Ethanol extract of <i>A. excelsa</i>	100 mg/kg	7±0.6832	22.2%*
	200 mg/kg	5±0.5774	33.3%*
	400 mg/kg	4±0.5165	55.5%**

** $P < 0.05$, * $P < 0.001$, when compared with controls (Dunnett's *t*-test after analysis of variance). Result are mean ± SEM (N= 6).

Table4. Effect of chloroform extract of *A.excelsa* by Effect on normal defecation in rats

Treatment	Dose	Mean no. of defecations in 4 hr	% inhibition
1% w/v aqueous carboxy methylcellulose suspension	5 mg/kg	6 ± 0.258	-
Chloroform extract of <i>A. excelsa</i>	100 mg/kg	5 ± 0.365	16.6%*
	200 mg/kg	3 ± 0.365	50.0%*
	400 mg/kg	2.3 ± 0.516	55.5%**

** $P < 0.05$, * $P < 0.001$, when compared with controls (Dunnett's *t*-test after analysis of variance). Result are mean ± SEM (N= 6).

Table5. Effect of aqueous extract of *A.excelsa* by Effect on normal defecation in rats

Treatment	Dose	Mean no. of defecations in 4 hr	% inhibition
1% w/v aqueous carboxy methylcellulose suspension	5 mg/kg	6±0.258	-
Aqueous extract of <i>A. excelsa</i>	100 mg/kg	5.1±0.307	13.5%*
	200 mg/kg	3.6±0.336	38.8%*
	400 mg/kg	3.2±0.494	44.4%**

** $P < 0.05$, * $P < 0.001$, when compared with controls (Dunnett's *t*-test after analysis of variance). Result are mean ± SEM (N= 6).

Table6. Effect of ethanol extract of *A.excelsa* by Effect on normal defecation in rats

Treatment	Dose	Mean no. of defecations in 4 hr	% inhibition
1% w/v aqueous carboxy methylcellulose suspension	5 mg/kg	6±0.258	-
Ethanol extract of <i>A. excelsa</i>	100 mg/kg	5.0±0.258	16.5%*
	200 mg/kg	2.8±0.344	52.6%**
	400 mg/kg	2.0±0.365	66.4%**

** $P < 0.05$, * $P < 0.001$, when compared with controls (Dunnett's *t*-test after analysis of variance). Result are mean ± SEM (N= 6).

IV. DISCUSSION

The ethanolic extract of the *A.excelsa* exhibit a potential antidiarrheal action when studied by using two animal models. These models are very effective for the investigation of the antidiarrhoeal activity of plant which used traditionally for the treatment of the diarrhea. Our investigation of the scientific reason behind folklore use of *A.excelsa* in the treatment of diarrhea diseases by which patient may be died. In this investigation the ethanolic extract of *A.excelsa* bark show potential antidiarrhoeal potential is dose dependant.

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