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## ANTIDIARRHOEAL ACTIVITY OF *AILANTHUS EXCELSA* STEM BARK

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### Abstract

In developing countries majority of people living in rural areas almost exclusively use traditional medicine in treating all sorts of diseases including diarrhoea. Diarrhoea is a major health problem especially for children under the age of 5 year and up to 17% of children admitted in the pediatric ward die of diarrhoea and accounts for more than 5.8 million deaths each year in infants and children below 5 years old especially in developing countries (1). According to WHO estimates for 1998 about 7.1 million deaths were caused by diarrhea (2). The incidence of diarrhoeal diseases still remains high despite the efforts of many government and international organizations to curb it. It is therefore important to identify and evaluate available natural drugs as alternatives to currently used antidiarrhoeal drugs which are not always free from adverse effects (3). A range of medicinal plants with antidiarrhoeal properties is widely used by traditional healers. However, the effectiveness of many of these anti diarrhoeal traditional medicines has not been scientifically evaluated.

*Ailanthus excelsa* (Simaroubaceae) is a fast growing tree, indigenous to central and southern India (4, 5). In indigenous system of medicine bark of *Ailanthus excelsa* is used to treat diarrhoea and dysentery, especially when there is a blood in stool (6, 7). The present study investigates the antidiarrhoeal activity of methanolic extract of stem bark of *Ailanthus excelsa*.

**Keywords:** Diarrhoea and *Ailanthus excelsa*.

## Material and Methods

### Plant material

The stem bark of *Ailanthus excelsa* was collected in September, 2008 from Bareilly, UP. The barks were then air dried at room temperature. The dry barks were ground into coarse powder and preserved in well stoppered container until further use.

### Preparation of extract

Shade dried, coarsely powdered stem bark, about 100g was extracted with methanol using soxhlet apparatus. The extract was dried in vacuo using rotary flash evaporator (8).

### Animals

Swiss wister mice (40-50 g) of both sexes were obtained from the animal house of the College of Pharmacy, IFTM, Moradabad and used in the experiment. For antidiarrhoeal activity the mice were given food and water *ad libitum*. All the animals were kept under laboratory conditions for an acclimatization period of 7 days before carrying out the experiments. All studies were carried out in groups of 6 mice each. Each mice was housed separately.

### Drugs and chemicals

Loperamide (standard reference antidiarrhoeal drug), castor oil (laxative agent), normal saline solution (9% NaCl) and vehicle (0.5% v/v Tweens 80 in distilled water) were used.

### Antidiarrhoeal activity

30 mice were allowed to fast for 18 h and divided into five groups of 6 animals each. All groups received castor oil at a dose of 0.4 ml/animal orally. 30 min after castor oil administration, the first group (control group) received vehicle (0.5% Tween 80 in distilled water), the second group received reference drug loperamide (3mg/kg body weight) and third, fourth and fifth group received methanolic extract 100, 150 and 200 mg/kg body weight, respectively. Then the animals were placed separately in metabolic cages with filter paper, which

was changed every hour. The severity of diarrhoea was assessed each hour for 6 h. The total number of faeces and diarrhoea faeces excreted and the total weight of faeces were recorded within a period of 24 h and compared with the control group. The total number of diarrhoea faeces of the control group was considered 100%. The results were expressed as a percentage of inhibition of diarrhoea. (9, 10, 11).

### Statistical analysis

The results were expressed as mean  $\pm$  SEM and analyzed statistically to find out significance difference between test groups vs. control group using student's t-test. The value of  $p < 0.05$  was considered statistically significant.

### Result and Discussion

Castor oil causes diarrhoea due to its active metabolite ricinolic acid which stimulates peristaltic activity in the small intestine, leading to changes in the electrolyte permeability of the intestinal mucosa. The results were similar to that of standard drug loperamide (3mg/kg) with regard to the severity of diarrhoea. Methanolic extract of *Ailanthus excelsa* (AEME) (150mg/kg) significantly reduced intestinal motility.

In the castor oil induced diarrhoea experiment, the mice that did not receive the plant extract, showed typical diarrhoea signs such as watery and frequent defecation. The methanolic extracts of *Ailanthus excelsa* produced a marked antidiarrhoeal effect in the mice.

The different doses of stem bark extract used significantly decreased ( $p < 0.05$ ) the total number of wet faeces produced by administration of castor oil (8.10, 6.50 and 9.16 at the doses of 100, 150 and 200 mg/kg respectively) as compared to castor oil treated control group (20.50). The percentage of inhibition of castor oil induced diarrhoea in AEME treated mice was 64.48, 68.29 and 58.87% at 100, 150 and 200 mg/kg body doses respectively.

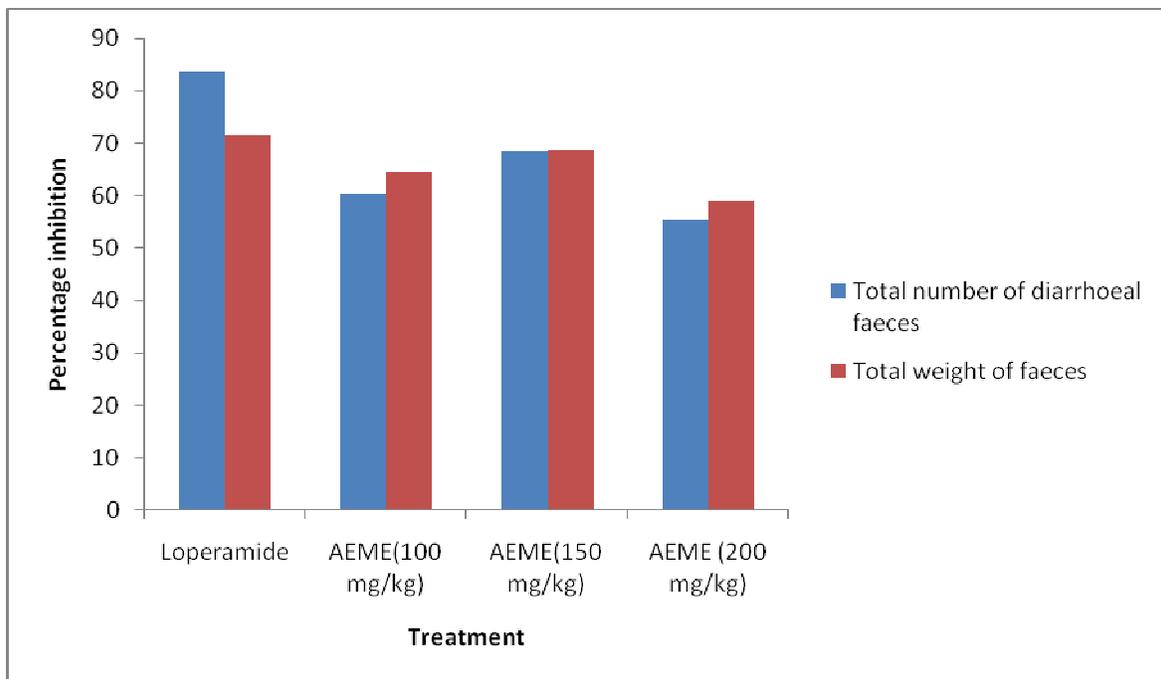
The effect of AEME was maximum at 150mg/kg body weight dose and produced significant percentage inhibition 68.69 and 68.29% with reference to total weight of faeces and total number of diarrhoeal faeces respectively (Table-1 and Figure-1).

**Table 1.** Effect of methanolic extract of stem bark of *Ailanthus excelsa* (AEME) on castor oil induced diarrhea.

Treatment	Total number of faeces	Total number of diarrhoeal faeces	Total weight of faeces (g)
Castor oil + vehicle	23.33±2.16	20.50±1.4	2.14±0.23
Castor oil + Loperamide (3mg/kg b.w.)	10.16±0.75	3.33±0.82	0.61±0.05
Castor oil + AEME (100mg/kg b.w.)	12.16±0.75	8.10±1.21	0.76±0.04
Castor oil + AEME (150mg/kg b.w.)	10.33±0.82	6.50±0.82	0.67±0.05
Castor oil + AEME (200mg/kg b.w.)	14.33±1.79	9.16±0.75	0.88±0.40

Values are expressed as mean ± SEM (n= 6); \*P <0.05 when compared with control.

**Figure 1.** Antidiarrhoeal effect of methanolic extract of stem bark of *Ailanthus excelsa* (AEME).



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