

ANTIDIARRHOEL ACTIVITY OF METHANOLIC EXTRACT OF *VERNONIA CINEREA* (L.) LESS ON FEMALE ALBINO RATS

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ABSTRACT

The present study was conducted with the objectives of investigating antidiarrhoeal activity of *Vernonia cinerea* whole plant (Family-Compositae), collected from tarai region of Uttarakhand. The plant extracts were obtained via cold extraction method. For the purpose of evaluating antidiarrhoeal efficacy of methanolic extract of the plant, rats were used as test animal. The time of onset of first wet faeces increased significantly and dose dependently by the extract. It was excellent at higher doses (100 & 200 mg/kg body wt., orally). It indicated reduction in peristaltic movement of gastro intestinal tract of animals. The antidiarrhoeal activity was further confirmed by its significant and dose dependent decrease in number of wet faeces and number of total faeces in comparison to rats used as control.

KEYWORDS: *Vernonia cinerea*, methanolic extract, rats, castor oil, antidiarrhoeal activity.

INTRODUCTION

Vernonia cinerea (Sahadevi) is one of the ten herbs that constitute the group of a reputed ayurvedic medicine “Daspuspa” (a group of ten flowers). It is also used as a folk medicine by the people of Nepal¹. The plant is found in tropical Asia, Africa, Australia and New Zealand. In India, it is found throughout the country, ascending up to 2400 m in the Himalaya, Khasi hills and hills of peninsular India. It is a very common weed found at the roadsides, garden lands and open forests in India. It is a small, erect, annual, hispid, herb with document, pubescent, cylindrical and branched stem. The leaves are simple, alternate and variable in shape. The basal ones are larger while the upper ones are smaller, ovate-lanceolate or orbicular to spithulate, shortly mucronate, margin entire or irregularly toothed shallowly, crenate-serrate and pubescent. The inflorescence is lax divaricate, corymbose, terminal cymose heads with pink-purple or pink-violet colored flowers. The fruits are achenes, hairy, obovate-oblong and slightly narrowed at base².

In continuation to our studies on essential oil and extracts of medicinal plants and their pharmacological study³, we investigate the antidiarrhoeal efficacy of methanol extract of *Vernonia cinerea* (L.) Less on white albino rats. The whole plant of *V. cinerea* has been documented to exhibit significant diuretic activity⁴, anti-inflammatory

activity⁵, antipyretic potential⁶ and antibacterial activity⁷. Its leaves have shown diuretic and anti-diuretic activity⁸, and also analgesic, antipyretic, anti inflammatory activities⁹.

MATERIALS AND METHODS

Plant collection

Fresh plants of *Vernonia cinerea*(Asteraceae) were collected locally from tarai region of Himalaya, Pantnagar, Uttarakhand, India. The specimen has been deposited in the Department of Chemistry, G. B. Pant University of Agriculture & Technology, Pantnagar, India.

Test animals used

The Pharmacological study was conducted on adult female albino rats (175-225g), purchased from Laboratory Animal Resource Section, Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India. The rats were maintained in Polypropylene cages and housed in the animal sheds of Department of Pharmacology and Toxicology, College of Veterinary & Animal Sciences, G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand, India under good managing conditions. Animals were fed standard ration *ad libitum* and had free access to clean drinking water.

Sample preparation

Fresh plants of *Vernonia cinerea* (5 kg) were collected from its natural habitat in the month of May and were shade dried for about 30 days. Shade dried plant material was powdered. For the purpose of extraction, about 1 kg powdered plant material was dipped in HPLC grade methanol for 20 days and stirring was done after every 4 to 5 days. The infusion was filtered through muslin cloth. The crude methanolic extract of plant was obtained after evaporation of methanol under reduced pressure.

The solutions of methanol extract of plant *Vernonia cinerea* were prepared with 10% Gum Tragacanth in Triple distilled water mixed properly with the help of an Ultra-Sonicator (Soni prep 150,UK).The solutions were sonicated before use, so a paste of methanol extract and tragacanth was used for administration in rats orally.

Antidiarrhoeal activity

To check antidiarrhoeal activity of methanolic extract of *V. cinerea*, the rats were placed in 4 groups. Each group contained 5 rats. All the rats of each group were fasted for 18 hours before starting the experiment. The animals were placed separately in cages with white chart paper during experiment. After 18 hours of fasting, tragacanth was orally administered @ 10 mL/kg body weight to the animals of group I (control group).

The cathartic agent (castor oil) was orally administered to the animals @ 10 mL/kg body weight after 60 minutes of tragacanth administration. The time elapsed between administration of castor oil and excretion of first wet faeces was evaluated for each animal. The total number of faeces as well as the number of diarrhoeic faeces (wet faeces) excreted in 4 hours was determined.

Different doses of the extract (50-200mg/kg) were administered orally to the animals of groups II, III and IV, 60 min before the administration of cathartic agent. Distribution of different doses of extracts in animals of groups I, II, III and IV are summarized in Table I.

Statistical Analysis

The results are presented as mean \pm S.E. of n observations values were analyzed using a student's t-test or ANOVA an appropriate and were considered to differ significantly when $p \leq 0.05$.

RESULTS

The antidiarrhoeic effect of methanolic extract of *Vernonia cinerea* (VME) was evaluated on castor oil induced diarrhoea in rats. After 18 hours of fasting, castor oil was administered in rats @ 10 mL/kg body weights, orally. The time of onset of first wet faeces in min, number of wet faeces and total faeces were recorded up to 4 hours from the administration of castor oil. In control rats, the cathartic effect of castor oil was found (appearance of first wet faeces) at 68 ± 3.21 min

after oral administration of castor oil. Number of wet faeces and total faeces were 3.2 ± 0.37 and 4.0 ± 0.71 respectively.

VME @ 50 mg/kg body weight orally, increased the time of onset of first wet faeces significantly to 97.2 ± 5.29 in group II of rats. However, this dose of the extract could not significantly alter the number of wet faeces and total faeces (Fig. I & II). The time of onset of first wet faeces was further increased significantly and dose dependently by VME at higher doses of 100 and 200 mg/kg body weight (Fig. III). The number of wet faeces and number of total faeces were also significantly reduced by VME, when administrated @ 100 and 200 mg/kg body weight.

DISCUSSION

The dose dependent increase in the time of onset of first wet faeces by VME indicates that the peristaltic movement of the gastrointestinal tract of animals was reduced by the extract. This antidiarrhoeal activity of VME was further confirmed by its significant and dose dependent decrease in number of wet faeces and number of total faeces. Our finding strengthens the folklore belief of antidiarrhoeal efficacy of the plant¹⁰. The results are summarised in Table II.

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Abbreviations Used

| | |
|-----|---|
| wt | weight |
| min | minute |
| g | gram |
| ng | nanogram |
| mg | milligram |
| mL | milliliter |
| Kg | kilogram |
| µl | microlitre |
| µg | microgram |
| VME | methanolic extract of <i>Vernonia cinerea</i> whole plant |

Table I: Effect of methanolic extract of *V. cinerea* on castor oil-induced diarrhoea in rats (n=5, mean ± SEM).

| Doses of extract (mg/kg body wt) | Onset of first wet faeces (min) | Total number of faeces | Number of wet faeces |
|----------------------------------|---------------------------------|------------------------|----------------------|
| 0.00(control) | 68 ± 3.21 | 4.0 ± 0.71 | 3.2 ± 0.37 |
| 50 | 97.2 ± 5.29** | 2.8 ± 1.31 | 2.4 ± 0.51 |
| 100 | 185.8 ± 17.02*** | 1.8 ± 0.37* | 1.4 ± 0.25** |
| 200 | 230.6 ± 6.89*** | 1.4 ± 0.224** | 1.2 ± 0.2** |

Each value represents the mean ± SEM obtained from 5 animals.

Table II. Distribution of different doses of extracts in animals of groups I, II, III and IV.

| Group number | Number of rats | Doses of methanolic extract of <i>V. cinerea</i> (mg/kg body weight) | Doses of cathartic agent (castor oil) (mL/kg body weight) |
|--------------|----------------|--|---|
| I(control) | 5 | 0.00 | 10 |
| II | 5 | 50 | 10 |
| III | 5 | 100 | 10 |
| IV | 5 | 200 | 10 |

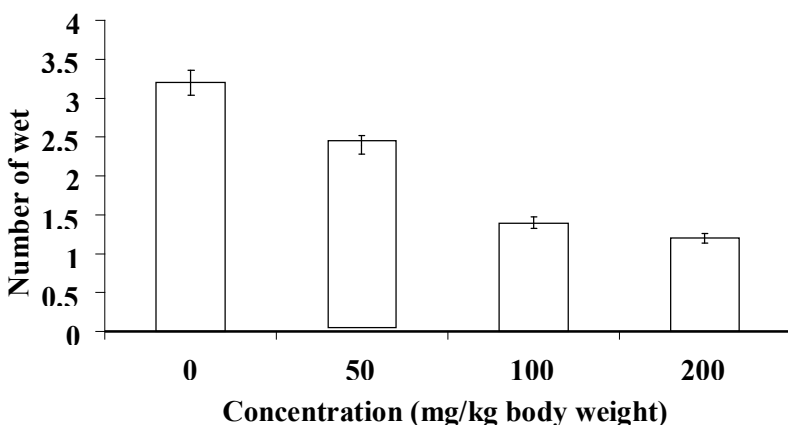


Fig I: Effect of methanolic *V. cinerea* whole plant extract (VME) number of wet faeces in castor oil-induced diarrhoea in rats.

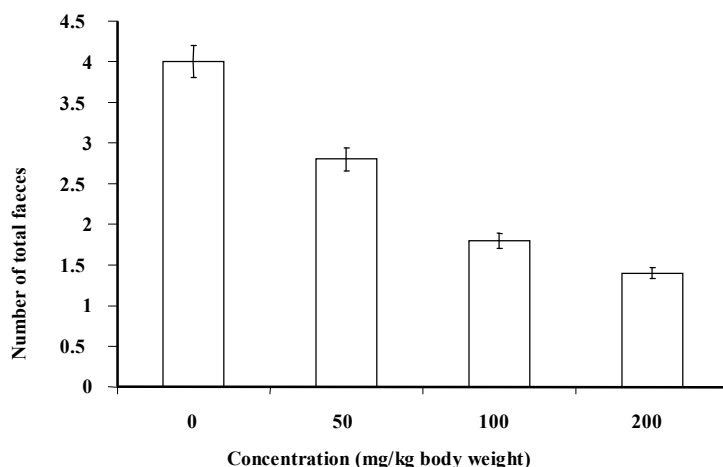


Fig II: Effect of methanolic *V. cinerea* whole plant extract (VME) number of total faeces in castor oil-induced diarrhoea in rats

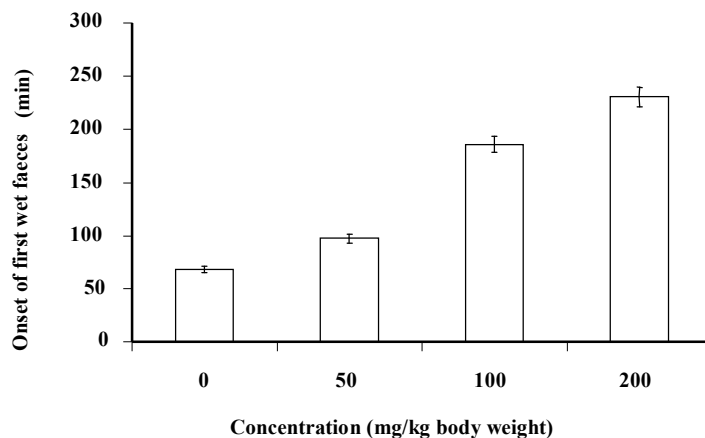


Fig III: Effect of methanolic *V. cinerea* whole plant extract (VME) onset of first wet faeces in castor oil-induced diarrhoea in rats.