



## ANTIDIARRHOEAL ACTIVITY OF ETHANOLIC ROOT EXTRACT OF *VITEX NEGUNDO* AGAINST CASTOR OIL INDUCED DIARRHOEA IN RATS

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### ABSTRACT

Traditionally the *Vitex negundo* root was used for the treatment of diarrhea. The ethanolic extract of *Vitex negundo* root was investigated for its anti-diarrhoeal property in Wister albino rats to validate its folklore claim. The ethanolic root extract of *Vitex negundo* at 250 mg/kg, was used to evaluate the anti-diarrhoeal activity against castor oil induced diarrhoea in rats. Diphenoxylate (50mg/kg) was used as reference control. The test drugs were administered through oral route by suspending in 0.1% Carboxy methyl Cellulose. After drug administration the mean total number of faecal, diarrhoeal faecal matter and percentage inhibition were calculated. The ethanolic root extract of *Vitex negundo* (250mg/kg) showed significant ( $P < 0.001$ ) decrease mean total number of faecal and diarrhoeal faecal matter compare to control groups. The effect produced by the *Vitex negundo* was comparable to that of standard drug diphenoxylate. From the result it was concluded that ethanolic root extract of *Vitex negundo* exhibits significant anti-diarrhoeal activity against castor oil induced diarrhoea in rats.

**Key words:** *Vitex negundo*, Anti-diarrhoeal activity, Castor oil, Diphenoxylate.

### INTRODUCTION

Diarrhoea is the passage of 3 or more loose or liquid stools per day, or more frequently than is normal for the individual. It is usually a symptom of gastrointestinal infection, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person to person as a result of poor hygiene. Severe diarrhoea leads to fluid loss, and may be life-threatening, particularly in young children and people who are malnourished or have impaired immunity. Diarrhea is the third most common cause of death in under-five children, responsible for 13% deaths in this age-group, killing an estimated 300,000 children in India each year (Bassani *et al.*, 2010).

It is a leading cause of malnutrition and death among children in the developing countries of the world today (Victoria *et al.*, 2000). Conventional drugs like diphenoxylate, loperamide and antibiotics are available for the treatment of diarrhoea but additionally it may produce side effects. Herbal medicines have been widely utilized as effective remedies for the prevention and treatment of multiple health conditions for centuries by almost every known culture which has been believed that it is free from side effects.

*Vitex negundo* Linn., commonly known as Five-leaved Chaste tree or Monk's Pepper is used as medicine fairly throughout the greater part of India and found mostly at warmer zones and ascending to an altitude of 1500m in outer Western Himalayas (Chopra *et al.*, 1956).

*Vitex negundo* Plant is bitter, acrid, astringent, cephalic, stomachic, antiseptic, alterant, thermogenic, depurative, rejuvenating, anti-gonorrhoeic, antiinflammatory, antipyretic and useful in bronchitis, asthma and enlargement of spleen. Roots are tonic, febrifuge, anti-rheumatic, diuretic, expectorant and are

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useful as a demulcent in dysentery, in cephalalgia, otalgia, colic, uropathy. Leaves are aromatic, bitter, acrid, astringent, anodyne, anti-inflammatory, antipyretic or febrifuge, tranquillizer, bronchial smooth muscle relaxant, anti-arthritis, antihelmintic and vermifuge. Flowers are cool, astringent and carminative. Fruit is nervine and emmenagogue and vermifuge (Hussain *et al.*, 1992) Only few of *Vitex negundo*'s ethnobotanical uses were scientifically proved, so the present study is conducted to validate its antidiarrhoeal activity. The study was planned to evaluate the antidiarrhoeal activity of ethanolic root extract of *Vitex negundo* in experimental animals.

## MATERIALS & METHODS

The Plant *Vitex negundo* was collected near Perundurai, Erode district in the month of October. The plant was identified and authenticated as *Vitex negundo* by the botanist, Agricultural University, Coimbatore. The Voucher specimen (34/2014) has been deposited in Herbarium for further references.

### Preparation of Extract

The roots were separated from the plant, washed with water and shade dried. With the mechanical blender, dried roots were coarsely powered. Dried course powders of the roots were extracted with 70% ethanol by using Soxhlet apparatus. The excess ethanol was removed by evaporation, until to get semi solid mass and stored in desiccators.

### Animals

Healthy male Wistar albino rats weighing between 180 – 200 gm were used for the study. The animals were obtained from animal house, of Nandha College of Pharmacy, Erode. The animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding.

## RESULT

**Table 1. Shows the anti-diarrhoeal activity of ethanolic root extract of *Vitex negundo* on castor induced diarrhea in rats**

Groups	Drug Treatment	Total Number of Faecal matter	Total Number of Diarrhoeal Faecal matter	%Inhibition
1	Control Castor Oil (1ml)	22.83±1.44	14.36±1.04	0.00
2	Castor Oil (1ml) + Diphenoxylate (5mg/kg)	6.52±0.53***	4.96±0.36***	65.46
3	Castor Oil (1ml) + <i>Vitex Negundo</i> (250mg/kg)	6.38±0.26***	5.17±0.27***	63.99

Values are in Mean ±SEM; (n=6) \*P<0.05, \*\* P<0.01 and\*\*\* \*P<0.001 Vs Control

## DISCUSSION

The effect of ethanolic root extract of *Vitex negundo* against castor oil induced diarrhea in rats was studied and results were shown on table 1. Total number of faecal matter, diarrhoeal faecal matter and percent of

Animals were housed at a temperature of 24±2°C and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee (688/02/C/CPCSEA) and were in accordance with the Institutional ethical guidelines.

### Castor Oil-Induced Diarrhoea

Rats were fasted for 18 h and divided into three groups of six animals each. Castor oil at a dose of 1 ml/animal orally, was given to all groups of animals for the induction of diarrhea (Doherty, 1981; Amresh *et al.*, 2004). Thirty minutes after castor oil administration, the first group (control group) received vehicle (0.1% Carboxy methyl Cellulose solution), while the second and third group animals received diphenoxylate (50 mg/kg ) and ethanolic root extract of *Vitex negundo* (250 mg/kg) respectively The test drugs were administered orally using gastric gavages by suspending in 0.1% CMC. Animals of all groups were placed separately in individual cages lined with filter paper. The filter papers were changed every hour and the severity of diarrhoea was assessed hourly for six hours. The total number of faeces excreted and the total weight of faeces were recorded within a period of six hour and compared with the control group. The total number of diarrhoeal faeces of the control group was considered 100%. The results were expressed as percentage of inhibition of diarrhea (Zaval *et al.*, 1988).

### Statistical Analysis

Results were expressed as mean ± SEM. The data were analyzed by using one way analysis of variance (ANOVA) followed by Dunnett's 't' test using GraphPad version 3. P values < 0.05 were considered as significant.

inhibition by the ethanolic root extract of *Vitex negundo* were observed for 6 hours. In control rats, the mean total number of faecal matter and diarrhoeal faecal matter were 22.83±1.44 and 14.36±1.04 respectively. In the reference

control, diphenoxylate treated animals, the mean total number of faecal matter and diarrhoeal faecal matter were  $6.52 \pm 0.53$  and  $4.96 \pm 0.36$  respectively. In the groups of ethanolic root extract of *Vitex negundo* treated animals, the mean total number of faecal matter and diarrhoeal faecal matter were  $6.38 \pm 0.26$  and  $5.17 \pm 0.27$  respectively. In Diphenoxylate and *Vitex negundo* treated groups, there was significant ( $P < 0.001$ ) decrease in the mean total number of faecal matter and diarrhoeal faecal matter as compared to control animals. The % inhibition was 65.46% and 63.99% with reference control diphenoxylate and ethanolic root extract of *Vitex negundo* respectively, when compared to control groups.

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## CONCLUSION

From the above result, it was concluded that, ethanolic root extract of *Vitex negundo* exhibited antidiarrhoeal activity, against castor oil induced diarrhoea in rats. Further studies needed on *Vitex negundo* in order to prove its mechanism of action.

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**CONFLICT OF INTEREST:**

The authors declare that they have no conflict of interest.