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## Anti-inflammatory activity of ethanolic extract of *Vitex negundo* linn roots

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### Abstract

The present study was undertaken to assess the anti-inflammatory effect of ethanolic extract of *Vitex negundo* roots in rats. The anti-inflammatory action was studied by Plethysmometer method. The ethanolic extract of *Vitex negundo* roots was screened for phytochemical analysis and revealed the presence of all components. The adult rats were divided into four groups of six each and maintained under ideal laboratory conditions. Group I was taken as control and group II treated with the standard drug Indomethacin (10 mg/kg), the ethanolic extract of *Vitex negundo* root 200 mg/kg and 400 mg/kg were fed to group III and IV. It is observed that the ethanolic extract of *Vitex negundo* roots shows considerable anti-inflammatory effect by using carrageenan induced rat paw edema method. The higher dose groups of *Vitex negundo* root extract (400 mg/kg) were revealed more activity than their corresponding lower dose.

**Keywords:** Nirgundi, Plethysmometer method, Ethanolic extract of *Vitex negundo* root, carrageenan induced rat paw edema method

### 1. Introduction

*Vitex negundo* Linn is commonly known as 'Nirgundi', is a large aromatic shrub belonging to family, Verbenaceae. It is an erect 2-5 m in height, found throughout the tropical, semi-tropical and warm temperature regions of India. It is also abundant along the bank of rivers in moist places and near the deciduous forests and the rural areas of the country. All the parts of the plant are used as medicine but the leaves and roots are more important and sold as drugs. Its leaves are reported to possess anti-inflammatory [1-4] and pesticidal [5] properties. Most of them had reported to have antifeedant, antibacterial activities, ant arthritic activity [6]. The roots are used in rheumatism, dyspepsia, dysentery, piles and considered as tonic, febrifuge, expectorant, antihelmintic, antiulcer [7] and diuretic. The flowers are astringent and are employed in fever, diarrhoea and liver complaints. The dried fruits are vermifuge and the bark is used in toothache. Previous studies on the stem barks of *Vitex negundo* have resulted in the isolation of many terpenes, sterols, phenolic compounds, flavonoids, alkaloids, organic acids, glycosides, and anthocyanines.

### 2. Material and Methods

**2.1 Plant Material:** The fresh plant of *Vitex negundo* Linn (Family: Verbenaceae) was collected from the Village Lalpur, a local area of Bareilly district. The plant was identified & authenticated by Dr. Alok Khare, Reader, Department of Botany and a specimen was kept for record at Bareilly College, Bareilly, UP, India. The plant was dried and powdered coarsely.

**2.2 Extraction:** About 400 gm of air dried coarse powdered was soaked with petroleum ether for 2 days. At the end of second day the powder was taken out and it was dried. After drying it was packed in 1000 ml soxhlet apparatus and extracted by using ethanol as solvent, till colour disappeared. The temperature was maintained at 55-65 °C. After that extract was concentrated by distillation and solvent was recovered. The final solution was evaporated to dryness. The colour, consistency and yield (16.75% w/v) of ethanolic extract were noted.

**2.3 Animals:** Adult male albino rats weighing about 200-220 g were used for study. The animal room was well ventilated with a 12 h light/ dark cycle throughout the experimental period. They were maintained in clean, polypropylene cages and fed with Mona Laboratory animal feeds for rats/mice (Manufactured by Raman Dairy Vikash Udyog and Marketed by Pashu Aahar Kendra, Varanasi, UP, India) and water ad libitum [8]. Institutional Animals

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Ethics Committee (IAEC) approved the experimental protocol and care of animals was taken as per guidelines of CPCSEA, Department of Animal Welfare and Government of India [9].

## 2.4 Anti-inflammatory activity [10]

### 2.4.1 Carrageenan Induced Paw Edema

Anti-inflammatory activity was evaluated by using the Carrageenan induced rat paw edema method [13-14]. After 16 hr of fast the rats were divided into four groups of three each.

Group I - served as control group, received 1% CMC w/v.

Group II - served as standard, received Indomethacin (10 mg/kg)

Group III - served as test, received ethanolic extract of *Vitex negundo* roots (200 mg/kg)

Group IV - served as test received ethanolic extract of *Vitex negundo* roots (400 mg/kg)

After one hour the respective treatment 0.1 ml of 1% w/v Carrageenan suspension was injected subcutaneously into the plantar surface of the right hind paw. The paw volume was measured by using a plethysmometer immediately after 1, 2, 3, 4 h of carrageenan treatment. The anti-inflammatory effect of ethanolic extract of *Vitex negundo* root was calculated by following equation.

The anti-inflammatory (%) inhibition =  $[(A-B)/A] \times 100$

(ie) =  $[(1-B/A)] \times 100$  Where,

A- Represents the paw volume of control group.

B- Represents the paw volume of treated group.

**Table 1:** Anti-inflammatory activity by Carrageenan induced paw oedema method

Drug	Dose	Carrageenan induced paw oedema (volume in ml)					
		0hr	60min	120min	180min	240min	300min
Control	-	0.314±0.0082	0.31 ± 0.0057	0.34±0.0021	0.402± 0.0034	0.374 ±0.004	0.366±0.003
Vitex negundo root extract	200 mg/kg	0.207 ± 0.006 (34.07)	0.265±0.003 (14.51)	0.292±0.003 (14.11)	0.23±0.0057 (42.78)	0.218 ±0.003 (41.71)	0.194±0.002 (46.99)
	400 mg/kg	0.22 ± 0.003 (29.93)	0.261±0.008 (15.80)	0.251±0.003 (26.17)	0.21± 0.005 (47.76)	0.179 ±0.004 (52.13)	0.159±0.007 (56.55)
Standard	10 mg/kg	0.204± 0.003 (35.03)	0.264±0.008 (14.83)	0.261±0.003 (23.23)	0.224± 0.006 (44.27)	0.15 ± 0.005 (59.89)	0.144±0.003 (60.65)

**Statistical Analysis** The results were presented as Mean ± S.E.M. One way analysis of variance (ANOVA) was followed by Dennett's-test for multiple comparisons statistical evaluation.

### 3. Result and Discussion

The result of anti-inflammatory activity by Carrageenan induced paw oedema method was tabulated in Table No-1. The extract found to have significant ( $P < 0.05$ ) anti-inflammatory activity in rats. The extract at the test doses 200 and 400 mg/kg body weight reduced the oedema induced by Carrageenan by 46.99% and 56.55% respectively, where as the standard drug showed 60.65% 5 h in table no.1

### 4. Conclusion

The *Vitex negundo* Linn extract found to have significant ( $P < 0.05$ ) anti-inflammatory activity in rats. In the present study, the results revealed that administration of ethanolic extract of *Vitex negundo*. Linn inhibited by edema starting from the first hour and during all phases of inflammation.

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