

A REVIEW ARTICLE ON PHARMACOLOGICAL ACTIVITY OF VITEX NEGUNDO

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ABSTRACT

Plant research have been widely increased all over the world for the effective development of drugs from herbal plants. *Vitex negundo* Linn is a n Indian plant which having wide variety of pharmacological actions. Various experimental studies have been conducted on this plant by professionals all over the world. This review aims to focus the medicinal values of *Vitex negundo*.

KEYWORDS: *Vitex negundo*, Phytoconstituents, Medicinal use, Pharmacological activities.

INTRODUCTION

Vitex negundo Linn. (Verbenaceae) is a woody, aromatic shrub growing to a small tree. The plant flourishes in humid environments and can be found along waterways in both wastelands and mixed open forests. It has been documented in various locations including Afghanistan, India, Pakistan, Sri Lanka, Thailand, Malaysia, eastern Africa, and Madagascar.^[1]



Fig. 1: *Vitex negundo*.

The *Vitex negundo* Linn., (Fig.1) commonly known as the Five-leaved Chaste tree or Monk's Pepper, is widely used as a medicinal plant across much of India. It is predominantly found in warmer regions, and can grow at elevations up to 1500 meters in the outer Western Himalayas. It shows various pharmacological activities including analgesic, anti-inflammatory, anticonvulsant, antioxidant, insecticidal and pesticidal activities.^[2]

Taxonomic classification^[4]

Kingdom - Plantae Class - Magnoliopsida Order - Lamiales Family - Verbenaceae Genus - *Vitex* linn
Species - *Vitex negundo* Linn. (Chaste tree)

Vernacular names

Malayalam: Vellanocchi, Indranee, Karunacci Hindi: Shivari, Nirgundi
English: Five leaved chaste tree
Kannada: Nkkilu, Lakkigida, Nekka, Nakkigida Telugu : Vaavili
Tamil: Nirkundi, Vellai-nochi

PHYTOCONSTITUENTS

The phytochemical screening of *Vitex negundo* L. uncovered the presence of a few key mixtures, including phlobatannins, carbs, tannins, glycosides, unstable oils, gums, resins, flavonoids, and saponins. The recognition of flavonoids proposes the plant might have cell reinforcement, against hypersensitive, mitigating, antimicrobial, and anticancer properties.

Moreover, the presence of tannins shows the plant has astringent characteristics and potential antiviral and antibacterial exercises that could help with wound recuperating and treatment of consumes. The saps and ambers tracked down help the plant's conventional use as an emollient and demulcent, possibly helping conditions like sore throat, stiffness, wounds, and consumes. Because some saponins and glycosides have cardioactive effects and may be useful in the treatment of heart conditions, they are also important secondary metabolites.

Besides, the unstable oils found in *Vitex negundo* L. have various modern purposes, filling in as drug/restorative unrefined components for emollients and demulcents, as well as dynamic elements for respiratory plot diseases. These unpredictable oils, like eucalyptus, lemon, and peppermint, are additionally used as enhancing specialists, in fragrance based treatment, and in perfumery. Quite, the compound thymol, which was identified, has been accounted for to have antibacterial properties.^[3]

Table 1: Phytochemical analysis of *Vitex negundo*.^[3]

Secondary metabolites	Stem and leaf
Carbohydrate	Positive
Tannins	Positive
Glycoside	Positive
Terpenes	Negative
Sterols	Negative
Volatile oils	Positive
Resins	Positive
Balsams	Positive
Flavonoids	Positive
Saponins	Positive
Phenols	Negative
Antraquinones	Negative

MEDICINAL USE

Roots and barks are used for relieving intermittent fever, thirst and body pain. Leaves are used for treating ophthalmia, deafness, indigestion, piles and Jaundice, were as, leaf juices are used in curing catarrh and fever. Tender fruits are bitter astringent, antilaxatives, digestion, promote digestion and strength, as well as overcome diarrhea and dysentery. Ripe Fruits are having nutritious, cooling, used in treating indigestion and to improve vision.^[4]

PHARMACOLOGICAL ACTIVITIES

Anticancer activity

Cytotoxicity of flavones isolated from the chloroform extract of *Vitex negundo* leaves. Vitexicarpin, a flavone was investigated for its cytotoxic action in human cancer cell line.^[5]

Table 2: cytotoxicity of chloroform extract of *Vitex negundo*.^[4]

Concentration µg/ml	Percentage of cytotoxicity %
200 µg	100%
100 µg	100%
50 µg	41%
20 µg	16%
10 µg	7%

Antimicrobial Activity

Antibacterial & antifungal activity of Vitexilactone & Casticin from the chloroform extract of *Vitex negundo* leaves against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans* & *Aspergillus niger* using

agar plate method.^[5]

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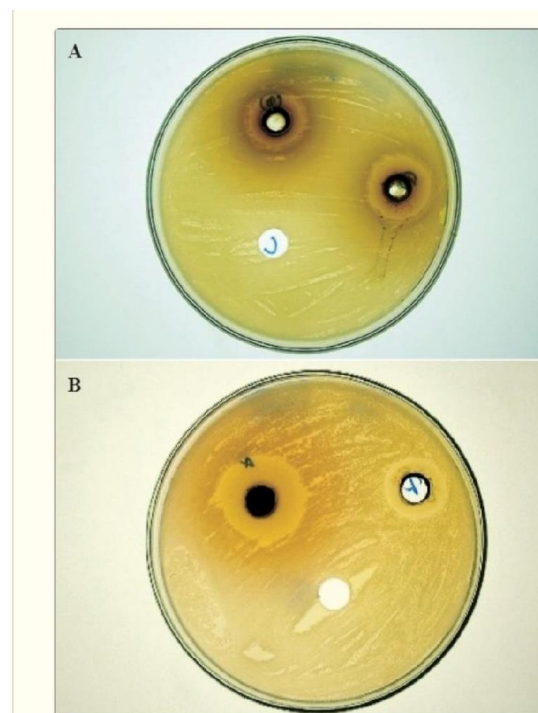


Fig.1

Antibacterial activity of *Vitex negundo* Linn. extracts

(A) Against *Pseudomonas aeruginosa*, 5-ethylacetate extract (AI=1.4), 7-ethanol extract (AI=1.2), C-DMSO (AI=0) and (B) against *Escherichia coli* 2-flowers oil (AI=0.8), 4-

Figure 2.^[1]

Anti-inflammatory Activity

Anti-inflammatory activity of chloroform extract of seeds of *Vitex negundo* in Sprague-Dawley male rats in carrageenan induced rat paw edema using Ibuprofen as standard drug.^[5]

Anti-inflammatory activity from the ethanolic extract of *Vitex negundo* leaves in albino rats (of either sex) using carrageenan-induced rat paw oedema and cotton pellet granuloma models using phenylbutazone (10-100 mg) and ibuprofen (10-200 mg) as standards.^[5]

Table 3: Anti inflammatory activity-% edema over treatment period.^[1]

Group	% Oedema \pm SD			
	1st h	2nd h	3rd h	4th h
Vehicle control (n=14)	2.71 \pm 13.10	38.23 \pm 21.80	44.21 \pm 25.56	40.00 \pm 38.13
Diclofenac sodium (Standard control) 25 mg/kg, (n=13)	13.14 \pm 11.64	14.30 \pm 12.60	14.52 \pm 14.15*	10.82 \pm 10.98
V. negundo extract (50% Methanol) 100 mg/kg, (n=7)	7.18 \pm 3.39	13.83 \pm 10.16	13.67 \pm 5.14*	21.52 \pm 10.58

* <0.05 **Anti-convulsant activity**

Vitex negundo exhibits anticonvulsant properties, especially in the context of convulsions induced by PTZ. Additionally, its ability to enhance the effects of diphenylhydantoin and valproic acid suggests that it could serve as a valuable adjunct therapy alongside conventional anticonvulsants, potentially reducing the necessary dosages of diphenylhydantoin and valproic acid.^[6]

Immuno-stimulant Activity

Immunostimulatory activity from the extracts of Vitex negundo in oxyburst phagocytic assay using human polymorph nuclear cells have been reported and Immunostimulatory potential of two iridoid glucosoides from Vitex negundo leaves.^[5]

Antioxidant Activity

Antioxidant potential of Vitedoin A, Vitedoin B and other lignans derivatives from the seeds of Vitex negundo and also anti-oxidant effect of Vitexin which is a new compound.^[5]

CNS Activity

CNS activity & anticonvulsant activities of petroleum ether & methanolic extracts of Vitex negundo in mice.^[5]

Anti-androgenic Activity

Antiandrogenic activity of various flavonoids from the seeds of Vitex negundo. The flavonoids which shows estrogenic properties as well as anti-implantation activities are 5, 7, 3'-trihydroxy and 6, 8, 4'- trihydroxy flavones.^[5]

Anti-histaminic Activity

Tested antihistaminic property of methanolic extract of Vitex negundo leaves. The said extract was found to be active against histamine release from mast cells.^[5]

Analgesic Activity

Analgesic activity from the aqueous extract of fresh leaves of Vitex negundo in female Wistar rats using hot plate, tail flick and formalin tests. The standard drug used in hot plate and tail flick was aspirin (100 mg/kg).^[5]

Table 4: Reaction Time (Sec) for Different Drug Treatments^[1]

Group	Drug Treatment	Basal Reaction Time (Sec)	30min	60min	90min	120min
I	5ml/kg of water	4.56 \pm 0.03	5.183 \pm 0.03* (33.03)	5.42 \pm 0.031* (18.84)	6.067 \pm 0.012* (13.66)	6.23 \pm 0.014* (36.60)
II	Diclofenac sodium (9mg/kg I.P.)	4.334 \pm 0.030	7.890 \pm 0.05*a (82.16)	7.25 \pm 0.04*a (67.40)	7.02 \pm 0.015*a (61.80)	6.81 \pm 0.011*a (57.20)
III	Vitex negundo (200 mg/kg, p.o.)	5.052 \pm 0.016	5.360 \pm 0.01* (12.14)	5.60 \pm 0.014* (17.16)	6.083 \pm 0.008* (27.27)	6.313 \pm 0.009* (32.08)
IV	Vitex negundo (300 mg/kg, p.o.)	4.917 \pm 0.024	7.29 \pm 0.04*ab (44.28)	7.68 \pm 0.033*ab (52.04)	6.96 \pm 0.017*a (37.78)	7.04 \pm 0.01*ab (39.43)

* $P<0.01$ vs. Baseline value of the respective drug group, a $P<0.001$ vs Control, b $P<0.001$ vs Diclofenac sodium, (n=6/group), One-way ANOVA; SEM = Standard error of mean.

Mosquito repellent Activity

Mosquito repellent activity of aqueous extract of Vitex negundo leaves. A new chemical 'rotundial' was tested for the said activity.^[5]

DISCUSSION

Vitex negundo, commonly referred to as Nirgundi, is recognized for its wide-ranging pharmacological attributes. It possesses significant anti-inflammatory and antioxidant properties, which aid in alleviating pain and addressing inflammatory disorders. The herb exhibits

antimicrobial effects against various bacteria and fungi, and preliminary research indicates possible anticancer properties. Furthermore, it demonstrates neuroprotective effects that may be advantageous for conditions such as Alzheimer's disease, along with antidiabetic and hepatoprotective benefits observed in animal studies. Vitex negundo may also provide relief for allergic conditions and play a role in regulating hormonal balance, particularly in relation to menstrual issues. These therapeutic effects are primarily linked to its phytochemical constituents, including flavonoids and

terpenoids. Nonetheless, additional clinical investigations are necessary to validate these findings in human subjects.

CONCLUSION

Vitex Negundo is having wide variety of biological activities which is already proved by many experimental studies. So this plant can be utilized for the drug development for various diseases. However, prior to considering it for clinical use in these situations, it is essential to conduct clinical trials and establish its clinical efficacy. In this review, we aim to cover the existing literature on Vitex negundo, focusing on its traditional uses, chemical components, and a summary of its diverse pharmacological effects.

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