



The Overall Study of Vitex Nirgundi Plant

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Abstract: Globally, there has been a recent surge in interest in plant study, and a substantial amount of data has accumulated to demonstrate the enormous potential of medicinal plants utilised in diverse traditional systems. Research has focused on finding and confirming plant-derived compounds for the treatment of a variety of ailments in the past few years. Around the world, *Vitex negundo*, also known as *nirgundi* in Hindi and Sanskrit, is a deciduous shrub that has become naturalised. There are many who believe that it started in the Philippines and India. The Vedas make no mention of *nirgundi*, although post-Vedic literature makes multiple references to it. The plant is used in many different ways in India, including basketry, dyeing, fuel, food, field pesticide, growth stimulant, stored-grain protectant, manure, and human and animal medicine. It is a component of allopathic, homoeopathic, Siddha, Unani, and Ayurvedic medicine systems. This study reviews the pharmacological properties and general therapeutic uses of several plant components.

Keywords: *Vitex Nirgundi, Nirgundi oil, Ayurveda, Antibacterial activity Anti-inflammatory.*

INTRODUCTION

Known locally as "nirgundi," *Vitex negundo* is a herb that is native to India and is a member of the Verbenaceae family. Any plant or chemical that shields the body against disease is referred to as "nirgundi" in Sanskrit. The Nirgundi plant grows to a height of 4.5–5.5 metres as a huge, aromatic shrub, or occasionally as a smaller, thin tree with quadrangular, densely white tomentose branchlets. Thin, gray-yellow bark; 3–5 foliolate leaves; lanceolate leaflets; 5–10 × 1.6–2.3 cm terminal leaflets, 1 smaller lateral leaflet, all almost glabrous. The leaves have a green upper surface and a silvery beneath surface.

When ripe, the bluish purple flower turns black, while the cylindrical, long, woody roots have a tortuous, grey-brown appearance. The volatile aromatic oil known as nirgundi oil is derived from the leaves of the *Vitex negundo* plant, also called the three- or five-leaf chaste tree. Castor oil, sometimes referred to as Erande regionally, is a vegetable oil that is extracted by pressing the seeds of *Ricinus Communis*. *Vitex negundo* Linn. is an essential oil that is used to cure a variety of conditions, such as rheumatoid arthritis, gonorrhoea, bronchitis, leukoderma, eye disease, toothache, inflammation, and skin ulcers. In addition, it's utilised as a tonic, emmenagogue, lactagogue, vermifuge, antimicrobial, antipyretic, and antihistaminic.



Different names:

1. Botanical Name: *Vitex negundo*
2. Sanskrit: Nirgundi, Sindhuvara, Neelamanjari
3. Indrasurasa, Bhoothakeshi, Neelika
4. Hindi: Samhalu, Saubhalu, Nirgnegundl
5. English: Five-leaved chaste tree
6. Bengali: Nirgundi, Nishinda
7. Gujarati: Nagod
8. Kannada: Bile-nekki
9. Malayalam: Indrani
10. Telugu: Nallavalli, Vavilli, Tellavavilli
11. Tamil: Nirkunuchi, Nallanochi

Chemical constituents:

Flavonoids, volatile oil, triterpenes, diterpenes, sesquiterpenes, lignan, flavones, glycosides, iridoid glycosides, and stilbene derivatives are only a few of the numerous chemical components found in plants. Every portion of the plant has these chemical components.

Family: Verbenaceae.

Parts used: root, leaves, flowers, fruits, bark.

Pharmacological Activities**Anti-inflammatory activity**

Experiments conducted on a variety of animal models have shown that the plant's leaves, fruits, roots, and seeds, in particular, have anti-inflammatory and anti-arthritis properties.

Antibacterial activity

Essential oils and *Vitex negundo* Linn. consecutive ethyl acetate and ethanol extracts demonstrated antibacterial efficacy against strains of *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*. D-guaiene, carryophyllene epoxide, and ethylhexadecanoate were the primary components found in leaf oil; α -selinene, germacrene-4-ol, carryophyllene epoxide, and (E)-nerolidol were found in flower oil; and β -selinene, α -cedrene, germacrene D, and hexadecanoic acid were found to be the primary components that contribute to antibacterial activity in fruit oil.

Analgesic activity

Several investigations have revealed that essential oil, leaf and other parts of *V. negundo* possess strong peripheral and central analgesic action in experimental animals. Further, it was also proposed that sub-therapeutic doses of *V. negundo* plant can perhaps amplify the efficacy of analgesic medications such as aspirin, meperidine etc., and therefore may be utilised as an adjunct to analgesic therapy.

CNS depressant activity:

It was discovered that a methanolic extract of *Vitex negundo* Linn. leaves considerably increased the amount of time mice slept when given pentobarbitone sodium, diazepam, and chlorpromazine.

Antifungal activity:

The Bidactivity The ethanolic extract of *Vitex negundo* Linn. leaves was fractionated under guidance, yielding five recognised chemicals and a novel flavone glycoside. At MIC 6.25 $\mu\text{g/ml}$, it was discovered that compound 5 and the novel flavone glycoside exhibited noteworthy antifungal activity against *Trichophyton mentagrophytes* and *Cryptococcus neoformans*.

Wormicidal activity:

To test the ethanolic extracts of *Vitex negundo* and *Moringa oleifera*'s anthelmintic properties against the Indian earthworm *Pheritima posthuma*. Both plant extracts showed dose-dependent efficacy, however The activity of *Moringa oleifera* is higher than that of *Vitex negundo*.

Snake venom neutralization activity:

The *Vitex negundo* Linn. root extracts in methanol Also demonstrating antisnake venom efficacy was *Emblica officinalis*. *Vitex negundo* Linn. is the plant. In both in vitro and in vivo experiments, extracts dramatically inhibited the fatal activity generated by the venom of *Vipera russellii* and *Naja kaouthia*. *Vipera russellii* venom-induced haemorrhage, coagulant, defibrinogenating and inflammatory activity were considerably neutralised by both plant extracts. There were no discernible precipitating bands between the snake venom and the plant extract.

Antiallergic Activity:

Vitex negundo Linn. ethanolic extract exhibited antiallergic action against mast cell degranulation triggered by immunological stimulation.



Parts used	Chemical constituents	Action
Leaves	Leaves contain an alkaloid nishidine, flavonoids like flavones, luteolin-7-glucoside, casticin, iridoid glycoside, benzoic acid, β -sitosterol and C-glycoside	Vitamin C
Seeds	hydrocarbons, β -sitosterol, benzoic acid and phthalic acid	Anti-inflammatory
Root	Vitexoside, agnuside, R-dalbergiphenol, negundin A, negundin B, 6-hydroxy-4-(4-hydroxy-3-methoxy)-3-hydroxymethyl-7-methoxy-3,4-dihydro-2-naphthaldehyde	Rheumatic ailments, diuretic, growth of hair, body pain.
Flower	flower essential oil were formic acid, n- heptane, p cymene, β -caryophyllene, trans-a-bergamotene, valencene, a-selinene, β -selinene, germacren-4-ol, caryophyllene epoxide	Analgesic, anti-inflammatory, anti-asthmatic.
Fruit	copaene, β -caryophyllene, a-cedrene, a- guaiane, guaia-3, 7-diene, a-humulene, aristolene, germacrene D, B-selinene, caryophyllene oxide, n hexadecanoic acid, palmitolic acid	Nutritious, cooling, used in treating indigestion and to improve vision.

Extraction Process:

The leaves were finely cut and allowed to dry for a week in the shade. A mechanical blender was then used to coarsely grind the dried ingredients.

Nirgundi leaves that had been pulverised and weighed a total of 20 g were extracted using the maceration process, which involved covering the leaves with aluminium foil and shaking them occasionally for two days while using 20 ml of 70% ethanol as a solvent.

Using a rotary evaporator, the ethanolic extract of Nirgundi leaves was filtered and concentrated until it was dry at low pressure and regulated temperature.

Until it was needed again, the extract was kept in airtight containers at 4°C in the refrigerator.

Preliminary Tests Of Extract:

The active components found in the plant extracts of ethanol were examined phytochemically. The substances were examined using qualitative biochemical assays to determine whether phenol, coumarin, reducing sugar, saponin, and steroids were present.

Reducing Sugar

The extract (1 ml) was first combined with 1 ml of water in a test tube along with 20 drops of Fehling's reagent that had been brought to a boil.

The presence of reducing sugars is indicated by the production of a precipitate red-brick at the tube's bottom.

Test for Saponins

In a test tube, a small amount of distilled water was added to 1 millilitre of extract. After giving the mixture a good shake, the mixture was watched for a stable, long-lasting foam for 20 minutes.

Test for Phenols

Two millilitres of distilled water and a few drops of a 10% aqueous ferric chloride solution were added to one millilitre of the sample extract. Phenols were present when a blue or green hue formed.

Test for Coumarin

Put 5 millilitres of extract and 2 millilitres of 10% NaOH in a test tube. The presence of coumarin is shown by the yellow colour after five minutes of boiling.

Test for Steroids

One millilitre of the extract was placed in a test tube with the least amount of chloroform possible. Three to four drops of acetic anhydride were then added, and finally, one drop of concentrated sulfuric acid. Blue green replaced the violet hue, signifying the presence of steroids.

Physicochemical Parameter

Sr. no	Physicochemical Parameter	Result
1	Plant part	Leaves
2	Colour	Greenish brown
3	Odour	Aromatic
4	Solubility	Soluble in Ethanol, ethyl acetate
5	Viscosity	6 centistok
6	Relative Density	0.92
7	Refractive Index	1.49
8	Iodine value	124
9	Saponification value	148
10	Unsaponification matter	8.4%
11	Acid value	11.9

Phytochemical Tests

Sr. no	Test	Observation	Result
1	Alkaloids- Wagner's Test	Reddish brown Precipitate	Negative
2	Carbohydrates-Fehling's	Brick red precipitate	Positive
3	Anthraquinone Glycosides- Borntrager's Test	Ammonical layer appears pink	Negative
4	Saponin Glycosides- Foam test	Persistent foam	Positive
5	Flavonoids- Shinoda test	Reddish purple color	Positive
6	Phenolics- Ferric Chloride test	Blue black Color	Negative
7	Tannins- Gelatin test	White Precipitate	Positive
8	Steroids- Salkowski test	Chloroform layer appears red	Negative

		and acid layer appears yellow	
9	Type of Oil-Filter Paper test	Stain on filter paper- Fixed oil is Present	Negative Volatile oil

Chromatographic standardization

Sr. no	Sample	Mobile phase	Visualisation	Rf value
1	Nirgundi oil	Toulene: Ethyl Acetate: Formic Acid (6:4:0.3)	In UV Spectrophotometer at 254 nm	0.44

Conclusion: The nirgundi is Because of its many medical benefits, Vitex negundo is a very significant herb that has been utilised for years. It has anti-allergic, anti-inflammatory, antibacterial, antianalgesic, central nervous system depressive, antifungal, wormicidal, and neutralising properties against snake venom. Nirgundi is further reinforced by the discovery and isolation of a few key chemical components, mainly flavanoids, from several plant parts, including leaves, flowers, bark, seeds, and roots. The key to the next generation developing into a healthy society in every way is the plantation and the advertising of the plant as having therapeutic qualities. Numerous experimental research, including the extraction procedure, preliminary extract testing, phytochemical test, physicochemical parameter, and chromatography standardisation, have demonstrated the wide range of biological activity possessed by V. negundo.

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