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An Overview of Nirgundi (*Vitex negundo*): A Traditional Ayurvedic Herb for Pain Relief and Healing

Review Article

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Abstract

Vitex negundo is commonly referred to as Nirgundi, which is a small aromatic medicinal plant widely used by traditional as well as modern systems of medicine. In Ayurvedic medicine, Nirgundi is used because it has the ability to control the balance between *vata and kapha doshas*, as it possesses bitter, pungent, and astringent rasa (taste). Classical texts describe it as possessing *sheeta* (cooling) or *ushna* (warming) properties according to preparation, making it versatile in treating a wide range of diseases. *Nirgundi* has also been traditionally used for anxiety, pain, inflammation, and other disorders like respiration, or liver dysfunction etc. Its time-honoured uses have been validated by extensive pharmacological studies, confirming a broad range of bioactive effects. *Vitex negundo* shows strong analgesic, anti-inflammatory, anticancer, cardiotonic, antihistaminic, anti-asthmatic, anxiolytic, and hepatoprotective activities. Its bioactivities prove to be helpful for the treatment of arthritis, asthma, allergic conditions, cardiovascular disorders, and mental illness. The possibility of its hepatoprotective role underscores the protection of the liver from toxic and potential damage effects. Its anticancer potential is considerably of interest in research on oncology. Strong efficacy in both experimental and clinical studies by various applications, this herb finds legitimacy in the disciplines of integrative medicine. Its multifarious pharmacological profile and a very benign safety profile open opportunities for the creation of drugs and alternative health practices. This review focuses on the holistic health benefits of the *Vitex negundo*, highlighting its relevance in both traditional and modern healthcare systems. It has an elaborate pharmacological activity profile and is a highly important botanical resource for the betterment of health and well-being of humans, including animals.

Keywords: Anti-inflammatory, Analgesic, Ayurveda, Complementary and Alternative Medicine, Herbal Drugs, Traditional Herb.

Introduction

Nirgundi (*Vitex negundo*) is a large aromatic the five-leafed shrub tree. This plant is of the Verbenaceae family. Nearly each component of this plant has therapeutic significance, and it is used to treat a wide range of illnesses in traditional alternative medicine systems including Ayurveda, alternative, Siddha, and Unani.(1) The Vitex plant describes its medicinal importance in Sanskrit. **"Nirgudati Shareeram Rakshati Rogebhyah.**" Nirgundi is the term for the person who defends the body from illness.(2) This plant is a fiery scented plant. It is a deciduous shrub of Its plant is bushy 6-12 feet high, covered with microscopic hairs and aromatic.This species is also seen throughout the greater part of India and often gown for reclamation of forest land.(3) This study presents not only the importance of Nirgundi but also traditional and modern medical uses of Nirgundi based on pain relief.

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Geographical distribution of Nirgundi (*Vitex negundo*) –

Over the world, Nirgundi is grown in China and the West Indies, America, Europe, Afghanistan, Pakistan, India, Sri Lanka, Thailand, Malaysia, and Eastern Africa and Madagascar. It also grows well in wastelands and mixed open forests near water channels or in humid conditions. Plants that are fruit bearing and in flower from March to August.(5)

Properties of Nirgundi (*Vitex negundo*):

There are some following properties of Nirgundi on the basis of Ayurvedic texts-

निर्गुन्डी कटुतिक्तोष्णा कृमिकुष्टरुजापहा।
वात्श्लेष्मप्रशमनी प्लीहगुल्मारुचीरजयेत्॥ (ध. नि.)(6)
निर्गुण्डी तुवरा तिक्ता मेध्या शीतोषणा लघुः॥
चतुष्या दीपनी केश्या कफानिल विषापहा।
हन्त्यरोचक शूलाम गुल्म मेदोव्रणकृमीन्॥
शोफकुष्टप्रतिश्याय श्वासकासांश्च सा द्विधा॥

शेफालिका तयोः पथ्या विषपित्तविनाशिनी॥
श्लेष्मानिलघ्नं लघुदीपनीयं, निर्गुण्डिकाया कृमिघातिपत्रम्।
कषायं कटुकं तिक्तं दुष्टव्रणविशोधनम्।
बलासानिल वातास कुष्ठकण्डू विषप्रणुत्॥ (कै.नि ११४ / ३४२)(7)
सिन्दुकः स्मृतिदस्तिक्तः कषायः कटुको लघुः।
केश्यो नेत्रहितो हन्ति शूल शोथाम मारुतान्।
कृमिकोष्ठारुचि श्लेष्मज्वरान्नीलापि तद्विधा॥ (भा.प्र.)

Nirgundi enhances concentration. It aids in hair growth and is good for the eyes. Nirgundi reduces pain, inflammation and works in worm infections, skin disorders and loss of appetite. Along with this, it is useful in rheumatoid arthritis and fever caused due to Kapha imbalance.(8)

Figure 1: *Nirgundi* (4)

Taxonomical Classification of Nirgundi (*Vitex negundo*) – There is botanical classification of Nirgundi (Vitex negundo) (9) –

Kingdom	**Plantae**
Subkingdom	Tracheobionta
Division	Tracheobionta
Class	Magnoliopsida
Subclass	Asteridae
Order	Lamiales
Family	Verbenaceae
Genus	*Vitex*
Species	*Negundo*

Vernacular Names of Nirgundi:(10) -

Table 1: Vernacular names

Language	Name
Botanical Name	Vitex Negundo
Sanskrit	Sindhuvara, Nirgundi, Bhoothakeshi, Indrasurasa, Neelamanjari, Neelika.
Hindi	Nirgundi, Samhalu, Newri, shiwali, shivari, sinuar, sinduari, siwain, bannah, nirgud, veeru, tarvan, shimalu, kali-nirgundi, shinduca, sinduari, khanni etc.
English	Indian privet, Five-leaved chaste tree.
Bengali	Nishinda, Nirgundi.
Gujarati	Nagod
Kannada	Bile-nekki
Malayalam	Indrani
Tamil	Nirkunnchi, Nallanochi
Telugu	Nallavalli, Vavilli, Tellavavilli, chirvaavili, mella-vavili, vavalipadu.

Traditional properties of Nirgundi (*Vitex negundo*) –

Traditional property of Nirgundi (*Vitex negundo*) is used worldwide.(11) These are following–

Table 2: Traditional properties of Nirgundi

1	Rasa	Kashaya, Katu
2	Guna	Laghu
3	Veerya	Usna
4	Vipaka	Katu
5	Karma	Krimighna

Effects on Doshas of Nirgundi (Vitex Negundo) –

Dosha-karma - Due to being Ushna virya, it is Vata, Kapha shamak.(12)

Which part used: Root, leaves, flowers, fruits, bark. (13)

Classical Uses of Nirgundi (Vitex Negundo): These are following classical Uses of Vitex Negundo(14) –
Charaka Samhita: Visaghna –Anti-poisonous shrub. Krimighna – Anti-helminthic shrub (15)
Susrutha Samhita: Surasadi (16)

Morphological Characteristics of Nirgundi (Vitex negundo): A shrub or small tree about 3 metre or 6-12 feet in height. There are following morphological character.
Leaves: The leaves are broken or unbroken like arhar. On a tree, three to five leaflets, 2-6-inch-long leaves, give a distinctive smell and middle one will be longer.
Flowers: Flowers are lavender blue. There is a variety "incisa" in this species, which is with deeply toothed leaves.Small, bluish purple up to 30 cm long and in lateral cymes.
Fruits: Fruit - spherical, 12-inch diameter when ripe there are black colours. Globose and black when ripe.
Seeds: Obovate or oblong. (17)

Figure 2: Nirgundi (Vitex negundo) – Leaf-stem(18), flower(19), root(20) and seeds(21)

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Table 3: Pharmacodynamic Properties of Nirgundi (Vitex negundo) according to texts of Ayurveda

Name of text	Properties				
Nighantu	Rasa	Guna	Virya	Vipaka	Prabhava
Bhavaprakash Nighantu(22), (23), (24)	Katu, Kashaya	Laghu	Ushna	Katu	Vata, Kapha Nashak
Shankar Nighantu(25)	Katu, Kasaya	Charpy, bitter, dry, hot, astringent, reminiscent, beneficial to the eyes, beautifying the hair, lightening the fire, irritating, pigmentary and anti-inflammatory, cough, removes breathlessness and bile.	Ushna	Katu	Vata, Kapha Nashak
Dhanvantari nighantu(26)	Katu, Tikta	It destroys worms, leprosy, vata, phlegm, spleen disease, gum and anorexia.	Ushna	Katu	Vata, Kapha rog Nashak
Kaidev niaghantu(27)	Katu, Tikta, Kashya, Medhya	Laghu	Sheet-Ushna	Katu	Vata, kapha Nashak, Krimighna, vish-pitta Vinashini
Mahaushadh Nighantu(28)	Katu, Tikta, Kashya, Medhya	Laghu	Ushna	Katu	Kaphghna, Vataghna, Vishaghna, Krimighna, Vedanasthapaka.

Chemical constituents of Nirgundi (*Vitex negundo*) and their Clinical Uses(29) –

These are following chemical constituents are found in Nirgundi (Vitex negundo)**.**

Table 4: Chemical constituents of Nirgundi (*Vitex negundo*) and their Clinical Uses (29)

Serial Number	Parts of Nirgundi (Vitex-negundo)	Chemical Constituents	Clinical Uses
1	Leaves	α -pinene, camphene, caryophyllene, citrol, zalaloids nishidine and hydrocotylene, amorphous glucoside, iridoid glucoside, phenolic acids, flavonoids casticin and luteolin. Leaves(30)	1.Hot infusion of the leaves very much useful in arthritis, myalgia and colics. 2. Bathing with infusion relieves body pains. 3. Leaf powder increases the sperm count in a period of 12-16 wks. Dosage: Infusion 50-100 ml., Leaf powder: 0.5-1g.(31) The leaf guards the pulses from insects and is utilized as a grain preservation material. Leaves possess antibacterial, antifungal, and pesticidal qualities.(32)
2	Seeds	Seeds of Nirgundi have these chemical constituents- hydrocarbons, β-sitosterol and benzoic acid and phthalic acid, (33) Anti-inflammatory diterpene, flavonoids, artemetin and triterpenoids,(34)	Seeds oil of Nirgundi is used for the most popular analgesic anti-inflammatory and natural anti-biotic, Nirgundi oil helps in reducing congestion, inflammation, the most popular, natural anti-biotic, anti-inflammatory analgesic, helps in reducing pain and inflammation, congestion and effective remedy used to treat anal fistula because it improves blood circulation, tones the surrounding area by treating lymph node hypertrophy, and is the most well-liked natural antibiotic, analgesic, and anti-inflammatory that also treats osteoarthritis, rheumatoid arthritis, and orchitis. (35) B-sitosterol, Seeds contain hydrocarbons, and benzoic acid and phthalic acid,(36) anti-inflammatory flavonoids, diterpene, artemetin and triterpenoids.(37)

3	Stem and Bark	Stem bark yields leucoanthocyanidins. Fatty acids, β-sitosterol, vanillic acid, p-hydroxybenzoic acid and luteolin have been isolated from bark.(38)	Nirgundi root and bark preparations contain large levels of the alkaloid nishindine, which has analgesic and anti-inflammatory qualities.(39)
4	Flowers	N-heptane, formic acid, p-cymene, β-caryophyllene, valencene, α-selinene, β-selinene, germacren-4-ol, P-(1,1-dimethylethyle) toluene, caryophyllene epoxide, and valencene are among the volatile oils isolated from V. Negundo flowers. (E)- nerolidol.(40)	Its astringent flowers are used in fever, diarrhoea, cholera, bleeding and heart disorders and liver diseases. (41)
5	Roots	Roots are tonic, anodyne, bechic, febrifuge, expectorant and diuretic.(42)	Roots are used to treat leprosy, inflammations, respiratory issues, flatulence, and joint pain.(43)

Pharmacological activities of Nirgundi (*Vitex-negundo*)

From the notable traditional use of Nirgundi (*Vitex-negundo*), the biological activities of various research papers have been studied to show that it possesses various therapeutic powers due to its chemical composition such as anti-oxidant, Analgesic activity, antiviral antidiabetic, anticancer and immunomodulatory activities. In this paper of ours, literary survey of Nirgundi (*Vitex-negundo*), biological activity research has been spotlighted. The whole plant of Nirgundi (*Vitex-negundo*) can be used for medicinal purposes in the medical system. Some main uses are following

Anti-oxidant Activity of Nirgundi (*Vitex-negundo*) – Vitex Negundo plant

Naturally source of many antioxidants which play a role protect your cells against free radicals.(44) Vitedoin,(45) a phytochemical derived from the Nirgundi plant, is a more effective antioxidant than L-cystine and Vit E. This research discovered that in Freund's adjuvant-induced arthritic rats, the antioxidant capacity of Vitex negundo leaf extract decreased the levels of superoxide dismutase, catalase, and glutathione peroxidise.(46)

Hepatoprotective activity of Nirgundi (*Vitex-negundo*)

Current researches about Nirgundi shows the various utility of this drug. Ethanolic extract of Nirgundi leaf showed a hepatoprotective activity against hepatotoxicity. The Nirgundi (vitex negundo) had highest estrogenic activity assessed on cell-based.(47)

Analgesic and Anti-inflammatory activity of Nirgundi (*Vitex-negundo*)

The compounds 5-hydroxy-3, 6, 7-trimethoxy-2 -4H-chromen-4-on and 5, 7-dihydroxy-2,4H-chromen-4-one are found in an ethanolic extract of Vitex negundo leaves. Additionally, negundoside, agnuside, and vitegnoside are present in the methanolic extract. P-hydroxybenzoic acid and β-sitosterol have been extracted from the bark of Vitex negundo Linn and identified by methanol and hexane extracts. Two phenylnaphtha-lene-type lignans, 6-hydroxy-4,3-hydroxy-methyl-7-methoxy-3, 4-dihydro-2-naphthaldehyde and vitedoamine A, have been isolated from the acetoacetate fraction of the seeds. Vitex negundo L. leaves significantly reduced experimentally produced colitis; as a result, niggundi has analgesic and anti-inflammatory properties.(48)

Anti-cancer Activity of Nirgundi (*Vitex-negundo*)

In the present study, some cancer cell lines were subjected to strong anticancer effects from chloroform, ethanol, and aqueous extracts derived from Vitex negundo. The current work aims to extract negundoside from dried Vitex negundo leaves and demonstrate its anticancer efficacy using in vitro MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium) test and in silico activity.(49) To assess cell viability, the microculture tetrazolium (MTT) experiment was performed as previously reported.(50)

Clinical Studies –

Kulkarni, *et al*.: Antioxidant and anti-inflammatory activity of (*Vitex-negundo*)

The ethno medical use of *V. negundo* has excellent anti-inflammatory and antioxidant potential. The results of this study have shown a significant relationship between V. negundo's antioxidant and anti-inflammatory properties. Study of this article we find probability p value is $p< 0.05$. So, the prevention of oxidative damage to tissue could therefore be one of the mechanisms responsible for the analgesic and anti-inflammatory.(51)

Tandon et. al.

Studies on the histomorphological effects of Vitex negundo extracts in rats revealed that even at hazardous levels, stomach tissue is undamaged. Both lower and larger dosages were shown to have a toxic impact on the heart. The cardiac specimens displayed vascular dilatation and bleeding considerably ($P<0.05$) in the 2.5 and 5 g/kg weight doses and ($P<0.01$) in the 7.5 and 10 g/kg weight doses of Vitex negundo extract under a microscope. The specimens also seemed thickened and hyperaemic. The liver showed ecomorphological alterations at moderate and higher dosages.(52)

Smit et. al.

This study shows the tissues of the heart, liver, and lungs showed dose-dependent alterations. Using COLO-320 tumor cells, the cytotoxic impact of Vitex

negundo leaf extracts was investigated and confirmed. The dried material of 14 species was extracted with 70% v/v ethanol, and the extracts' cytotoxicity was assessed using the microculture tetrazolium (MTT) assay on COLO 320 tumor cells. A measure of cytotoxicity was the IC50-value, or the concentration at which 50% of the tumor cells' ability to grow was inhibited. The maximum concentration examined, 100 micrograms/ml, was the limit at which the extracts of numerous other plants failed to exhibit cytotoxic effects. (53)

Conclusion

Ayurvedic and traditional medicine both use Nirgundi as a main herbal remedy. To make herbal medicines, almost every component of the plant is used. Many different ailments have been successfully treated using natural compounds derived from medicinal plants. Chloroform, ethanol, aqueous extract of V. negundo, and other chemical components have the potential to have antifeedant, anticancer, antimicrobial, anti-hyperpigmentation, hepatoprotective, antihistaminic, and analgesic properties, according to the current research. We're now doing further research to define the active ingredients and clarify the extract's mode of action. So, in the majority of life-threatening illnesses, these plant extracts may have therapeutic and clinical potential. Therefore, Nirgundi believes that plants may provide bioactive molecules that might be used to create new "leads" that could be used to fight a variety of ailments.

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