

A Review on *Vitex negundo*- Lamiaceae Family

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Abstract

Negundo plant, also named as five leaves chaste tree belongs to the family lamiaceae, an evergreen medicinal plant belongs to the nativity of in china, japan and India. Parts of leaves, roots, seeds and flowers were having many beneficial activities with pungent, bitter, and astringent tastes consists of enormous phytochemical constituents such as alkaloids, steroids, flavonoids, glycosides, volatile oils, lignans, iridoids, terpenes, and steroids for multi-purpose therapies including analgesic, anti-inflammation, digestion, respiratory system, menopausal phases. The plant is typically known for its role in the modulation of various cellular events in the human body like apoptosis, cell cycle, and motility of sperms, polycystic ovary disease, and menstrual cycle as it stimulates and plays a key role in the treatment of certain conditions. Its extractions using leaves were used for many home remedies like to cure cough, asthma, wound, ulcer, joint pain and swelling. Many bioactive compounds obtained from this plant have been commercialized and are under investigation currently. In this review, we highlighted and presented up-to-date information about this plant and made a detailed study about its phytochemical constituents, microscopic studies, general uses, adverse effects, marketed preparations, and beneficial effects.

Keywords: Chinese chaste tree • Nochi • *Verbenaceae* • Anti-inflammatory • Anti-pyretic • Home remedies

Introduction

Vitex negundo (Figure 1) is the evergreen medicinal deciduous plant which is also known as Chinese chaste tree, five-leaved chaste tree and Horseshoe vitex. In Tamil, it is called as Nochchi which grown in the weather of sun having anti-inflammatory, antipyretic, diuretic, rheumatic and tonic properties. It is used to cure cough, malarial fever, dysentery, ulcer, leprosy, wounds and to relieve pain etc. Siddha medicine classifies karunochchi as one of the 'kayakalpa' herbs found mostly in the forests. It is used to treat female disorders especially disorders linked with female reproductive system and decreasing their sexual desire. The plant can grow on nutritionally poor soil. Negundi is the plant belongs to the family *Verbenaceae*. The word vitex is derived from the Latin 'vicio' which means "to tie and bind" because of flexible nature of its stems and twigs. The Sanskrit word of *Vitex negundo*- *nirgundi* literally means "that which protects the body from disease". 270 known species are found in its genus. The genus was established by Linnaeus in 1753 with 4 species *Vitex negundo*, *vitex angustifolia*, *vitex pinnata* and *vitex trifolia* belongs to the family *Verbenaceae* in which all alleviates vatta and kappa dosa, as well as it stimulates or increases the pitta dosa. Based on the phylogenetic studies of DNA sequences, vitex along with the several genera were transferred from *Verbenaceae* to *Lamiaceae* in 1990's [1].

Biological kingdom

- **Kingdom:** Plantae
- **Super Division:** Spermatophyte
- **Division:** Magnoliophyte

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Figure 1. *Vitex negundo*.

- **Sub class:** Asteridae
- **Order:** Lamiales
- **Family:** *Lamiaceae*
- **Genus:** *Vitex*
- **Species:** *Negundo*

Macroscopic view

General features: *Vitex negundo* is an aromatic plant with quadrangular, small or much branched up to 5 m tall or sometimes small, slender having thin and gray bark [2].

- 1. Leaves:** Petiole is short 2.5:3.8 cm, mostly trifoliate, occasionally pentafoliate, leaflets are lanceolate, lateral leaflets smaller than terminal ones, middle one will be longer. Base acute and Apex is acuminate and texture leathery. The edges of the leaves are plain or serrated. The lamina shows single layer.
- 2. Roots:** Cylindrical, hard, tough with irregular fracture, external surface is rough due longitudinal, narrow, cracks, and small rootlets, bark thin, easily separate from wood, wood hard. The bark of the root is green outside and yellowish inside.

- 3. **Flower:** There are numerous flowers were small, 2-3 inch in long inflorescence. The flowers were purple to white in colour. Flowering stage begins during summer season (June-August). Flowers are in lateral cymes, bluish purple up to 30cm long.
- 4. **Fruits:** The fruit is rounded, small, and of mixed colours white and black. The fruits were 1-3cm in diameter and are globose and black when ripe.
- 5. **Seeds:** The Seeds are ovate or oblong and are in 5-6 mm in diameter.

Microscopic view -epidermal features

Cells were cubical or oval in shape and cell walls were straight, arched and sinuous. The cells of lower epidermis are cubical in shape. The cells on the veins are generally elongated. Unicellular to tricellular non glandular trichomes and few glandular trichoderma are observed on the leaves. Bicellular are most in numbers. Stomata are present on the lower surface of leaf and densely covered with trichomes. The shape of the stomata is oval and circular.

- 1. **T.S of petiole:** The petiole (Figure 2) is more or less circular in outline with longitudinal median groove with few. Glandular and non-glandular trichomes were common. Epidermis is followed by wide zone of chlorenchymatous hypodermis. Hypodermis followed by 6-8 layered thick walled parenchymatous cortex. There is a large central vascular bundle with continuous phloem and separated by medullary rays. Phloem consist of sieve tubes, companion cells and xylem consist of vessels, trachids and xylem parenchyma [3].
- 2. **T.S. leaf:** The plant having dorsiventral and hypostomatic leaf. The lamina shows a single layered epidermis on the upper side of cubical cells (Figure 3). The upper epidermis shows unicellular, bicellular and multi cellular hairs. Glandular hairs were seen rarely. The cells of lower epidermis were cubical in shape mostly with unicellular trichomes (Figure 4). Each small vein in the leaf were represented by 3-5 xylem element and 4-6 phloem elements. The large central vascular bundle has continuous system phloem, xylem. The phloem consists of sieve tubes, companion cells and phloem parenchyma and xylem consist of vessels trachids and xylem parenchyma.

Medicinal uses of the plant's various parts of *Vitex negundo*:

- 1. **Leaf:** The leaves of *Vitex negundo* were used to cure stomach pain, wounds and fever. In addition, the leaf extracts were having anti-inflammatory, anti-oxidant (Figure 5), anti-convulsant and antibacterial properties.
- 2. **Bark:** Bark portion of the plant were quite bitter and having cooling properties which is used to cure ophthalmic inflammations and act as an anti-dote for the snake bite. Along with this, it is used for the treatment of skin diseases and as a result produces a fair colour to skin, act as a mucolytic agent and also to relieve pain.
- 3. **Fruits:** The fruit juice satisfied the condition of excessive thirst during

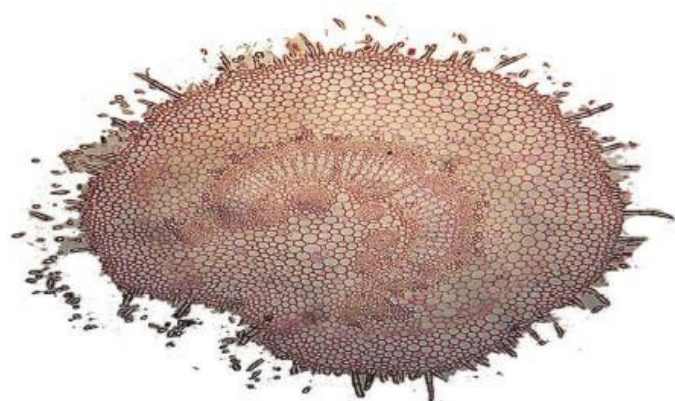


Figure 2. T.S of petiole.



Figure 3. TS of leaf.

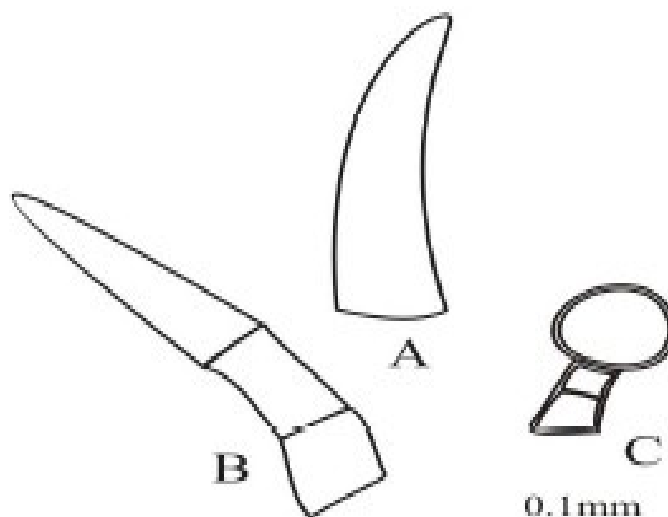


Figure 4. Trichomes.

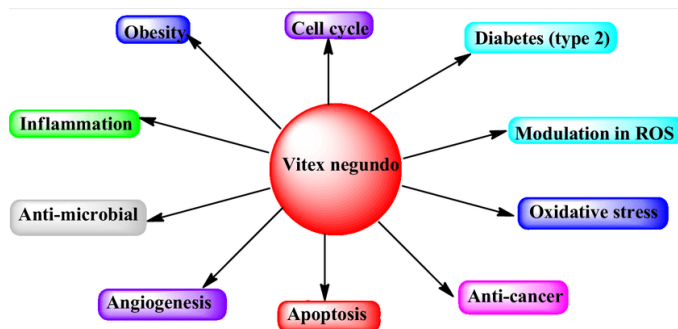


Figure 5. Multiple roles of *Vitex negundo*.

body fevers. Ripen fruits were used to treat indigestion and also helps to improve vision.

- 4. **Flowers:** The floral parts were used to induce lactation (Ayurvedha) and suggested for the treatment of arthritis (siddha).
- 5. **Roots:** Roots were employed as a major ingredient for the preparations of some herbal formulations for treating dysentery, diarrhoea, fever and vomiting [4].

Adulterations

Tulsi (basil) plants were substituted in the part of negundo were looking quite similar and cheaply available where its pharmacognostical and phytochemical studies matched with *Vitex negundo*.

Allied species

Vitex tri-folia, *Vitex rotundo folio* and *Vitex trifolia steenis* were the allied species for this plant [5].

Geographical source, collection and cultivation

Vitex negundo were commonly found near the water bodies, distributed in lands, grasslands and mixed open forests. It is a small aromatic plant with typical five foliate leaves which belongs to the nativity of tropical Eastern and Southern Africa and Asia. The tree has a thin, grey bark, quadrangular branches, and a height range of 2-4 meters. The plants were highly grown in the countries of China, Japan and India Bhutan, Kenya, Philippines, Taiwan, Bangladesh, Afghanistan, Cambodia, Indonesia, Malaysia, Pakistan and Vietnam etc. It is particularly found in Karnataka and Tamil Nadu used for the traditional purposes. It is widely cultivated in Europe, Asia, North America and West Indies and planted as a hedge plant between the fields. It can be reproduced from its shoot cuttings. Plants tolerate temperature down to about 10° Celsius. It is basically cultivated in a loamy type of soil and also in sun and loose, moist and well-drained soil. Throughout India it is grown in warmer zones. It is partially belonging to the southern parts of Asia and Africa and the plants were generally 2-8 meters long. It is widely planted as a hedge plant between the fields. It can be reproduced from shoot cuttings. It grows in wasteland up to 2000 m in the Himalayas and in mixed thickest on mountain slopes up to an altitude of 1400 m in China. Moderately to fairly fast growing, it can be managed by coppicing, with a rotation of 2 years. Plant produces root suckers. It Yields upto 0.3 tonnes/ hectare of airdry fuel wood can be obtained when planted on contours 5 meters apart [6,7].

Phytoconstituents

Table 1. List of phytoconstituents present in *Vitex* [7,8].

Phytoconstituents	Phytoconstituents			
	Ethanol Extract	Petroleum Ether Extract	Hexane Extract	Acetone Extract
Alkaloids	-	+	-	+
Steroids	+	+	+	-
Triterpenids	+	-	-	+
Flavanoids	+	+	+	+
Tannins	-	-	-	-
Phenols	+	+	-	-
Glycoside	+	-	+	+
Saponin	-	-	-	-
Anthroquinones	+	+	-	+

Chemical test

The fresh suspension of *Vitex negundo* were yellowish-green in colour. However, as a result, after the addition of AgNO_3 and stirring for 48 h at room temperature, the emulsion turned dark brown (Figure 6).

Uses

Negundo were act as a life protector and enriched with multiple medicinal properties. Most commonly it is known for its analgesic effect which helps to alleviate pain and discomfort. They were enriched in Vitamin C and E and also having anti-microbial and anti-inflammatory properties which helps to prevent from several infections and aids in the process of digestion too [8].

As analgesic and anti-inflammatory: Negundo oil used is used to massage to reduce inflammations due to arthritis as it acts as a pain reliever.

For digestion: It was named as a wonderful plant mainly used for the treatment of digestive disorders by enhancing the body's digestion power and aids in relieving from the stomach pain. It helps to release gas and cures swelling of the stomach due to indigestion. It possesses carminative action which helps to deals various digestive problems like nausea, constipation, gas, vomiting.



Figure 6. Photograph of *Vitex negundo* and Ag/Vitex negundo emulsion after 48 h.

Role in respiratory system: It is used as an anti-asthmatic. Herbal tea prepared from the plant which helps to decongest the respiratory tract by removing phlegm from it and helps to open the passages for air to pass by improving the ventilation and normalises the breathing. In addition, it is employed as a favoured ingredient in ayurvedic products which targets for many respiratory diseases such as bronchitis, asthma, pneumonia and cough.

Having anti-acne properties: Negundo has essential nutrients and also having anti-oxidant properties which helps in improving the skin texture and prevent warts, acnes and pimples and to treat variety of skin problems such as eczema due to its anti-bacterial properties. Negundo seeds are also helpful for skin disease of vitiligo and leprosy. The plant juice used to treat bacterial skin infections.

For epilepsy treatment: In ancient days, negundo is attributed as a memory boosting plant as it has neuroprotective properties enriched with phytoconstituents like polyphenol, organic steroids and alkaloids. These phytoconstituents were helps in regulating nerve signal from brain and smooth relaying of sensory signals like the cutaneous sensation of touch, taste, smell and sound. Thus, negundo were highly preferred for the better treatment of epileptic patients

For menopausal phases: Negundo helps to improve progesterone hormone secretion, which makes easy for women during menstrual cycle and also used to treat various menstrual disorders like amenorrhea, dysmenorrhea and pre-menstrual syndromes. It is also used to improve menstrual flow therefore used in obstetric conditions. The fruits of negundo were enrich in terpenoids which helps to rectify hormonal imbalances in female system.

Treatment of fever: The negundo plant has anti-viral and anti-bacterial properties were effective to cure fever. It also has anti-oxidant properties which help to boost immunity and helps to reduce fever as it has anti-pyretic activity too.

Improvement of fertility level: Negundo juice and oil is used to improve

Table 2. List of marketed formulations available from *Vitex negundo*.

S.No	Brand Name	Types of Marketed Formations	Dose	Prescribed For	Price	Company Name
1	Lagundex 300 mg	Tablet	300 mg (2 tab)	Adult	₹ 4.45/tab	Azarias pharmaceutical laboratories
			300 mg (1 tab)	Children (7-12 years old)		
2	Lagundex 600 mg	Tablet	600 mg (1tab)	Adult	₹ 5.93/tab	Azarias pharmaceutical laboratories
			600 mg (1/2 tab)	Children (7-12 years old)		
3	Lagundex 600 mg/5 mL	Syrup	600 mg/5 mL (10mL-2 tsp)	Adult	₹ 110	Intralife private limited
4	Lagundex Forte 600 mg/5 mL	Syrup	(5 ml) 1 tsp	Adult	₹ 303.82	Lacroesus pharma, Inc
			1 tsp	Children (18 years old and above)		
5	Ascof Forte	Syrup	(5 ml) 1 Teaspoon	Adults	₹ 4.45	Azarias pharmaceutical laboratories
			1 Teaspoon	Children (18 Years old and above)		

fertility a major concern for many women. It helps to conceive in short period of time. Pregnant women should not consume as it may lead to miscarriage.

Treatment of diabetes: Plants leaf extracts have anti-hyperglycemic activity which plays a main role in blood sugar regulation.

Wound healing properties: Plant extracts has anti-inflammatory effect, hence it is highly beneficial for the treatment of wounds. Further, anti-bacterial essence helps in preventing bacterial infections.

For snake venom poisoning: As Negundo is used to treat snake venom poisoning as it stimulates the production of antibodies against the particular snake venom and improves the immune system to invade against the toxins [9].

Adverse effects:

- Reduces milk production of new mothers.
- It is not recommended during pregnancy as it causes miscarriage.
- Accelerate hormone secretion during pregnancy which is quite harmful.
- Reduces effectiveness of oral contraceptives.
- Negundo juice or powders sometimes leads to cause mild stomach upset.
- Skin irritations occur while using negundo oil or paste.
- People with diabetes, high cholesterol, heart disease and high blood pressure should consult physicians on subsequently using negundo.
- Individuals may get allergic conditions like skin rashes, itching, swelling or difficulty in breathing can seek immediate medical attention [9].

Marketed formulations (Table 2)

Homemade remedies

Joint pain and swelling: A warmed little application of fine paste of negundo leaves, where the leaves were collected and triturate using water and make it into a fine paste which can be applied over the joint and swelling areas cause reductions of swelling and joint pains respectively [10]

Body ache and Joint pain: *Negundo* leaf oil, act as a good analgesic and anti-inflammatory activity which is to be prepared with 50 gm nigundi leaves, 200 ml of sesame oil and 800 ml of water or leaf decoction /fresh juices were used to relieve from body ache and also used to treat joint pain.

Cough and asthma: Leaf decoctions were prepared by adding 1 tablespoon of leaf powder with 2 cups of water, boiled and reduced to half cup and filtered finally which is highly used in cases of asthma and pacifies cough, throat infection and also used for gargling purposes. Steam inhalation prepared with leaves boiled with water can be used as a better inhaler to get rid of cough [10].

Wound and ulcer: Leaf decoction can be employed to wash out the wounds and ulcers. Leaf juices were used to cure the infected ulcers and helps in purification and easy healing of wounds.

Snake bite: The methanolic root extracts obtained from the plant neutralises the effect of potent snake venom.

Administration

Oral administration which may be taken with or without food [11].

Precautions

- People with hormone dependent condition such as fibroids, breast cancer should not take.
- Patient with allergic condition should not take.
- Pregnant or nursing individuals should avoid using vitex.
- Avoid intaking it without properly consulting with a doctor.
- It is not recommended during pregnancy and breast-feeding mothers for lack of safety.

Storage condition

Stored at a temperature not exceeding 30 °C

Conclusion

Vitex negundo is a deciduous plant naturalized in many parts of the world. It is used in all the systems of treatment like ayurvedha, unani, siddha, homeopathy and allopathy. It referred to as sindhuvara in ayurvedha, which has been used as medicine since from ancient times. It can be applicable in both ways, internally and externally. In India, the plant has multiple uses: dyeing, fuel, pesticide, manure, poultry, and humans. It is used to treat headache, asthmatic pains, skin infections, wound ulcer and swelling, asthma, diabetes etc. However, in ayurvedha the leaves, roots, and barks are the main important parts for various treatment purposes. Most promising bio-effects such as anti-inflammatory, anti-tumor, anti-oxidant, insecticidal, antimicrobial, anti- androgenic, anti-osteoporotic, anti-cataract, hepatoprotective and anti-hyperglycemic activity were found from its crude extracts and phytoconstituents. The above collected informations about *Vitex negundo* lead us to concluded that it has convincing medicinal potential value and best remedial source of gift from nature [12].

Acknowledgement

None.

Conflict of Interest

None.

References

1. Gill, Balraj Singh, Richa Mehra, Naveet and Sanjeev Kumar. "Vitex negundo and its medicinal value." *Mol Biol Rep* 45 (2018): 2925-2934.
2. Kamal, Nurkhalida, Nurul Syahidah Mio Asni, Ivana Nur Allisya Rozlan and Muhammad Aniq Hamzah Mohd Azmi, et al. "Traditional medicinal uses, phytochemistry, biological properties, and health applications of *Vitex* sp." *Plants* 11 (2022): 1944.
3. Shashikanth, J. and P. Ramachandra Reddy. "Macroscopic and microscopic standardization of *Vitex negundo* linn. Stem bark." *J Res Educ Indian Med* 19 (2013): 93-96.
4. <https://www.nparks.gov.sg/florafaunaweb/flora/4/8/4827>
5. Singh, Yogendra, Pankaj Mishra and Pushendra Kannoja. "Morphology, phytochemistry and pharmacological activity of *Vitex negundo*: An overview." *J Drug Deliv Ther* 10 (2020): 280-285.
6. Zheng, Cheng-Jian, Hua-Qiang Li, Shan-Cheng Ren and Chuan-Liang Xu, et al. "Phytochemical and pharmacological profile of *Vitex negundo*." *Phytother Res* 29 (2015): 633-647.
7. Tirpude, Narendra Vijay, Anamika Sharma, Robin Joshi and Monika Kumari, et al. "Vitex negundo Linn. extract alleviates inflammatory aggravation and lung injury by modulating AMPK/PI3K/Akt/p38-NF- κ B and TGF- β /Smad/Bcl2/caspase/LC3 cascade and macrophages activation in murine model of OVA-LPS induced allergic asthma." *J Ethnopharmacol* 271 (2021): 113894.
8. <https://www.easyayurveda.com/2014/07/27/nirgundi-vitex-negundo-uses-dose-side-effects-research/>
9. Kumar K., Saravana, P. Nagaveni and T. Mahaboob Subahan. Evaluation of Anti-arthritic activity of Vitex Negundo Linn "Pharma Research Library 1 (2013): 1-4
10. <https://pharomeasy.in/blog/home-remedies-for-breast-pain/>
11. Kadir, Farkaad A., Normadiah M. Kassim, Mahmood A. Abdulla and Wageeh A. Yehye. "Effect of oral administration of ethanolic extract of *Vitex negundo* on thioacetamide-induced nephrotoxicity in rats." *BMC Complement Altern Med* 13 (2013): 1-8.
12. <https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=http://ir.kdu.ac.lk/bitstream/handle/345/999/bas-025.pdf%3Fsequence%3D1%26isAllowed>

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