



MEDICINAL PLANT: *VITEX NEGUNDO*

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ABSTRACT

Nirgundi (*Vitex negundo*) is an important medicinal plant found all over India. The plant contains numerous bioactive compounds. Therefore almost all of its parts are used as traditional medicine. This review reveals a brief account of *Vitex negundo* its medicinal uses, phytochemical properties and cultivation practices.

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INTRODUCTION

Bioactive compounds are a type of alternative medicine that originates from plants and plant extracts. These are used to heal illness and disease and are the precursors to modern medicine. They are obtained from wide variety of natural resources including plant leaves, barks, seeds, flowers and roots. Plants used in traditional medicine can be used to treat chronic and even infectious diseases. Nirgundi (*Vitex negundo*) is one of the most important medicinal plants.

BOTANICAL DESCRIPTION

Nirgundi (*Vitex negundo*) is also known as chaste tree, belongs to family verbenaceae. The plant is a aromatic, deciduous shrub grows all over India, in wastelands, mixed open forest, up to 1500 meters elevation. It is also found in Afghanistan, Pakistan, Sri Lanka, Thailand, Malaysia, Eastern Africa, China, and Madagascar. In India, it is cultivated as a hedge plant. The tree grows 2-4 meters in height, with quadrangular branches and thin grey bark.

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The leaf stalk is long and 3-5 leaves grow at its tip. The leaves are petiolate, smooth, exstipulate, 4-10 cm long, hairy beneath, have a typical pungent odor. The flowers are small, bluish purple in colour, lanceolate, in panicles up to 30 cm long. The fruits are small, ovoid or obovoid, four seeded drupes, black when ripe.

PHYTOCHEMICAL PROPERTIES

A total of 120 compounds isolated from *V.negundo* can be divided mainly into phenolic compound, protein contents, flavonoids, lignans, terpenoids, iridoids and steroids (Roy *et al.*, 2013; Neha *et al.*, 2021). Chemical constituents of volatile oil extracted from leaves of *V.negundo* are viridiflorol, -caryophyllene, caryophyllene oxide, camphene, camphor, carene, benzaldehyde, 1,8-cineole, sabinene, bornyl acetate, -elemene, terpinen-4-ol, -terpinene, 1-oceten-3-ol, globulol (Singh *et al.*, 1999).

Chemical constituents of volatile oil extracted from flowers of *V.negundo* are formic acid, n-heptane, *p*-cymene, -caryophyllene, trans- -bergamotene, valencene, -selinene, -selinene, germacrene-4-ol, caryophyllene epoxide, (E)-nerolidol, P-(1,1-dimethylethyle) toluene (Khokra *et al.*, 2008).

THERAPEUTIC PROPERTIES

This plant species finds use for treatment of a wide spectrum of health disorders in traditional and folk medicine; some of which have been experimentally validated. The root, fruit, flowers, leaves, and bark of nirgundi have medicinal value and are used for medicinal purpose externally as well as internally. All compounds extracted from all the parts of the plant exhibited various bioactivities, including anti-nociceptive, anti-inflammatory, anti-tumor, anti-oxidant, anti-androgenic, anti-osteoporotic, anti-cataract, hepatoprotective, anti-hyperglycemic, insecticidal, anti-microbial activity (Yunos *et al.*, 2005; Tiwari and Tripathi, 2007; Sahare *et al.*, 2008; Zheng *et al.*, 2015; Gill *et al.*, 2018; Koirala *et al.*, 2020). Whole part of the plant is used to treat chronic and infectious diseases. In Chinese traditional medicine, it has been used for the treatment of chronic bronchitis. Nirgundi decoction is used for steam bath for arthritis, joint pains and sciatica. The dried leaves when smoked are said to relieve headache. Decoction of nirgundi leaves is an effective gargle in stomatitis and sore throat. The tub-bath of the decoction of its leaves is rewarding in epididymo-orchitis and uterine inflammations. Casticin has been isolated from leaves which have antiproliferative and apoptotic activities (Chan *et al.*, 2018). Fresh leaves of *V.negundo* have anti-inflammatory and pain suppressing activities possibly mediated via PG synthesis inhibition, antihistamine (anti-itching), membrane stabilising and antioxidant activities (Dharmasiri *et al.*, 2003).

Leaf extract of *V.negundo* exerts a protective effect on human liver cell i.e. CYP2E1-dependent CCl₄ toxicity via inhibition of lipid peroxidation, followed by an improved intracellular calcium homeostasis and inhibition of Ca (2+)- dependent proteases (Tasduq *et al.*, 2008). Roots are used for joint ache, inflammations, flatulence, breathing problems, malaria and leprosy. Roots are tonic, anodyne, febrifuge, bechic, expectorant and diuretic. Flowers are used for diarrhea, cholera, fever, hemorrhages, and cardiac disorder. Flowers are astringent and used in fever, diarrhea and liver complaints. The dried fruits contain lignans, including a phenylindene-type lignan, vitexdoin F (1), and three phenylanthralene-type lignans, vitexdoin G, H and I (2-4) having anti-inflammatory and anti-osteoporotic activities (Telang *et al.*, 1999; Tandon and Gupta, 2006; Zheng *et al.*, 2014) and the bark is used in toothache. Nirgundi oil is found to be salutary for sloughing wounds and ulcers, sinuses and scrofulous sores, in premature graying of hair and scalp infections. When used internally, it is anti-pyretic and cures bronchial asthma. It cures urinary problems. It is antihelmintic and kills worms and microorganism.

V.negundo has shown promise as an effective bio-control agent against diseases and pests of cultivated plants. The extracts of leaves possess inhibitory, deterrent or lethal activity that cause disease and damage to other organisms (Sathiamoorthy *et al.*, 2007). The leaves are reported to possess pesticidal, antifungal and antibacterial properties. The leaf extract are used as grain preservation material to protect the pulses against insects (Raja *et al.*, 2000). Volatile oil possess the antimicrobial properties due to presence of monoterpene constituents which exerts membrane damaging effects. Ursolic acid and betulonic acid are triterpenoids having pesticidal effect (Khokra *et al.*, 2008; Vishwanathan and Basavaraju, 2010).

CULTIVATION PRACTICES

The plant can be grown easily through seed as well as shoot cuttings. It prefers a light well-drained loamy soil.

CONCLUSION

The demand for more and more bioactive compounds from plant sources is continuously increasing. To meet the requirement of pharmaceutical industries, there has been an increased interest in the cultivation of *V.negundo* in our country.

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