



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.

REFERENCES

- Chan, EWC., Wong, SK., Chan, HT. 2018. Casticin from *Vitex* species: a short review on its anticancer and anti-inflammatory properties. *J Integr Med.* 16(3):147-152. doi: 10.1016/j.joim.2018.03.001.
- Dharmasiri, MG., Jayakody, JRAC., Galhena, G., Liyanage, SSP., Ratnasooriya, WD. 2003. Anti-inflammatory and analgesic activities of mature fresh leaves of *Vitex negundo*. *J Ethnopharmacol.* 87(2-3): 199-206. doi: 10.1016/s0378-8741(03)00159-4.
- Gill, BS., Mehta, R., Navgeet, Kumar, S. 2018. *Vitex negundo* and its medicinal value. *Mol.Biol.Rep.* 45(6):2925-2934. doi: 10.1007/s11033-018-4421-3.
- Khokra, S., Prakash, O., Jain, S., Aneja, K., Dhingra, Y. 2008. Essential oil composition and antibacterial studies of *Vitex negundo* Linn. extracts. *Indian J Pharm. Sci.* 70(4): 522-526. DOI: 10.4103/0250-474X.44610.
- Koirala, N., Dhakal, C., Munankarmi, NN., Ali, SW., Hameed, A., Martins, N., Sharifi-Rad, J., Imran, M., Arif, AM., Hanif, MS., Basnyat, RC., Salehi, B. 2020. *Vitex negundo* Linn.: Phytochemical composition, nutritional analysis, and antioxidant and antimicrobial activity. *Cell Mol Biol.* 66(4):1-7. DOI: 10.14715/cmb/2020.66.4.1.
- Neha, B., Jannavi, R., Prabhu, S. 2021. Phyto-pharmacological and biological aspects of *Vitex negundo* Medicinal Plant-A Review. *J Pharm.Res. Int.* 33 (29A):17-31.
- Raja, N., Albert, S., Ignacimuthu, S. 2000. Effect of solvent residues of *Vitex negundo* Linn. and *Cassia fistula* Linn. on pulse beetle, *Callosobruchus maculatus* Fab. and its larval parasitoid, *Dinarmus vagabundus* (Timberlake). *Indian J Exp Biol.* 38(3): 290-292.
- Roy, SK., Bairwa, K., Grover, J., Srivastava, A., Jachak, SM. 2013. Analysis of flavonoids and iridoids in *Vitex negundo* by HPLC-PDA and method validation. *Nat. Prod. Commun.* 8(9):1241-1244. doi.org/ 10.1177/1934578 X1300800914
- Sahare, KN., Anandhraman, V., Meshram, VG., Meshram, SU., Reddy, MV., Tumane, PM., Goswami, K. 2008. Anti-microfilarial activity of methanolic extract of *Vitex negundo* and *Aegle marmelos* and their phytochemical analysis. *Indian J Exp Biol.* 46(2): 128-131.
- Sathiamoorthy, B., Gupta, P., Kumar, M., Chaturvedi, AK., Shukla, PK., Maurya, R. 2007. New antifungal flavonoid glycoside from *Vitex negundo*. *Bioorganic Med Chem Lett.* 17(1): 239-242. doi.org /10.1016 /j.bmcl.2006.09.051
- Singh, V., Dayal, R., Bartley, JP. 1999. Volatile constituents of *Vitex negundo* leaves. *Planta Med.* 65(6):580-582. DOI: 10.1055/s-2006-960832

- Tandon, VR., Gupta, RK. 2006. *Vitex negundo* Linn (VN) leaf extract as an adjuvant therapy to standard anti-inflammatory drugs. *Indian J Med Res*, 124(4):447-450.
- Tasduq, SA., Kaiser, PJ., Gupta, BD., Gupta, VK. ,Johri, RK. 2008. Negundoside, an irridiod glycoside from leaves of *Vitex negundo*, protects human liver cells against calcium-mediated toxicity induced by carbon tetrachloride. *World J Gastroenterol*. 14(23): 3693-3709. doi: 10.3748/wjg.14.3693.
- Telang, RS., Chatterjee, S., Varshneya, C. 1999. Studies on analgesic and anti-inflammatory activities of *Vitex negundo* Linn. *Indian J pharmacol*. 31(5): 363-366.
- Tiwari, OP., Tripathi, YB. 2007. Antioxidant properties of different fractions of *Vitex negundo* Linn. *Food Chem*.100(3): 1170-1176. doi.org /10.1016/j.foodchem.2005.10.069
- Vishwanathan, AS., Basavaraju,R. 2010. A review on *Vitex negundo* L.-A medicinally important plant. *EJBS*. 3(1): 30-42.
- Yunos, NM., Mat Ali, R., Kean, OB. ,Abas, R. 2005. Cytotoxicity evaluations on *Vitex negundo* anti-inflammatory extracts. *Malays J Pharm. Sci*. 24: 213-217.
- Zheng, CJ., Li, HQ., Ren, SC., Xu, CL., Rahman, K., Qin, LP., Sun, YH. 2015. Phytochemical and pharmacological profile of *Vitex negundo*. *Phytother Res*.29(5):633-647. doi: 10.1002/ptr.5303.
- Zheng, CJ., Zhang, XW., Han, T., Jiang, YP., Tang, JY., Bromme, D., Qin, LP. 2014. Anti-inflammatory and anti-osteoporotic lignans from *Vitex negundo* seeds. *Fitoterapia*. 93:31-38. doi: 10.1016/j.fitote.2013.12.006
