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Review Article

A REVIEW ON DIFFERENT PHARMACOLOGICAL IMPORTANCES OF NISHINDA (*VITEXNIGUNDO*)

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ABSTRACT

Ayurvedic plants have shown their effects on various kind of diseases. Those properties of the plants are sublimed in some molecules in the plants, which can be extracted out by performing various kinds of processes (eg. Soxhlation, Percolation). World is running so first, at this moment medicines have to work to maintain the health of the people to give them power to stabilize them. Modern medicine is working from a decade or so, but many traditional systems of medicines also show some beneficial effects in that era. Likewise Kempo, Traditional Chinese Medicine(TCM), Ayurveda & Herbal Medicines. Those kinds of medicines can give a patient resistant to protect the disease without less side effects. *Vitexnigundo* is a plant which plays a commendable role in that era. It is used in different kind of diseases which are described in this mini review.

INTRODUCTION

Description

*Vitexnegundo*is an erect shrub or small tree growing from 2 to 8 m (6.6 to 26 ft) in height. The bark is reddish-brown. Its leaves are digitate, with five lanceolate leaflets, sometimes three. Each leaflet is around 4 to 10 cm (1.6 to 3.9 in) in length, with the central leaflet being the largest and possessing a stalk. The leaf edges are toothed or serrated and the bottom surface is covered in hair. The numerous flowers are borne in panicles 10 to 20 cm (3.9 to 7.9 in) in length. Each is around 6 to 7 cm (2.4 to 2.8 in) long and are white to blue in color. The petals are of different lengths, with the middle lower lobe being the longest. Both the corolla and calyx are covered in dense hairs. The fruit is a succulent drupe, 4 mm (0.16 in) in diameter, rounded to egg-shaped. It is black or purple when ripe.[1][2]

Distribution and Habitat

Vitexnegundo is native to tropical Eastern and Southern Africa and Asia. It is widely cultivated and naturalized elsewhere. Countries it is indigenous to include Afghanistan, Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Kenya, Madagascar, Malaysia, Mozambique, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Taiwan, Tanzania, Thailand, and Vietnam. *Vitexnegundo*are commonly found near bodies of water, recently disturbed land, grasslands, and mixed open forests.[2][3]

Nomenclature

Common names of*Vitexnegundo* in different languages include: [2]

- Assamese: Pochotia
- Bengali: Nirgundi; Nishinda; Samalu
- English: Five-leaved chaste tree; Horseshoe vitex; Chinese chaste tree
- Gujarati: Nagoda; Shamalic
- Hindi: Mewri; Nirgundi; Nisinda; Sambhalu; Sawbhalu
- Kannada: Bile-nekki
- Malayalam: Indrani
- Marathi: Nirgunda
- Punjabi: Banna; Marwan; Maura; Mawa; Swanjan Torbanna

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- Sanskrit: Nirgundi; Sephalika; Sindhuvara; Svetasurasa; Vrikshaha
- Tamil: Chinduvaram; Nirnochchi; Nochchi; Notchi; Vellai-nochchi
- Telugu: Sindhuvara; Vavili; Nalla-vavili; Tella-vavililekkali

Pharmacological Properties

Phytochemical and Pharmacological Profile of Vitex negundo.[4]

Research claims to show the chemical constituents and pharmacological properties of *Vitexnegundo*L. (Verbenaceae) (VN). VN is an important medicinal plant used as reputed herbal medicine with versatile pharmacological activities in China, India and Japan. A total of 104 referred articles about VN were compiled from major databases and academic publishers, such as MEDLINE, Pubmed, Scholar, Elsevier, Springer, Wiley and CNKI. As a result, a total of 120 compounds isolated from VN can be divided mainly into four classes: flavonoids, lignans, terpenoids and steroids. The crude extracts and purified compounds of VN exhibited promising bioactivities, including anti-nociceptive, antiinflammatory, anti-tumor, anti-oxidant, insecticidal, antimicrobial, anti-androgenic, anti-osteoporotic, anti-cataract, hepatoprotective and anti-hyperglycemic activity. All the reported data lead us to conclude that VN has convincing medicinal potential. However, further researches are needed to explore its bioactive constituents, the structure-activity relationship and their molecular mechanisms of action.

Therapeutic effects of standardized Vitexnegundoseeds extract on complete Freund's adjuvant induced arthritis in rats.[5]

The experiment exclaimed that the seeds of *Vitexnegundo*L. (Verbenaceae) have been commonly used as a folk remedy for the treatment of rheumatism and joint inflammation in Traditional Chinese Medicine. This study aimed to evaluate the anti-arthritic activity of the extract of *V. negundo* seeds (EVNS) using Freund's complete adjuvant (CFA) induced arthritis (AA) in rat model. As a result, EVNS, with abundant phenyl naphthalenetypelignin's, significantly inhibited the paw edema, decreased the arthritis score and spleen index, and reversed the weight loss of CFA-injected rats. Histopathological studies showed a marked decrease of synovial inflammatory infiltration and synovial lining hyperplasia in the joints of EVNS-treated animals. The remarkable decrement of serum inflammatory factors (TNF-α, IL-1β and IL-6) were observed in EVNS-treated rats, whereas, IL-10, an anti-inflammatory cytokine, was found to be significantly increased by EVNS. The expressions of COX-2 and 5-LOX in PBMC were also inhibited by administration of EVNS. Our results demonstrated that *V. negundo* seeds possessed potential therapeutic effect on adjuvant induced arthritis in rats by decreasing the levels of TNF-α, IL-1β and IL-6 and increasing that of IL-10 in serum as well as down-regulating the levels of COX-2 and 5-LOX, and therefore may be an effective cure for the treatment of human rheumatoid arthritis.

Scientific investigation of crude alkaloids from medicinal plants for the management of pain.[6]

Study shows tissue damage is associated with pain, which is an alarming sign. Aspirin and morphine have been widely used in recent decades for management of pain. Medicinal herbs have been in use for treatment of different diseases for centuries. Many of these herbs possess analgesic activity with relatively less incidences of adverse effects. The strong positive correlation of alkaloids in medicinal plants for analgesic activity persuades an intention to determine possible analgesic activity of total alkaloids extracted from the selected medicinal plants using animal models to answer its possible mechanisms. Crude alkaloids from selected medicinal plants (Woodfordiafruticosa (DhatakiPuspa), Adhatodavasica (Vasaka), Chenopodiumambrosioides, Vitexnegundo, Peganumharmala and Broussonetiapapyrifera) were extracted as per reported literature. The test crude alkaloids were screened foracute toxicity study. Writings induced by acetic acid, tail immersion method and formalin-induced nociception assay procedures were used for possible analgesic effects of the crude alkaloids.Crude alkaloids were safe up to dose of 1250 mg/kg body weight in mice. The alkaloids significantly reduced the abdominal constrictions, and increased the time for paw licking response in both phases with a significant raise in latency time in nociception models ($P \leq 0.05$). Moreover, the antinociceptive response was significantly attenuated by pretreatment with naloxone suggesting involvement of the opioid receptors for possible antinociceptiveaction.Crude alkaloids of Wood fordiafruticosa and Peganumharmala showed prominent analgesic potentials through inhibition of peripheral as well as central nervous system mechanisms. Further work is required for isolation of the pharmacologically active constituents.

Insight into the bronchodilator activity of Vitex negundo.[7]

Report indexed that *Vitexnegundo*Linn. (Verbenaceae) is traditionally used in hyperactive respiratory disorders.This study explored the mechanisms underlying the effectiveness of *Vitexnegundo*in hyperactive respiratory disorders.Crude extract of *V. negundo* leaves was obtained. For in vivo bronchodilatory activity in anesthetized rats, different doses (1, 3, 10, 30, and 50 mg/kg) of the crude extract of *V. negundo* (Vn.Cr) were tested. The underlying mechanisms were studied in isolated guinea pig tracheal strips, suspended in organ baths at 37 °C. Intravenous doses of the crude extract of Vn.Cr showed dose-dependent bronchodilatory effect (9-50%) against carbachol (CCh; 100 µg/kg)-induced bronchoconstriction, similar to aminophylline. In isolated guinea-pig tracheal strips, Vn.Cr Relaxed CCh (1 µM) and high K(+) pre-contractions with respective EC50 values of 0.72 (0.48-1.10; n = 5) and 3.38 mg/mL (1.84-6.21; n = 4), similar to papaverine. Diltiazem also relaxed both contractions with more potency against high K(+) pre-contraction ($p < 0.05$). Pre-incubation of the tracheal strips with Vn.Cr potentiated the isoprenaline inhibitory concentration response curves (CRCs), similar to papaverine. The inhibitory effect against CCh and high K(+) suggests involvement of phosphodiesterase (PDE) inhibitory pathway(s), in addition to an inhibitory effect on Ca(++) entry. This finding was further strengthened when pre-treatment of the tracheal strips potentiated the isoprenalineCRCs. suggestVn.Cr possesses a combination of

papaverine-like PDE inhibitor and diltiazem-like Ca(++) entry blocking constituents, which partly explain its bronchodilatory effect, thus validating its medicinal importance in asthma.

Synthesis and characterization of silver nanoparticles using crystal compound of sodium para-hydroxybenzoatetetrahydrate isolated from Vitex negundo. L leaves and its apoptotic effect on human colon cancer cell lines.[8]

The research explained that metallic nanoparticles are major concern, particularly silver nanoparticles (AgNPs) are used in various applications. In the present investigation, we report a novel strategy with biological approach for synthesis of AgNPs using sodium para-hydroxybenzoatetetrahydrate (SPHT) isolated from *Vitexnegundo* leaves. The synthesized SPHT-AgNPs were characterized by UV-vis spectroscopy, high resolution transmission electron microscopy (HRTEM) with selected area electron diffraction (SAED) pattern, field emission scanning electron microscopy (FESEM) with energy-dispersive X-ray spectroscopy (EDX), zeta potential and Fourier transform infrared spectroscopy (FT-IR) analysis. The various pH and temperature were evaluated to find their stability effects on SPHT-AgNPs synthesis peak at 430 nm. The size of SPHT-AgNPs were ranging from 26 to 39 nm and were spherical in shape. The hydroxyl and carboxylic functional groups from bio-reducing mediators of SPHT have a stronger ability towards synthesis of AgNPs, which was confirmed using FT-IR spectrum. In addition, anticancer activity were determined by MTT assay, Annexin V-FITC/PI and cell cycle analysis.

Antioxidant lignans from the seeds of Vitexnegundovar. cannabifolia.[9]

Report shows a new phenyldihydronaphthalene-type lignan, vitexdoin F (1), along with 22 known lignan derivatives (2-23) was isolated from the seeds of *Vitexnegundo*var. cannabifolia. Their structures were established by comprehensive 1D and 2D NMR spectroscopic analyses. The antioxidant activities of these lignans were evaluated through 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical-scavenging assays, and 16 of these isolates exhibited obvious radical-scavenging effect on the stable-free radical, DPPH.

Antiestrogenic and Anti-Inflammatory Potential of n-Hexane Fraction of VitexnegundoLinn Leaf Extract: A Probable Mechanism for Blastocyst Implantation Failure in Mus musculus.[10]

Research shows the anti-implantation potential of different fractions of *Vitexnegundo* Linn leaf extract was evaluated in female Swiss Albino mice. Animals from different groups were dosed orally either with 0.2% agar (vehicle) or with fractions of V. negundo leaf extract (n-hexane, chloroform, n-butanol, and remnant fractions) at 10:00 a.m., from day 1 to day 6 of pregnancy. The pregnant females from each group were sacrificed on different days of pregnancy (n = 6), and uterus was excised and used for estimation of lipid peroxidation and assay of superoxide dismutase activity as a marker for blastocyst implantation. Animals treated with n-hexane fraction showed altered level of superoxide anion radical and superoxide dismutase activity as compared to control animals. The probable mechanism by which this extract exhibits inhibition of blastocyst implantation is through the anti-inflammatory and antiestrogenic potential.

Anti-inflammatory and anti-osteoporotic lignans from Vitexnegundoseeds.[11]

The research explained that Chemical investigation of *Vitexnegundo* seeds afforded four new lignans, including a phenylindene-type lignan, vitexdoin F (1), and three phenylnaphthalene-type lignans, vitexdoins G, H and I (2-4). Their structures were elucidated by detailed spectroscopic analyses on the basis of NMR, IR, and MS data. All compounds were evaluated for their anti-inflammatory and anti-osteoporotic activities, employing RAW264.7 macrophages, osteoblast-like UMR106 and osteoclastic cells, respectively. Compound 1 showed significant inhibition on the nitric oxide (NO) production (IC50 4.17 μg/mL) due to its down-regulation of the inducible nitric oxide synthase (iNOS) protein expression in LPS-stimulated RAW264.7 cells, which also exhibited potent stimulatory effects on the proliferation and ALP (alkaline phosphatase) activity of UMR106 cells, and significantly up-regulated the OPG/RANKL protein ratio.

PASS-predicted Vitexnegundoactivity: antioxidant and antiproliferative properties on human hepatoma cells--an in vitro study.[12]

Report shows that Hepatocellular carcinoma is a common type of tumour worldwide with a high mortality rate and with low response to current cytotoxic and chemotherapeutic drugs. The prediction of activity spectra for the substances (PASS) software, which predicted that more than 300 pharmacological effects, biological and biochemical mechanisms based on the structural formula of the substance was efficiently used in this study to reveal new multitalented actions for *Vitexnegundo*(VN) constituents. Experimental studies based on antioxidant and antiproliferative assays verified the predictions obtained by the PASS-predicted design strategy. Antioxidant activity of VN extract was studied using 1,1-diphenyl-2-picrylhydrazyl (DPPH) and Ferric reducing or antioxidant power (FRAP) assays. The antiproliferative activity of VN extract against WRL68 and HepG2 was investigated based on methylthiazol tetrazolium (MTT) spectrophotometric assay.VN extract showed 79.43% inhibition of DPPH stable radical with IC50 13.31 ± 0.18 μg/ml. This inhibition was too closed to butylated hydroxyl toluene (BHT) 82.53% (IC5013.8 ± 0.14) and gallic acid 89.51% (IC50 3.1 ± 0.08). VN extract exhibited the strongest free radical scavenging power compared with two commercial antioxidants, BHT and ascorbic acid. VN increased the activities of antioxidant enzymes in normal embryonic liver cells (WRL68) including, superoxide dismutase (SOD) and glutathione peroxidase (GPX) compared with to H2O2 group. The ethanolic extract of VN showed cytotoxicity to HepG2 cells in a dose and time-dependent manner with IC50 66.46 μg/ml, 57.36 μg/ml and 65.12 μg/ml at 24, 48, and 72-hours incubation respectively, with no sensitivity in WRL68 cells. This was associated with significant elevation in lactate dehydrogenase (LDH) release in HepG2 cells. In addition, the activation of caspase-3 enzyme suggesting that the observed cytotoxicity was mediated via an intrinsic apoptosis pathway. PASS-predicted plant activity could efficiently help in selecting a promising pharmaceutical leads with high accuracy and required antioxidant and

antiproliferative properties. This is the first report on PASS-predicted VN activity.

Antifilarial activity of ethyl acetate extract of Vitexnegundoleaves in vitro.[13]

Research tried to evaluate the possible antifilarial effect of ethyl acetate extract of *Vitexnegundo* (Verbenaceae) leaves against Setariacervi filarial parasite in vitro. In vitro screening was done by the method of motility inhibition and MTT reduction assay with concentrations of 0.03 to 1.00 mg/mL for 2 to 24 h incubation periods respectively, for possible antifilarial effect by comparing with control. In motility assay, complete inhibition of motility was observed and in MTT reduction assay which gave >50% reduction for concentrations 0.20, 0.50 and 1.00 mg/mL at 10, 6 and 2 h incubation periods respectively in a dose dependent manner ($P<0.05$). An antifilarial effect imparted by plant extract was found to be a function of their relative concentrations. Inhibitory concentration (IC50) for the plant extract was found to be 0.16 mg/mL. The present study recorded significant antifilarial effect of *Vitexnegundo* plant extract and contributed toward the development of database for novel drug candidates for lymphatic filariasis.

CONCLUSION

Now a days when the world keep a turn to the Harbal or Ayurvedic medicine, & Billions of people using those medicine, because of its more effectiveness, at that era Nishinda can perform a major role. It shows a variety of actions, which increase the probability & interest of a researcher & companies to research & made products through it.

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