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EXPLORING THE DIVERSE ACTIVITIES OF VITEX NEGUNDO: A COMPREHENSIVE REVIEW.

Swapnita Balasaheb Dhore, Kadambari S. Ghatpande, Arya Hanumant Barabole, Rutuja Sanjay Ahire

Student Bachelor of Pharmacy, Assistant Professor, Student Bachelor of Pharmacy, Student Bachelor of Pharmacy

Department of Pharmaceutical Chemistry

Krishnarao Bhegade Institute of Pharmaceutical Education and Research, Pune, India

ABSTRACT:

Vitex negundo, commonly known as Nirgundi, is a medicinal plant widely distributed in tropical and subtropical regions. This review aims to provide a comprehensive overview of the phytochemical composition, pharmacological properties, and therapeutic potential of *Vitex negundo*. The phytochemical profile of Vitex negundo is diverse, comprising essential oils, flavonoids, alkaloids, terpenoids, and other bioactive compounds. These constituents contribute to the plant's varied pharmacological activities, including anti-inflammatory, antioxidant, antimicrobial, analgesic, antipyretic, mosquito repellent and immune modulatory effects. Additionally, Vitex negundo has been traditionally used in various traditional medicine systems for the management of conditions such as arthritis, respiratory disorders, skin ailments, and reproductive health issues.

Key Words: Vitex negundo, Pharmacological activities, Analgesic effects, Anti-inflammatory, Safety and toxicity, Antioxidant properties

INTRODUCTION:

Name: Vitex negundo Linn.

Description: It is a woody plant primarily found in the Indian subcontinent and neighboring countries.

Characteristics:

Size: It can grow as an erect shrub or a small tree, reaching heights between 2 to 8 meters.

Bark: The bark is typically reddish-brown in color.

Leaves: The leaves are compound, consisting of three to five finger-like lanceolate leaflets. Each leaflet is 4 to 10 cm long, with the central leaflet being the longest and possessing a stalk. The leaf edges are toothed or notched, resembling a saw, and the bottom surface is covered with hair.

Flowers: Purple-white flowers are abundant, borne in panicles about 10 to 20 cm long. The petals vary in length, with the middle lower lobe being the longest. Both the corolla and calyx are densely covered in hairs. The flowers are fragrant and hermaphrodite, meaning they have both male and female reproductive organs and are pollinated by insects.(1)

fig(1). vitex negundo linn.

TAXONOMICAL CLASSIFICATION:
Kingdom - Plantae – Plants
Sub Kingdom: Tracheobionta (Vascular plants)
Super Division: Spermatophyta (Seed plants)
Division: Magnoliophyta (Flowering plants)
Class: Magnoliopsida (Dicotyledons)
Subclass: Asteridae
Order –Lamilales
Family –Verbenaceae
Genus-Vitexlinn.
Species – *Vitex negundo Linn.* (Chaste tree)(2)

VERNACULAR NAMES:
Telugu :Vaavili
Tamil :Nirkundi,
Hindi :Shivari, Nirgundi
Punjab :Shwari
Assam :Aslok
Bengal :Nirgundi, Nishinda
Gujarati :Nagod
Marathi :Nirgundi
Punjabi :Sambhalu, Banna
Sanskrit :Nirgundi
English: five leaves chase tree(2)

PHARMACOLOGICAL ACTIONS:(1,13,17,18)
The herbal plant Vitex negundo linn. Shows the following pharmacological actions:

- Anti-inflammatory
- Immuno stimulant
- Anti convulsant
- Anti-oxidant
- Antibacterial
- Anti-fungal
- Anti diabetic
- Anti arthritic
- Anti-allergic
- Hepato protective
- Analgesic

- Anti-hyperpigmentstion
- Anti-androgenic
- Insecticidal and pesticidal
- Anti-pyretic
- Anti-microbial
- Nephro protective
- Anti-HIV activity
- Astringent activity
- Anxiolytic activity

Anti-inflammatory activity:(4)

Mature fresh leaves (MFL) of Vitex negundo were collected from a tree in the campus garden of the University of Colombo, Sri Lanka, between March and July 2002. They were gathered 1-3 weeks before and 1-2 weeks after flowering. Healthy mature Swiss mice (weighing 18-22 g) and mature Wistar rats (weighing 100-150 g), of both sexes, were provided by the National Institute of Hygiene and Epidemiology in Hanoi, Vietnam. Animals were acclimated 5-7 days before experiments. The experiments took place at the Department of Pharmacology, Hanoi Medical University, Vietnam. Animal research protocols were approved by the Ethical Council of Hanoi Medical University, Vietnam.

Anti-convulsant activity:(5)

The plant was identified, authenticated by an expert (botanist) and collected in the month of September, 2001 from local area of Sevagram, district Wardha, Maharashtra. The fresh leaves of Vitex negundo were shade dried and powdered. The powder was macerated for 24 hrs in 70% v/v ethanol. Then it was subjected to percolation using 70% v/v ethanol as solvent. The liquid obtained was dried in the shade, and the thick extract was mixed with 1% gum acacia for the current study on preventing seizures. Total yield of extract was 9.5%.

Anti-diabetic activity :(6,7)

Nirgundi stems (L.) were collected from Vitex negundo medicinal garden of MFP-PARC barked pathani Bhopal. The plant has been identified and authentication by Dr. Zia UL Hasan, Head of the botany department at Safia college of science, Bhopal. Standard Drug: Glibenclamide, Animals Species: Wistar albino rats (either sex) of weight 120 to 150 g.A suspension formulation of hydro-alcoholic extract of Vitex negundo stem in 1.0% Carboxy Methyl Cellulose solution was prepared for further pharmacological study.

Anti-oxidant activity:(8)

Leaves and stems of V. negundo were collected from Jakarta, Indonesia (6°15'43.4"S 106°52'39.9"E) and identified at Herbarium Bogoriense, Research Center for Biology, LIPI, Indonesia. Each sample was extracted using the maceration technique with 90% ethanol as a solvent at room temperature. After 72 h, the filtrate was filtered with Whatman filter paper and evaporated at 60°C with a rotary evaporator (Buchi R-100). The extracts of leaves and stems were analyzed for their antioxidant activity and chemical content by the GC-MS method.

Samples used: 25 grams of trifoliate leaves (TF)
125 grams of pentafoliate leaves (PF)
250 grams of fresh stem (S)

They tested the antioxidant activity using a DPPH assay. They mixed 1 mL of sample solutions (at concentrations of 10, 50, 100, 150, and 200 parts per million) with 1 mL of 0.1 mM DPPH. Then, they let the mixtures sit for 30 minutes at room temperature. After that, they measured the absorbance of the solutions at 517 nm. They used DPPH without sample solution as a negative control and ascorbic acid as a positive control.

Anti-microbial activity:(9)

The plant was collected from the foot hills of Shivalik range of Himalayas in Hardwar and identified at Botanical Survey of India, Dehradun, Uttarakhand. The plant was shade dried at room temperature and then powdered plant material was loaded in soxhlet assembly and extracted in four different solvents such as

petroleum ether, acetone, methanol and water. They used the well diffusion or cup plate method to test for antibacterial activities. The 8mm diameter wells were punched in the agar and filled with extracts and respective solvents for control and standard antibiotic ampicillin (100 mg /ml) was used as positive Then kept the plates at 37°C for 24 hours during the incubation period.The antibacterial activity was evaluated by measuring the diameter of inhibition zone in mm.

Anti-fungal activity:(10)
Vitexnegundo Linn., dried fruits of medicinal plant were purchased from herbal market at Karachi, during the month of April 2004. The material was botanically identified and confirmed by Porf. Dr. Ghazala H. Rizwani, Chairperson of Department of Pharmacognosy, Faculty of Pharmacy, University of Karachi, Karachi, A voucher no 013 was deposited in the museum of Herbal Medicine, Department of Pharmacognosy, Faculty of Pharmacy, University of Karachi. The dried plant fruits were washed with clean distilled water, dried and ground into coarse powder. The powdered fruits (seeds) were percolated in absolute ethanol (Merck) at room temperature for 15 days. The percolate was filtered and evaporated by using rotary evaporator (Eyela Japan). The extract was dried in lyophilizer (Eyel, Japan) and the extract was taken for assay.

Analgesic activity:(11)
The fresh leaves from VN and dried them in the shade. Then, ground the dried leaves into a coarse powder (500 grams). Next, used a Soxhlet apparatus to extract the powder with water for ten hours. The solvent was removed, and the extract was dried using rotatory evaporator. A dark brownish residue was obtained (30 gm). The dried extract was stored in a desiccator in a cool and dark place. For pharmacological screening, VNE was then dissolved in distilled water to prepare fresh drug solution in the desired concentration just before use.

Arthritic activity(12)
Dried leaves of Vitex negundo and Punica granatum by leaving them in the shade at room temperature until they were completely dry. Then,crushed them into a fine powder using a mechanical grinder.
Next took 10 grams of this powdered material and soaked it in 100 milliliters of distilled water and methanol separately. Put each mixture into a sealed conical flask and left it for 48 hours.
After 48 hours, filtered the plant extracts to separate the liquid from the solid material. Used a method called Soxhlet extraction, where heated the mixture at 40-50°C to extract the desired components.
Finally, used a rotary evaporator to remove the solvent from the extract, leaving behind a concentrated sample. Stored this sample at 40°C until needed to use it for further experiments.

Anti-pyretic activity:(13)
Gathered the roots, flowers, and fruits of Vitex negundo from college's herbal garden. Washed each part with water and let them air dry for several days separately. Then, to prepare them for grinding, then dried them in an oven for 24 hours at a low temperature, making sure it stayed below 40°C.
Once they were dry, used a powerful grinding machine to turn them into a coarse powder. Cleaned the plant parts with water and let them dry in the shade. Then, used an electric blender to grind them into a fine powder. Next, used a special apparatus called a Soxhlet extractor to extract the desired substances from the powdered plant material using an appropriate solvent.
After extraction, used vacuum distillation to remove the solvent from the extract, leaving behind a semi-solid substance. This substance was then used for more detailed analysis.

Anxiolytic activity:(14)
The roots were dried and coarsely powdered. The dried powdered material was then exhaustively extracted with95% ethanol, concentrated under controlled temperature ,and was used for the pharmacological investigation.Then used Diazepam ampoules from Watson Pharmaceuticals, India. These contained 10 mg of Diazepam in 2 ml of solution. Used them as reference drugs for comparison in our study. Diazepam was diluted to 1.5 mg/10 ml with distllled water. Two different concentrations (100 and 200 mg/kg) of the VN root extract were prepared by dissolving the extracts in distilled water .All solutions were prepared freshly on test days and administered orally (p.o.) in a volume of 0.1 ml/10 g bodyweight of mice.

Mosquito repellent activity:(15,16)
Scientists extract bioactive compounds from Vitex negundo, usually using solvents like ethanol or methanol. This extraction process helps concentrate the active components that may contribute to the mosquito

repellent activity. Mosquito bioassays involve exposing mosquitoes to different concentrations of Vitex negundo extracts or isolated compounds. The researchers observe the effects on mosquito behavior, such as their attraction or avoidance of the treated substances.

CONCLUSION:

Vitex negundo, commonly known as the five-leaved chaste tree or Nirgundi, is a versatile medicinal plant that has been widely studied for its pharmacological properties. The review of Vitexnegundo highlights its diverse range of therapeutic applications, including anti- inflammatory, analgesic, antioxidant, antimicrobial, and immune modulatory effects.

Vitex negundo seems like a promising plant for our health, and as we learn more, it could become a helpful addition to traditional and modern medicine.

Studies suggest that Vitex negundo has compounds that can help reduce pain, fight inflammation, and protect the body from damage. It might be useful for conditions like arthritis, respiratory troubles, and skin diseases.

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