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Review on various activities exhibited by *Vitex negundo L.* Leaves

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Abstract
Vitex negundo is another Indian herb with extensive historical uses for numerous ailments. A member of the Verbenaceae family, the small tree Vitex negundo has thin, gray bark. The herb is abundant and has pharmacological effects against a variety of ailments in conventional medicine. Numerous secondary metabolites, including alkaloids, phenols, flavonoids, glycosidic iridoids, tannins, and terpenes, are present in all parts of the plant, but especially in the leaves. The plant is said to have a, variety of therapeutic uses due to its abundance of phytochemicals, including antibacterial, anti-inflammatory, astringent, bronchodilator, CNS depressant, emmenagogue detoxifying diuretic, anticancer, and hepatoprotective properties. In addition, it has larvicidal, insecticidal, and repellent uses. Leaf extract is used as an anthelmintic, nerve tonic, and sedative. It became known as the chaste berry tree. Widely cultivated in the Americas, Europe, Asia, and the West Indies, this plant is found in Indo-Malesia. It can be found in most partsof India as well as the outer Himalayas. The plant has the potential to be an effective biocontrol agent and is includedin several commercially available herbal supplements. The use of methods such as cell and tissue culture would allow rapid propagation and maintenance of plant species and, from a phytochemical perspective, would provide scope for improving the number and quality of bioactive secondary metabolites naturally produced by plants.

Keywords: *Vitex negundo*, Traditional uses, Medicinal Values, Anti-inflammatory

Introduction
V. negundo Linn. belongs to the family Verbenaceae, it has quadrangular branches and tri- or penta-foliate leaves with 5 leaflets grouped like a palm and so is also known as the 5-Leaved Chaste Tree. The plant prefers to moisten environments to grow that's why it preferred to grow in India, Thailand, Madagascar, Malaysia, Sri Lanka, Eastern Africa, and Pakistan. Each part of the plant is developed with medicinal value; hence this plant plays a crucial role in traditional medication systems. Since the plant has therapeutic potential in every component, it is essential in systems of traditional medicine. All parts of V. negundo contain several phytoconstituents like fatty acids, alkaloids, flavonoids, phenols, lignans, tannins and steroids. Due to the presence of a variety of secondary metabolites, V. negundo is used to treat different types of diseases such as stomachache, asthma, cold, diarrhoea, indigestion, gallstone, hernia, eye disorders, rheumatism, irritable bladder, headache, migraine, arthritis, jaundice, and liver disorders. In Unani medicine, the seeds of V. negundo are also utilized to treat swellings. Chinese medicine recommends consuming the fruit of the V. negundo plant to alleviate headaches, soreness, and swollen eyes [1]. Vitex negundo is a large aromatic shrub distributed throughout the greater part of India up to an altitude of 1500 meter in the Himalayas. It is abundant along the banks, rivers in moist situations, and open waste lands. It is widely planted as hedge plant along the roads and between fields. The shrub can be reproduced readily from cutting and as it produces roots, it is useful for planting against soil erosion. The traditional systems of Siddha and Ayurvedic medicine use this plant alone or in combination with other medicinal plants for the treatment of various diseases [2].

Fig 1: *Vitex negundo L.* Leaves

Taxonomical Classification
Kingdom - Plantae
Subkingdom - Tracheobionta
Super division - Spermatophyte
Division - Magnoliophyta
Class - Magnoliopsida
Subclass - Asteridae
Order - Lamiales
Family - Verbenaceae
Genus - Vitex
Species - Negundo [3].

Materials and Methods
Screening of Flavonoids: Alkali test depends on using ethanolic KOH (2 mL) mixed with 3 ml of alcoholic extract. The yellow color is indicated the flavonoids presence.
Screening of Tannins: Few drops of crude extract were mixed with 1% aqueous ferric chloride change of dark green to the blue color can predict the tannin presence.
Screening of Saponins: Froth assay was used to screen saponin by shaking distilled water vigorously with 5 mL of crude extract for approximately fifteen minutes. A persistent froth (1 cm) can be indicator for the saponins presence.
Screening of Terpenoids: Salkowski test were used as screening of terpenoids confirmed by using 4 ml of the hexane and alcoholic extracts were treated with 4 mL extract was added to 2 mL of chloroform and 2 mL of concentrated sulphuric acid, the positive result gives a reddish- brown color.
Screening of Reducing Sugar: Fehling test (solution I and II) was done by the addition of 20 mL of diluted sulphuric acid (H2SO4) to 4 mL of the dried extract in a test tube and boil for 10 min, and then it was cooled and 4 mL of Fehling solution and 10% potassium hydroxide were added, the red to blue precipitate was considered as the positive results.
Screening of Alkaloids: Approximately few drops of the crude extract were dissolved individually in few volumes of 1% hydrochloric acid, and then it was filtered. After that, the filtrate was reacted with Mayer's reagent; a positive result for alkaloids was indicated by the presence of white precipitate [4].

Results
The phytochemical analysis revealed the presence of flavonoids, tannins, alkaloids, reducing sugar, terpenoids and saponins.

Discussion
Vitex negundo L. is considered as an important source for chemical constituents such as saponins, tannins, terpenoids, alkaloids, reducing sugar etc. *Vitex negundo* has variety of therapeutic uses due to its abundance of phytochemicals, including antibacterial, anti-inflammatory, astringent, bronchodilator, CNS depressant, emmenagogue detoxifying diuretic, anticancer, and hepatoprotective properties. In addition, it has larvicidal, insecticidal, and repellent uses. Leaf extract is used as an anthelmintic, nerve tonic, and sedative. *Vitex negundo* plant showed major biological activities, however, they cannot directly be referred for pharmaceutical usage. Further extensive phytochemical and pharmacological studies along with mechanism of action are crucial not only to estimate this preliminary experiment but also to characterize and isolate the unknown compounds to inaugurate their pharmacological properties.

Conclusion
Vitex negundo L. is one of the major plants which has wide applications in traditional systems of medicines.All parts of the plant, from root possess a multitude of phytochemicals like flavonoids, terpenoids, tannins which are important bioactive agents imparting a variety of medicinal uses to the plant. It's biological activities and pharmacological potential are antioxidant, anti-inflammatory, and anti-cancer properties. Apart from this, it is also reported to have pesticidal and anti-microbial activities. Many investigations and researches are continuously made in the field of biotechnology to reveal other applications of Vn and its scope in modern medicine. Vitex negundo, like many other herbal products, has immense potential in treating diseases and fighting pathogens and it is upon us to make the best use of it.

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