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## Pharmacological Research

# Antimicrobial Activity of *Vitex Negundo* Linn. (Nirgundi) Leaves Extract

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### Abstract

**Background:** Antibiotic resistance in human pathogens has been more widespread during the last several years. This necessitates the development of antibacterial medications that are not based on antibiotics. Aims: in vitro testing of the antibacterial properties on both f and g gramme of *Vitex negundo* Linn. (Nirgundi) organisms with a gramme positive and a gramme negative stain

**Material and Methods:** To test the antimicrobial activity of *Vitex negundo* Linn. leaf oethanol extracts against three strains of bacteria obtained from the American Type Culture Collection (ATCC 25922, ATCC 25923, and ATCC 27736), researchers used the well diffusion technique (ATCC). The concentrations of 20 mg/ml, 40 mg/ml, and 60 mg/ml were used in this investigation. Leaf extract concentrations of up to 100 mg/ml were utilised.

**Results:** All of the bacterial pathogens investigated were shown to have antibacterial properties. Highest ZOI recorded for *S. aureus* was 15 mm at 80 and 100 mg/ml, respectively, whereas the maximum ZOI was 12 mm for *E. coli* and 11 mm for *K. pneumoniae* at 100 mg/ml for the other two pathogens.

**Conclusion:** A significant antibacterial effect was found for *S aureus* in the *Vitex negundo* Linn. leaf extract when compared to all the other microorganisms.

**Keywords:** Antimicrobial Property, *Vitex negundo* Linn., Nirgundi, Well Diffusion Method

### Introduction

icrobes, such as viruses, bacteria, and parasites, are all around us, some of which are helpful to our health and others which are detrimental. Infectious illnesses account for 26% of all fatalities each year and over 30% of all DALYs

(disability-adjusted life years) lost each year. [1] More than three million children die each year from malaria and diarrheal illnesses alone in impoverished nations. [2] Antibiotics are the medicines that suppress or kill germs. Developing novel medications to treat

infections is necessary since bacteria are capable of transmitting and acquiring resistance to pharmaceuticals used as therapeutic agents [3].

Bacteria appear often in ancient works of literature. Vedic literature has identified and described over a hundred different species of microorganisms. There are macroscopic and microscopic creatures (like Drishya) in the world (Adrishya). They might come from inside or outside the body. They've located the main (Vesa) and secondary (Parivesha) locations of infection in the body. The organisms should be wiped off in order to lessen their negative impacts. For example, herbal medications such as Manidharana (wearing jewels), Bali (sacrificing an animal), Homa (votive ritual), and Mantra (hymns) were used, as well as the sun, re, and Guggulu. [4] Sankramaka or infectious disorders were identified by Sushrut and Vagbhata. Some of these disorders have been linked to microbes, according to the research. Because of this, antimicrobial medications known as Krumighna or Rakshoghna have been described in Ayurvedic texts for centuries. [5] [6]

As a member of the verbenaceae family, Vitex negundo grows to a height of up to 4.5 metres and is distributed across India. Therapeutic properties include anti-inflammatories, antibiotics, antibacterials, moderate CNS depressants antifertility, analgesic, hepato-protective and estrogenic anticonvulsant. Herbalists employ the leaves for anything from rheumatism and arthritis to catarrhal fever and syphilis to sprains and inflamed sores and ulcers. [7] Antibiotic-resistant pathogens, as well as their adverse effects, might be harmful to the host. As a result of the pressing demand for novel antimicrobial medications with fewer

side effects than synthetic pharmaceuticals, the current research examined the antibacterial activity of Nirgundi leaves. Results were collected at Jawaharlal Nehru Medical College in Wardha, Maharashtra, India, in the department of microbiology..

Plant material: T From the 21st of July to the 30th of September of 2014, fresh leaves of Vitex negundo Linn. were harvested in the hamlet of Dabha, Wardha District (MS), which is located at 20.57 N and 78.81 E. Herbarium was made and delivered to the Botanical Survey of India in Pune, Maharashtra, for plant certification. No. BSI/WRC-Technology/2014/447-MSD-4 is a voucher specimen.

Washing leaves under tap water for 2-3 times, followed by an ethanol wash, and then allowing them to dry in the shade at room temperature for seven days removes soil and other contaminants. Using a mixer grinder, we pulverised the leaves of three different plants until we had a coarse powder. Polyethylene bags containing the powder were secured, marked, and placed in an airtight container for further investigation.

Preparation of extracts: A soxhlet device was used to extract 20 gm of powdered Vitex negundo Linn. leaves into 200 ml of ethanol at 40-50°C. 2.29 gramme of the filtered extract was collected and stored at room temperature to eliminate any remaining ethanol. And 10 cc of ethanol was used to dilute the solution. The mother solution was kept in a refrigerator for future usage and was referred to as 20 mg/ml, 40 mg/ml, 60 mg/ml, 80 mg/ml, and 100 mg/ml concentrations of the extract.

Microorganisms: E. coli, Staphylococcus aureus and Klebsiella pneumoniae bacteria were

purchased from the American Type Culture Collection (ATCC) for use in this study (ATCC).

**Preparation of subculture media for Inoculum:**  
The agar slant culture was transferred into the sterilised nutrient broth medium through a loopful of organism. At 370 degrees Fahrenheit, the tubes were incubated for 18-24 hours.

**Preparation of Assay Medium and Pour plates:**  
After sterilising the Petri plates, Mueller Hinton Agar (MHA) was poured into them and allowed to cool at 400C until it solidified. There is a lot of room for

at 37°C. An aseptic area was used for all operations. [8]Results:

Vitex negundo's ethanolic extract was shown to have an antibacterial effect beginning at a concentration of 20mg/ml for all three microorganisms studied in this investigation (Fig-1). E. coli was shown to have antibacterial activity at all concentrations, with the greatest ZOI of 12 mm at 100 mg/ml (Table-1). At 80 mg/ml and 100 mg/ml, the greatest zone of inhibition of 15 mm was obtained against S. aureus (Table-2). At a concentration of 100mg/ml, Klebsiella pneumonia had the



greatest ZOI of 11 mm (Table-3).

development and culture in the Petri dishes. A sterile swab stick was used to mow the prepared subculture media (a combination of microorganisms) over the surface of the solid MHA medium. Six 8-mm-diameter wells (holes) were drilled. An ethanol-based reference solution (99 percent ethanol) was also placed into one well, and leaves extracts of a trial medication at various concentrations were poured into each well, using the sterile pipette. There was a 50 l volume for all of the test and standard solutions tested. For 18 to 24 hours, the Petri dishes were incubated in an incubator

**Fig.1: Inhibition zone of Vitex negundo Linn. leaves extract**

*Escherichia coli*  
*Staphylococcus aureus*  
*Klebsiella pneumonia*

**Discussion:**

The plant's active principle, in millimetres.  
Inverse polarity

Gram-positive (*S aureus*) and gram-negative (*E. coli*) bacteria were both killed by the plant extract (*E. coli*, *K. pneumoniae*). A control medication of 98 percent ethanol was utilised. Due to the little amount (50 l) and high concentration of the control medication, it demonstrated minimal inhibition. Gram negative bacteria were less responsive to the experimental medication compared to gram positive bacteria. Gram-negative bacteria tend to be more resistant to antibiotics than their gram-positive counterparts. [9]

*S. aureus* was shown to have the widest area of inhibition, which is impressive given the organism's significance. There are a slew of things that might influence Antimicrobial properties are largely influenced by the extraction solvent. It may be possible that plant extracts include broad-spectrum antibiotics or just general metabolic poisons in them if they are able to kill both Gram positive and Gram negative bacteria. [10,11]

*Vitex negundo* leaves and bark have been shown to have antibacterial and phytochemical properties in a prior research.

*Staphylococcus epidermidis*, *Bacillus subtilis*, *Staphylococcus aureus*, and *S. aureus* were the three gram-positive bacteria tested, while *E. coli*, *Salmonella typhimurium*, *Pseudomonas aeruginosa*, and *Vibrio anguillarum* were the four gram-negative bacteria. Bacteria such as *Cholera* and *Vibrio alginolyteus* polar and non-polar substanc

Disc diffusion, Agar Cup and Broth Dilution procedures were used to test the antibacterial activity of the various extracts, including petroleum ether, chloroform, ethanol, and methanol. *E. coli* and *S. aureus* were shown to be the most resistant bacteria to extracts from both bark and leaves. Alcoholic leaf extracts inhibited the growth of bacteria in the positive and negative serogroups, but extracts from the tree bark in petroleum ether and chloroform exhibited superior antibacterial action. [12] Based on these and other studies, the trial medication seems to be an effective antibacterial therapeutic agent..

### Conclusion

Antibacterial activity was shown to be present against all of the bacterial pathogens investigated in this investigation. Because of this, it may be employed as an antibacterial supplement as well as a potential novel medicinal drug.

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