



ANTIMICROBIAL ACTIVITY OF AZADIRACHTA INDICA LEAVES EXTRACT AGAINST MRSA STRAINS

Microbiology

Dr. T. Durai Anand Asst. Professor/Zoology, Department of Zoology, VHNSN College (Autonomous), Virudhunagar, Tamilnadu, India

ABSTRACT

Azadirachta indica, generally well-known as neem tree, Vempu, Nimba, Medusa and Limbo. It is mainly grown in the tropical and subtropical regions. *Azadirachta indica* (i.e.) Neem is a native tree of India. This tree is treated as "village pharmacy of south Asia" (India) due to its huge medicinal properties and natives use it in general without knowing its multiple benefits. This study focuses on analyzing the antibacterial potential of the *Azadirachta indica* leaves extracts against methicillin-resistant *Staphylococcus aureus* (MRSA). The antibacterial actions of water extract of dried out *Azadirachta indica* leaves were tested against MRSA strains by agar well diffusion method. The leaves extract sterilized by bacterial filter proved advanced inhibitory outcome against the MRSA strains.

KEYWORDS

Azadirachta indica, Betalactum antibiotics, *Methicillin-Resistant Staphylococcus aureus*

INTRODUCTION

Azadirachta indica also well-known as "Indian neem tree", is the oldest and significant medicinal plants in India [1]. The various parts of neem tree like leaves, stems, flowers, roots and bark have various valuable uses. In ancient times it was used as household therapy against various human diseases [2,3,4]. The products of neem tree are mostly used in Ayurveda and Unani medicines due to its antibacterial, antiviral, antifungal properties and is also applied to cure skin diseases [5]. As noted in advance, both in India and Africa millions of people use twigs of neem as "tooth brushes" every day. Dentists have investigated about this ancient practice and found it is more effective in preventing periodontal disease [6].

MATERIALS AND METHODS:

Sample Collection And Preparation

The leaves of *Azadirachta indica* were collected in fresh condition from the campus of VHNSN College (Autonomous), Virudhunagar. The collected leaves were processed in Microbiology Research Laboratory of VHNSN College (Autonomous), Virudhunagar. The Collected leaves were washed with distilled water and impurities were cleaned off. The cleaned leaves were air dried for 15 days and constantly monitored to avoid fungal contamination during this process. The completely dried leaves were ground to fine powder and stored in a sterilized air tight container at the room temperature for further analysis.

Preparation Of Aqueous Extract

The powdered leaves of 1.5gm was mixed in 50 mL of double distilled water and incubated in shaking incubator at 25^o C by continuous shaking at 250 RPM for 5 days. By using Whatman filter paper, it was filtered and the filtrate was kept at 42^o C to evaporate all the solvent so that only crude aqueous extract only left. The filtered crude aqueous extracts were mixed with in equal volume.

Separation Of Methicillin-resistant *Staphylococcus Aureus* (mrsa) Strains From Wounds Of Patients

For the isolation of MRSA the pus samples from wounds were used. The samples were collected from the Bose Clinical Laboratory, Madurai. For MRSA strains enrichment, the Fluid thioglycollate medium was used. [7]. The specimen was inoculated on blood agar plates. The plates were incubated aerobically at 37^o C overnight.

Kirby-bauer Disk Diffusion Susceptibility Test

The Kirby-Bauer disk diffusion test was used for this study. For that the sterile disks loaded with the MRSA strains and antibiotics cloxacillin, cephalothin, cefoxitin and ofloxacin were infused on the disk. The sensitivity patterns of the MRSA were recorded for each synthetic antibiotics [8]. The Hi-media sterile disks were used for this study. The sensitivity patterns of MRSA were recorded again for reaction with neem tree leaves extract.

RESULTS AND DISCUSSION:

The antibiotic sensitivity pattern of isolated *Staphylococcus aureus* strains against antibiotics such as cephalothin, cloxacillin, ofloxacin and cefoxitin were studied by Kirby - Bauer disk diffusion test. The results were noted in Table I.

Table I : Antibiotic sensitivity pattern of isolated strains of MRSA for synthetic antibiotics

Antibiotics	Concentration (µg)	Average Diameter of zone of inhibition (cm)	Reaction of the organism
Ofloxacin	20	1.6	Sensitive
Cloxacillin	20	0.15	Resistive
Cefoxitin	20	0	Resistive
Cephalothin	20	1.1	Intermediate sensitive

With the application of neem tree leaves aqueous extract on the disk with MRSA, the sensitivity pattern was recorded. The results were recorded in Table II.

Table II: Antibiotic sensitivity pattern of isolated strains of MRSA for Neem tree leaves extract

S.No	Organism	Concentration (µg)	Diameter of zone of inhibition (cm)	Reaction of the organism
1.	48%	15	2.3	Sensitive
2.	37%	20	2.5	Sensitive
3.	15%	25	2.6	Sensitive

From the table II, the sensitivity pattern of MRSA against Neem leaves extract is high. The diameter of zone of inhibition is above 2 cm. It shows the neem leaves extract has more antimicrobial sensitivity against MRSA strains.

CONCLUSION:

Neem tree is famous for its medicinal properties all over India. Ayurveda and Unani medicines use extensively all the products of neem tree due to its antimicrobial properties. In olden era it was used as household remedy against various diseases. Now trends and awareness for using neem plant and its products as medicines and disinfectants are increasing. In this paper the antimicrobial property of neem plant against the MRSA strains is proved. In future the synergistic effect of the neem extracts with synthetic antibiotics can be studied.

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