

ANTIBACTERIAL EFFECTS OF CRUDE EXTRACT OF *Azadirachta indica* AGAINST *Escherichia coli* and *Staphylococcus aureus*

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Abstract: *Azadirachta indica* (neem) leaf extract was used to test antimicrobial activity against disease causing bacteria *E.coli* and *S.aureus*. Methanol extracts of varying concentrations 0.5, 1.0, 1.5, and 2.0% was prepared and tested against test organisms using agar diffusion method. Gentamicin of same varying concentrations was used to compare the effect of antimicrobial activity of methanol leaf extract.

Keywords: *Azadirachta indica*, *Escherichia coli*, *Staphylococcus aureus*.

Introduction

Azadirachta indica is a tree in the mahogany family *Maliaceae*. Neem is the most useful traditional medicine as a source of many therapeutic agents in the Indian culture and grows well in the tropical and semi-tropical countries. Its twigs are used as tooth brush and are widely used in the Indian sub-continent. Earlier studies on neem have showed that it contains active substances in almost every part of the seeds, leaves, roots, bark, trunk and branches with multiple medicinal properties. It is now considered as a valuable source of unique natural products for development of medicines against various diseases and also for the development of industrial products. *A.indica* is used for the treatment of diabetes like neem biscuits and shows the potential role of anti-diabetic activity. Aqueous extract of neem leaf extract has a good therapeutic potential as anti hyperglycemic agent. Anti-inflammatory effect of neem extract is less than that produced by dexamethasone. Neem leaves has antibacterial properties and could be used for controlling airborne bacterial contamination in the residential premise. Neem seeds are used in traditional medicine to treat infections conditions especially those involving the eye and ear. Administration of alcoholic extract of neem flower disrupts the estrous cycle in Sprague Dawley rats and causes a partial block in ovulation and has the potential of an ideal antifertility agent. Neem aqueous extract has powerful chemotherapeutic and viral agent. The purpose of the present study was to

investigate the antimicrobial activity of Neem leaves against disease causing bacteria, such as *Escherichia coli*, *Staphylococcus aureus*

Requirements and procedure

Plant materials-*A.indica* (neem) leaves were collected from Sahara State, Jankipuram, Lucknow, U.P

Leaf extract-The leaves were completely shade dried, powdered and mixed with methanol. The obtained liquid extract was subjected to Rotary evaporatory and subsequently concentrated and stored in refrigerator at 4° C.

Test microorganisms-The disease causing strains of *E.coli* and *S.aureus* were obtained from Biotech Park, Lucknow and used as test organisms

Antimicrobial activity

Agar diffusion method-The method is suitable for organisms that grows rapidly overnight at 35-37° C

The well is made in medium after inoculation with microorganisms. When well is loaded with antibiotics, it diffuses in the medium and inhibits the growth of organism. There is logarithmic reduction in antibiotic concentration. The zone of inhibition of bacterial growth around each well is measured and the susceptibility is determined.

Medium-Muller Hinton Agar (3.8gm/100ml of distilled water) was prepared, autoclaved at 121° C for 15minutes at 15lbs and poured in sterile petri plates up to a uniform thickness of approximately 5-6mm and the agar was allowed to set at ambient temperature and used.

Inoculums-The microorganisms were inoculated in Nutrient broth and incubated at 37° C and were used as inoculums.

Method-25 µl of inoculum was spread over the MHA medium, using sterile spreader.

After few minute, four wells were made in each Petri plate and loaded with 0.5, 1.0, 1.5 and 2.0% methanol extract. Similarly 0.5, 1.0, 1.5 and 2.0% gentamicin solution was added in another plate.

Plates were incubated at 37° C for 24hrs.

Antimicrobial activity was evaluated by measuring zone of inhibition by using Hi-media zone scale.

Result

The methanol extract of *A.indica* against *E.coli* and *S.aureus* bacteria show varied zone of inhibition.

Table.1. Antibacterial activity of methanol neem leaf extracts against *S.aureus*

Concentration	Well Diameter(cm)	Zone of inhibition(cm)	Inhibition length(cm)
0.5%	0.8	2.0	1.2
1.0%	0.8	2.3	1.5
1.5%	0.8	2.1	1.3
2.0%	0.8	2.0	1.2

Table.2. Antibacterial activity of methanol neem leaf extracts against *E.coli*

Concentration	Well Diameter(cm)	Zone of inhibition(cm)	Inhibition length(cm)
0.5%	0.8	2.1	1.3
1.0%	0.8	2.3	1.5
1.5%	0.8	2.4	1.6
2.0%	0.8	2.0	1.2

Graph.1. Antibacterial activity of methanol neem leaf extract against *E.coli* and *S.aureus*

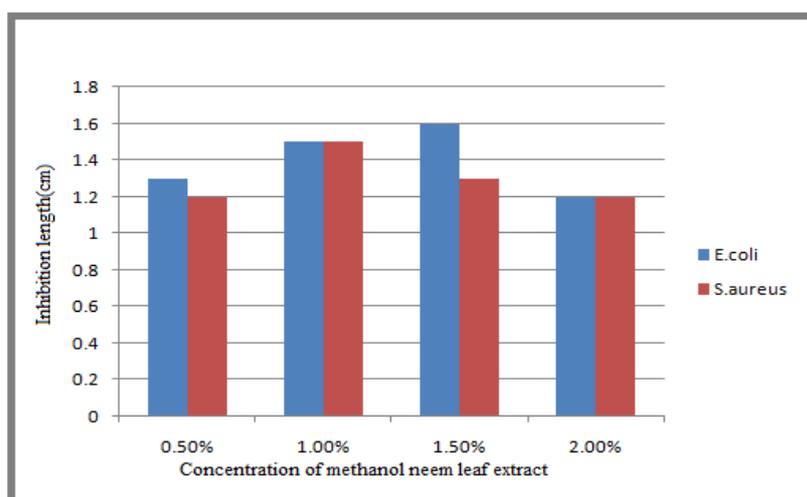
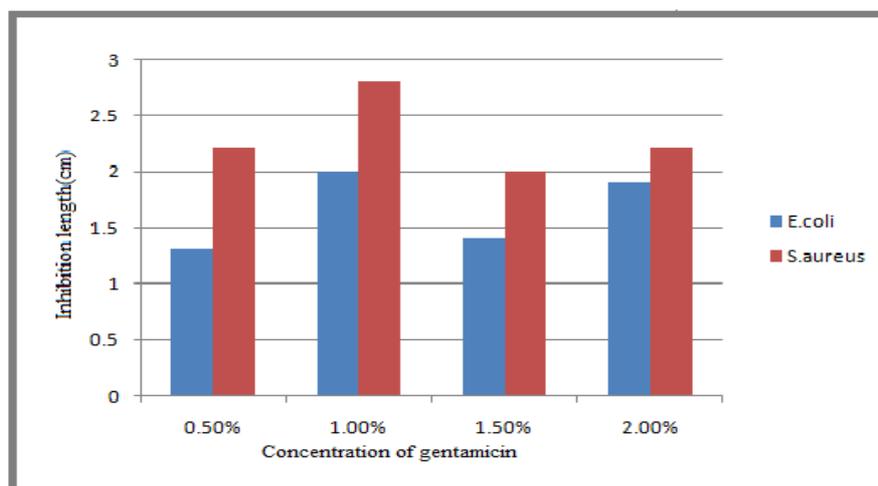


Table.3 Antibacterial activity of Gentamicin against *S.aureus*

Concentration	Well Diameter(cm)	Zone of inhibition(cm)	Inhibition length(cm)
0.5%	0.8	3.0	2.2
0.1%	0.8	3.6	2.8
1.5%	0.8	2.8	2.0
2.0%	0.8	3.0	2.2

Table.4 Antibacterial activity of Gentamicin against *E.coli*

Concentration	Well Diameter(cm)	Zone of inhibition(cm)	Inhibition length(cm)
0.5%	0.8	2.1	1.3
1.0%	0.8	2.8	2.0
1.5%	0.8	2.2	1.4
2.0%	0.8	2.7	1.9

Graph 2: Antibacterial activity of Gentamicin against *E.coli* and *S.aureus*

Discussion

Many of the existing synthetic drugs cause various side effects. Hence, drug development plant based compounds could be useful in meeting this demand for newer drugs with minimal side effects. *A.indica* leaves possessed good antibacterial activity confirming the great potential of bioactive compounds and is useful for rationalizing the use of this plant in primary health care. The extract of *A.indica* when used as medicinal plant, could be useful for the growth inhibition of the carcinogenic bacterium, *S. sobrinus*. The alkaloids,

glycosides, flavanoids and saponins are antibiotic principles of plants. These antibiotic principles are actually the defensive mechanisms of the plants against pathogens.

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