Indian J.L.Sci. 5 (2) : 89-91, 2016

ISSN : 2277-1743 (Print)
ISSN : 2278-7879 (Online)

# EFFECT OF ANTIMICROBIAL ACTIVITY OF *Azadirachta indica* ON THE BACTERIA ISOLATED FROM PESTICIDE CONTAMINATED SOILS

**ARCHANA MISHRA[a1], JAMALUDDIN[b] AND A. K. PANDEY[c]**

[ab]Department of Biological Sciences,Rani Durgavati University, Pachpedi, Jabalpur, Madhya Pradesh, India

## ABSTRACT

**The present study was conducted to evaluate the antimicrobial activity of bark and leaf extracts of *Azadirachta indica* commonly called as neem. Ethanol extracts were tested against the bacteria which were isolated from pesticide contaminated soils of Central Institute of Cotton Research( CICR) Nagpur.The neem material which was used in the experiment was obtained from a local garden . The efficiency of the neem extracts was studied by bore well method by applying different concentrations of the extracts on the isolated strain and comparing the zone of inhibition with the different antibiotics.**

**KEYWORDS :** Antimicrobial Activity, Neem Extract, Bore Well, Bacteria, Antibiotics

Natural products are known to play an important role in human life. The medicines especially which are plant derived have made a major contribution to human health and well being. India has a rich flora of medicinal plant species that are widely distributed throughout the country. The importance of plants as medicine is known since olden times, as they have the ability to produce a wide range of chemicals compounds that are used to perform important biological functions and provide a shield against insects, fungi, herbivores ,mammals (Taylor et al., 2001). Various parts of plants like root , bark ,seed,and leaves have been used as an important source of medicines , since thousands of years (Kunjal et al., 2014). Traditionally, plants have provided a foundation as well as inspiration for the formation of novel drug compounds since the use of herbs is more safe and cost effective , without any side effects (Uwimbabazi et al., 2015). In recent times a predominant interest has been observed in evaluating different plant extracts for their antimicrobial properties against various types of bacteria responsible for different types of human infection.One such tree with great healing power is Neem tree(Mamman et al.,2013; Gajendra et al., 2012). It is very common , its importance has been recognised by U.S. National Academy of Science which published a report in 1992 entitled Neem a tree solving global problems. More than 135 compounds have been isolated from different partes of the tree.They have been divided into isoprenoid and non- ispprenoid compounds(Kumar and Parmar 1996, Dastagir and Hag 1997, Biswas and Feltham, 2002) .The present study was thus conducted to evaluate the antimicrobial properties of neem against a bacteria which was isolated from pesticide contaminated soil. The efficacy of the neem extracts(bark and leaf) was determined by comparing it with different antibiotics.

## MATERIALS AND METHODS

### Isolation of Bacteria

To isolate a bacteria from pesticide contaminated soil, soil samples were collected from Central Institute for Cotton Research (CICR), Nagpur. Soil samples were brought in sterile polythene bags and maintained at $4^0$C. The pesticide degrading strains were isolated by enrichment technique. The selected strain was identified by different biochemical tests in the laboratory.

### Collection of Neem Samples

The bark and leaves of Neem tree were collected from a nearby garden.The material was washed with Distilled Water and dried under shade for 6-7 days.All the materials were ground in an electric grinder to produce a powder. The materials were exposed to UV light for 10 minutes for complete sterility. 10 grams of the bark and leaf powder were weighed and dissolved in 1000ml of sterile distilled water to get 1% concentration .Similarly the concentration of 3%, 6% and 9% was prepared.

### Experimental Procedure

A series of Muller Hinton(MH) agar plates were prepared since this media is commonly used for antibiotic sensitivity tests. The selected strain was spread onto the MH plates by spread plate method. After few minutes , wells were bored onto the MH plates with the help of cork borer. Different concentrations of neem extracts( bark and leaf)

[1]**Corresponding author**

were added into the wells along with antibiotics. The plates were incubated at 37°C for 24 hrs. After incubation the plates were observed for the zone of inhibition.

## RESULTS AND DISCUSSION

A total six strains were identified from pesticide contaminated field viz. C1, C3,C4,C6,C7 and C10. out of these strains only one strain(C1) was found to be most potent strain as visible by its capacity, to degrade maximum concentration of the pesticide methyl parathion. The strain was identified in the laboratory by detailed biochemical tests as *Achromobacter sp* C1. Since ancient times the healing and medicinal properties of neem has been known.The neem tree is a store house of different chemicals which are used to prepare different herbal medicines. Its importance has been recognised by U.S. National Academy of Science which published a report in 1992 entitled " Neem a tree solving global problems". More than 135 compounds have been isolated from different parts of the tree. Thus the present study was conducted to evaluate the antimicrobial activity of neem (bark and leaf extract). As clearly seen from the Table 1-3 that, both the extracts had significant effect on the inhibition of the test strain C1 as visible from the zone of inhibition when compared with the different antibiotics. However as compared to the bark extract, the leaf extract was more effective at all concentrations more significantly at concentration of 9%. Several researches in past have studied the antibiotic ability of plant derived products. Murray et al. evaluated the possible use of *Morinda citrifolia* juice as an alternative to sodium hypochlorite as an irrigants. *Mimusops elengi* commonly called as bakul has found an important place in indigenous system of medicine. The bark of it is acrid, astringent and is used as a gargle for odontopathy). , inflammation and bleeding gums. Its tender gums are used as tooth brushes (Purnima et al., 2010; Kritikar and Basu, 1991 and Satyavati and Gupta,1987).

Okemo et al., (2001) and stated that crude extract of neem was very effective against *Staphylococcus aureus* and *E. coli* they found that an extract concentration of 0.5 mg/ml had significantly reduced the bacterial infection. Awasthy et al., 2009. reported ethanol extract of neem was very useful to treat many diseases caused by bacteria. Aslam et al. reported that neem extract was very effective against three bacterial species *Staphylococcus aureus*, *Corynebacterium sp*. and *E. coli* Although many drugs that

**Table 1 : Shows the Zone of Inhibition of the Different Antibiotics Used Against the Test Strain(C1)**

| S.No. | Antibiotics Used | Zone of Inhibition (cm) |
|---|---|---|
| 1. | Ciprofloxacin | 1.8 |
| 2. | Erythromycin | 1.6 |
| 3. | Norflaxacin | 1.1 |
| 4. | Gentamycin | 1.9 |

**Table 2 : Shows the Zone of Inhibition of Different Concentrations of Bark Extract of Neem Used Against the Test Strain(C1)**

| S.No. | Concentration of Bark Extract | Zone of inhibition (cm) |
|---|---|---|
| 1. | 1% | 1.2 |
| 2. | 3% | 1.1 |
| 3. | 6% | 1.5 |
| 4. | 9% | 1.5 |

**Table 3 : Shows the Zone of Inhibition of Different Concentrations of leaf Extract of Neem Used Against the Test Strain(C1)**

| S.No. | Concentration of Leaf Extract | Zone of Inhibition(cm) |
|---|---|---|
| 1. | 1% | 1.3 |
| 2. | 3% | 1.9 |
| 3. | 6% | 1.9 |
| 4. | 9% | 2.1 |

come from tress generally have been replaced by more potent synthetic ones.

## REFERENCES


Aslam F., Khalil U., Asghar M., Sarwar S., 2009. Antimicrobial activity of various leaf phytoconstituents of neem. Pak. J. Agri. Sci. **46**(3):209-213.

Awasthy K. S., Chaurasia O. P. and Sinha S.P., 1999. Prolonged murine genotoxic effects of crude extracts of neem.Phytotherapy. **13**(1):81-83.

Biswas G. I. and Feltham R. A., 1993. Manual for identification of medical bacteria.3rd edi. Cambridge University press. Great Britan **50**:60-126.

Dastagir G. and Hag I.U., 1997. Testing wood powder from different plants on human teeth.J. of Science and Technology.**21**(7):57.

Gajendra P. R., Bhavika M. K.., Rohit S., Hetal A. and Prajapati P. K., 2012 . In vitro antibacterial study of two commonly used medicinal plants in Ayurveda Neem and Tulsi.IJPBA. **3**(3):582-586.

Kritikar K. R. and Basu B. D., 1991. 2nd edi.Allahabad Publication by Lalit Mohan Basu .Indian medicinal Plants. 1494-6.

Kumar and Parmar B. S., 1996. Compounds of medicinal importance in neem tree. J. of Agricultural Science.and Food Chemistry, **44**(8):2137-2143.

Kunjal S. M., Zarna S., Girish P. and Samir S., 2014. The antimicrobial activity of *Azadirachta indic*a, *Mimussops elengi*, *Tinospora cardifolia* & 2% Chlorhexidine gluconate on common endodontic pathogens : A *vitro* study. Eur. J. Dent. **8**(2):172-177.

Mamman P. H., Mshelia W. P., Susbatrus U.S.C. and Sambo K.W., 2013. Antibacterial effects of crude extract of *Azadirachta indica* against *E. coli*. *Staphyloccus sp.* Int. J. Med. Sci. **5**(1):14-18.

Murray P. E., Farber R. M., Namerow K. N., Kuttler S. and Garcia G., 2008. Evaluation of *Marinda citrifolia* as an endodontic irrigant.J. Endod. **34**:66-70.

Okemo P.O., Mwatha W. E., Chhabra S. C. and Fabry W., 2001. The kill kinetics of *Azadirachta*. a juice extract on *Staphylococcus sp*., *E. coli*, *Pseudomonas* sp. *Candida albicans*. Africal Jr. Sci. Technol. **2**: 113-118.

Purnima A., Koti B. C., Thippeswamy A. H., Jaji M.S., Swamy A.H. and Kurhe Y. V., 2010. Antipyretic analgesic and antipyretic activities of *Mimusops elongi*. J. Phar. Sci.**72**:480-5.

Satyavati G. V. and Gupta A. K., 1987. 2nd edi.. New Delhi.Indian Council of Medical research.257-61.

Taylor J. L. S., Rabe T., McGaw L. J., Jagar A. K. and Staden J. R., 2001. Towards the scientific validation of traditional medicinal plants. Plant Growth Regulation. **34**:23-37.

Uwimbabazi F., Umimana J and Rutanga J. P., 2015. Assessment of antibacterial activity of neem plant on Staphylococcus aureus and *E. col*i. J. of Medicinal Plants. **3**(4): 85-91.