



Anti-Bacterial Activity of Neem Oil on Oral Pathogens – An *In vitro* Study

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ABSTRACT

The aim of the study is to evaluate the antibacterial activity of neem oil against selected bacterial pathogens. The antibacterial activity is carried out by agar well diffusion technique against the bacterial pathogens and the zone of inhibition is measured in mm diameter. Neem is a powerful popular herb in Ayurvedic medicine. It has an incredible amount of uses from helping with digestive issues to healing skin problems. It can be taken orally or topically. The neem tree lives up to its name, 'The Tree of Life.' Neem oil, the oil pressed from the seeds of the neem tree, is the most widely known and used neem product. It possesses antibacterial, anti-fungal, anti-parasitic, analgesic and anti-inflammatory properties. The present study is aimed to determine the antimicrobial activity neem oil against various oral pathogens. In the present study, neem oil was found to be effective against the oral pathogens tested when compared with control. So from this study it can be concluded that neem oil possess antibacterial activity.

Keywords: Antibacterial, neem oil, Agar well diffusion, zone of inhibition.

INTRODUCTION

In recent times, there is an increase in the resistance of pathogenic bacteria to antibiotics. Increase in microbial pathogens which are resistant to drug have become a major threat to human society. Drugs present have almost no effect on these microbes.

Therefore natural or Ayurvedic remedies have been put forward. Neem the versatile medicinal plant is the source of several compounds having diverse chemical structure and biological effects¹. Neem is been used extensively in Ayurveda, unani and homeopathic medicine and has become a wonder tree of modern medicine². Neem oil is extracted from the seed. It contains one seed, which in turn can have one or more kernels. It is produced by crushing and pressing the kernels and then by purifying the extract. Over many years the beneficial properties of neem have been recognised in Indian tradition. Each part of neem tree has some medicinal property³.

Neem oil, the bark and leaf extract are being used therapeutically as folk medicine in-order to control leprosy, intestinal helminthiasis, respiratory disorders, constipation and also as a general health promoter.

The use of it for the treatment of rheumatism, chronic syphilitic sores and indolent ulcer have also been evident. Neem oil is been used to control various skin infections. Bark, leaf, root, flower and fruit all together is used to cure blood morbidity, biliary afflictions, itching, skin ulcers, burning sensations and ptyhisis⁴. The isoprenoid group of the constituents of neem have anti-inflammatory,^{5,6} anti-bacterial,^{7,8} anti-fungal⁹⁻¹¹ and immunomodulatory properties¹².

Neem twig is used as oral deodorant, toothache reliever and for cleaning of teeth. The neem plant products popularity is being increased because of its least

persistence, biodegradability, least toxic to non target organisms, economic and easy availability.

MATERIALS AND METHODS

Test organisms

The bacterial strains used were *Streptococcus mutans*, *Enterococcus faecalis* and *Lactobacillus acidophilus*. The organisms were obtained from department of microbiology, Saveetha Dental College and Hospitals, Chennai, India.

Methodology

The Antimicrobial activity of Neem oil was evaluated against the three oral pathogens mentioned above by agar well diffusion technique.¹³ Broth culture of the test organisms compared to Mac Farland's standard 0.5¹⁴ were prepared. Lawn culture of the test organisms were made on the Muller Hinton agar [MHA-Hi media M-1084] plates using sterile cotton swab and the plates were dried for 15 minutes. Wells measuring 4mm in depth was made on the agar using sterile cork borer. 100microlitres of the essential oil was added to the wells. 0.2% chlorhexidine was used as positive control. The plates were incubated at 37 degree celsius overnight and the zone of inhibition of growth was measured in mm diameter. All the test were done in triplicate to minimize the test error.

RESULTS AND DISCUSSION

The antibacterial activity of Neem oil is screened against the bacterial pathogens using agar well diffusion assay and the zone of inhibition is measured in mm diameter. The area of inhibition where the growth of microorganisms was inhibited by neem oil was observed to be significant with all the three pathogens used when compared with the control. The maximum zone of inhibition was seen with *Streptococcus mutans* measuring



27 mm diameter. The zone of inhibition for *Enterococcus faecalis* and *Lactobacillus acidophilus* was found to be 24mm and 18mm respectively. The width of zone of inhibition of neem oil against the three strains of microorganisms is given in Table 1.

Through this study it was found that neem oil is effective against the oral pathogens. Many of the synthetic drugs present cause various side effects. Hence the drugs which are developed through plant based compounds have minimal side effects. The neem oil has got very good antibacterial activity.

Table 1: Antibacterial activity of Neem Oil

Bacterial strains	Zone of inhibition (in mm diameter)
Streptococcus mutans	27
Enterococcus faecalis	24
Lactobacillus acidophilus	18
0.2% Chlorhexidine (control)	35

CONCLUSION

Neem oil is an important source of compounds having antimicrobial, antioxidant, anti-tumour, anti-fungal, anti-inflammatory and antiviral properties. The result indicated that using various parts of the neem have beneficial effect in controlling the oral pathogens and thus can be used in therapeutic formulations in the near future.

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