

Antibacterial Effect of Clove Oil against Clinical Strains of *Escherichia coli*.

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Abstract:

Aim: To study and compare the antibacterial properties of clove oil and eucalyptus oil against clinical strains of staphylococcus.

Objective: To study and compare the antibacterial properties of clove oil and eucalyptus oil against clinical strains of staphylococcus.

Background: Staphylococcus Aureus is a gram positive bacteria, belonging to firmicutes. It is commonly found in the respiratory tract, skin and nose. Abscess are frequently associated with S.aureus. they produce protein toxins and inactivated antibodies. The antimicrobial property of clove was established as its essential oil extracts killed many gram positive and gram negative bacteria including fungi. This property is attributed to eugenol, oleico acids and lipids found in essential oils. Eucalyptus has several medicinal properties and can be used against several agents including staphylococcus aureus.

Reason: Simple natural oils can be used as effect anti microbial agents. This study aims at analyzing which of the two natural oils are effective in their anti microbial properties against staphylococcus aureus and to create awareness about the same.

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

INTRODUCTION:

Escherichia coli (also known as *E. coli*) is a gram-negative, facultatively anaerobic, rod-shaped, coliform bacterium found in the lower intestine of warm-blooded organisms (endotherms).¹ Most *E. coli* strains do not cause disease,² *E. coli* is an important species in the fields of biotechnology and microbiology, where it has served as the host organism for the majority of work with recombinant DNA. Under favorable conditions, it takes only 20 minutes to reproduce.³

Virulent strains can cause gastroenteritis, urinary tract infections, and neonatal meningitis. In rarer cases, virulent strains are also responsible for bowel necrosis (tissue death) and progressing to hemolytic-uremic syndrome, peritonitis, mastitis, septicemia, and gram-negative pneumonia.⁴

Antibiotic susceptibilities were assessed, and the presence of the carbapenem resistance gene *bla*_{NDM-1} was established by PCR. *Escherichia coli* are highly resistant to all antibiotics except to tigecycline and colistin⁵.

Clove, an evergreen tree, has been used traditionally as a spice for thousands of years, especially in Europe and Asia⁶. The oil extracted from clove, has numerous medicinal properties. It is essential in the manufacturing of Indian Ayurvedic medicine and Chinese medicine. It is also used in dentistry when the clove oil is used for dental emergencies as anodyne. In addition, cloves also possess certain other medicinal properties such as antimutagenic, anti-inflammatory, antioxidant and etc. Clove oils are also used in the production of antibiotics for its antimicrobial properties. They have been screened for their potential uses

as alternative remedies for the treatment of many infectious diseases⁷

Clove is rich in minerals such as calcium, iron, phosphorus, sodium, potassium, and vitamin A and vitamin C. The health benefits of clove oil can be attributed to its antimicrobial, antifungal, antiseptic, antiviral, aphrodisiac and stimulating properties. The main constituents of the oil are phenylpropanoides such as carvacrol, thymol, eugenol and cinnamaldehyde⁸. In dentistry, the clove oil is used and act as a painkiller⁹. It is applied to the gum for reducing toothache⁴. Apart from that, clove oil is a major component of eugenol which is used to reduce pain in the nerves.

Sample wise distribution of clinical isolates of *E. coli*:

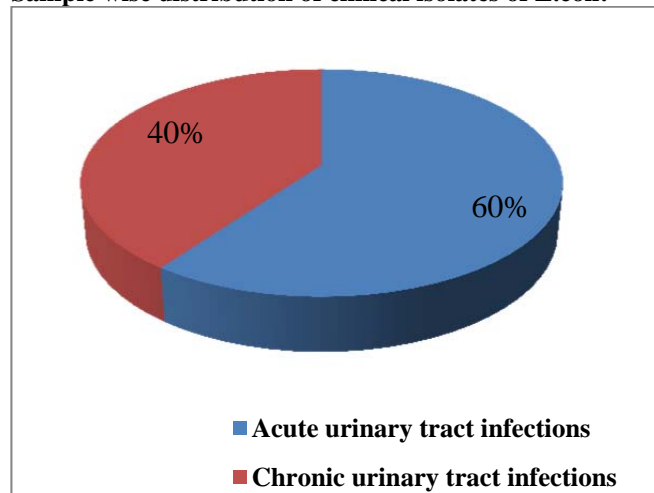


Figure 1: Sample wise distribution of urinary isolates of *E. coli*

Antibiotic susceptibility testing:

Antibiotics	Sensitivity(20)(%)	Intermediate (20)(%)	Resistant(20)(%)
Ampicillin	5	0	95
Amoxicillin	5	0	95
Ceftazidime	10	10	80
Cefotaxime	5	5	90
Amikacin	70	10	20
Gentamicin	45	20	35
Norfloxacin	15	15	70
Ciprofloxacin	20	5	75
Imipenem	70	0	30

Table 2: Showing antibiotic sensitivity pattern of E.coli**RESULT****Antibacterial activity of clove oil against clinical isolates of E. coli:**

We have observed that, none of the isolate was inhibited in these dilutions of clove oil. In the present study, clove oil was found to be equally effective against both gram-positive and gram-negative organisms. Thus, from this study it can be concluded that clove oil possess antibacterial activity.

The essential oil showed favorable result against various bacterial strains tested. *Staphylococcus aureus* showed the maximum susceptibility towards the clove bud oil with 21mm zone of inhibition. The antibacterial activity of clove oil against *E. coli* showed zone of inhibition 19mm.

CONCLUSION:

Clove oil did not show any activity against *E. coli*, having a negative effect on the same. However, in order to validate this result, more number of isolates needs to be included and must be tested with increased dilutions. Thus this study claims that although it is said that clove oil produces antimicrobial properties¹², it is not very effective in inhibiting the growth of clinical strains of *Escherichia coli*.

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