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Research Article

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Evaluation of antimicrobial activity of lavender oil against selected bacterial pathogens: An *in vitro* study

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ABSTRACT

Essential oils [EOs] and other extracts of plants have evolved interest as sources of natural products with promising antimicrobial activity. Lavender oil comes from lavender (lavandula angustifolia), an easy to grow evergreen shrub that produces clumps of beautiful, scented flowers. The oil is very well known for its anti- depressant, anti-inflammatory, anti-fungal, anti-septic and anti- bacterial properties. To evaluate the antimicrobial activity of the lavender oil against some selected bacterial pathogens. The antibacterial activity was carried out by agar well diffusion technique against the bacterial pathogens and the zone of inhibition is measured in mm diameter. In the present study, the lavender oil was found to be effective against both gram-positive and gram-negative organisms. So from this study it can be concluded that lavender oil possess antibacterial activity.

Key words: Antibacterial, Lavender oil, Agar well diffusion, zone of inhibition.

INTRODUCTION

The spread of drug resistant pathogens is one of the most serious threats to successful treatment of microbial diseases. Essential oils [EO] and other extracts of plants have evolved interest as sources of natural products with promising antimicrobial activity [1]. Essential oils are obtained from plant materials such as flowers buds, seeds, leaves, twig etc. EOs are a mixture of volatile constituents produced by aromatic plants as secondary metabolites, as a protective mechanism against predators, microorganisms or weather adversities. The antimicrobial activity of essential oils is due to small Terpenoids and phenol compounds present in it.[2].

Lavandula angustifolia, formerly L. officinalis[common name : Lavender], is a flowering plant in the family Lamiaceae, native to the western Mediterranean, primarily the Pyrenees and other mountains in northern Spain. Lavender oil is extracted mostly from the flowers of the lavender plant, primarily through steam distillation. The flowers of lavender are fragrant in nature and have been used for making potpourri for centuries. Traditionally, lavender essential oil has also been used in making perfumes.[3] The oil is very useful in aromatherapy and many aromatic preparations and combinations are made using lavender oil. It is much more than just pretty & calming. It is one of the most powerful remedies in the plant world, offering both physical and emotional relief for problems as varied as burns, migraines, insomnia, insect bites, skin problems, infections, stress and nervous tension.[4] It owes this amazing spectrum of healing powers to its complex chemical makeup. The main component of this oil is 1,5-Dimethyl-1-vinyl-4-hexenylbutyrate followed by 1,3,7- octatriene, eucalyptol and camphor.[5] It has a very good relaxing effect on the body. It is highly recommended for skin as it can cleanse cuts, bruises and skin infections Lavender is particularly rich in aromatic molecules called esters, which are antispasmodic, pacifying and tonic, while other molecules give it its antiviral, bacterial and anti-inflammatory powers.[6] Especially beneficial to the respiratory tract in particular coughs, colds, influenza. Certainly eases breathing when lungs and sinuses are choked

with phlegm. Lavender oil also have Antidepressant, Analgesic, Antiseptic, Cicatrizant, Expectorant, Nervine and Vulnerary properties

In this study, the aim is to check the Antimicrobial activity of the lavender oil against some selected bacterial pathogens.

EXPERIMENTAL SECTION

Essential Oil: Lavender oil was obtained from department of biochemistry, Saveetha Dental College and Hospitals, Chennai, India.

Test organisms: The bacterial strains used were *Escherichia coli, Pseudomonas aerogenosa, Staphylococcus aureus and Enterococcus feacalis.* The organisms were obtained from department of microbiology, Saveetha Dental College and Hospitals, Chennai, India.

Methodology: The Antimicrobial activity of lavender oil was evaluated against the four pathogens mentioned above by agar well diffusion technique.[7,8] Broth culture of the test organisms compared to Mac Farland's standard 0.5[9,10] 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

In the experiment carried out, the antibacterial activity of lavender 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 lavender oil was observed to be significant with all the four pathogens used when compared with the control. The maximum area where the growth of the micro- organisms was inhibited by lavender oil was observed with *Escherchia coli* with a zone of inhibition of 24 mm. The zone of inhibition of growth with *Staphylococcus aureus* was 19mm. The zone of inhibition for *Enterococcus feacalis* and *Pseudomonas aerogenosa* was found to be 22mm and 23mm respectively. The width of zone of inhibition of lavender oil against the four strains of micro organisms is given in table1.

Table 1: Antibacterial activity of Lavender oil

Bacterial strains	Zone of inhibition (in mm diameter)
Escherichia coli	24
Pseudomonas aerogenosa	23
Enterococcus faecalis	22
Staphylococcus aureus	19
0.2% Chlorhexhidine (control)	35

DISCUSSION

Lavender oil comes from lavender(*lavandula angustifolia*) , an easy to grow evergreen shrub that produces clumps of beautiful, scented flowers. This essential oil is being obtained from the flowering tops by steam distillation method (11). Lavender oil is added to bath and body care products such as soaps, perfumes, cleaners and detergents. The oil is very well known for its anti- depressant, anti- inflammatory, anti-fungal, anti-septic, anti- bacterial and anti- microbial properties. It is used in inhalations, vapourizers, compressers, bath application or massages (12). The ability of this essential oil to disrupt the permeability barrier of cell membrane structure and accompanying loss of chemiosmotic control are the most likely reasons for its lethal action .. Lavender oil has found to be having an effect against many species of bacteria, including those resistant to anti- biotics such as methicillin- resistant staphylococcus aureus and vancomycin- resistant Enterococcus(13, 14). In the present study the lavender oil showed significant antibacterial activity when compared with the control

CONCLUSION

Hence, this study concludes that lavender oil has an very effective anti- microbial property and can be used to fight against various diseases, infection and other problems which are being caused by pathogens.

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