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Phytochemical Screening and Antimicrobial Activity of Lemon Grass against Selected Pyogenic Bacteria

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ABSTRACT

This investigation of phytochemical screening and antimicrobial activity is conducted on the Ethanolic extracts of Lemon grass against the pyogenic bacteria like *Staphylococcus epidermidis*, *Streptococcus pyogenes* and *pseudomonas aeruginosa*. The leaves of Lemon grass are evaluated and pounded for this study and extract is prepared by using ethanol as a solvent. Now the various concentrations of solvents were evaluated for the Phytochemical screening where various active present compounds and their presence is evaluated with the help of various tests and these concentrations are also used against the selected microbes for antimicrobial testing against *Staphylococcus epidermidis*, *Streptococcus pyogenes* and *pseudomonas aeruginosa*. The effectiveness of this plant and their part against these pyogenic bacteria's are evaluated and reported that help in the development of various antimicrobial drugs that are based on the natural products like plants. These drugs are very much effective against drug resistant bacteria's as well as they have less adverse effects.

Key words: Lemon grass, Extract preparation, Pyogenic bacteria, Phytochemical screening, Antimicrobial activity

Pyogenic contamination is a disease portrayed by extreme nearby aggravation, typically with discharge arrangement, by and large brought about by the pyogenic microorganism. People are the regular host for some bacterial species that colonize the skin as typical vegetation. Skin diseases are normal and might be brought about by microbes, organisms or infections. Human disease, especially those including the skin and mucosal surfaces might prompt genuine confusions. The most well-known microorganisms which cause wound contaminations are *Staphylococcus epidermidis*, *Streptococcus pyogenes*, and *Pseudomonas aeruginosa*.

Staphylococcus epidermidis is an endemic microorganism, comprising of non-motile Gram-positive cocci, organized in grape like groups. The capacity to frame biofilms on plastic gadgets is a significant destructiveness factor for *Staphylococcus epidermidis*. It is essential for the skin greenery,

and result part of human vegetation. It can likewise be found in the mucous layer of people and in animals 2. *Streptococcus pyogenes*, or Group a *Streptococcus*, is a circular, Gram-positive bacterium. *S. pyogenes* turned into the explanation of numerous significant human illnesses, going from gentle shallow skin contaminations to perilous foundational sicknesses. Contaminations commonly start in the throat or skin. The most striking sign is a strawberry-like rash. *S. pyogenes* causes assortment of diseases of suppurative contaminations of the skin, including wounds, consumes, with an inclination to create lymphangitis and cellulitis. Diseases of minor scraped areas may prompt deadly septicemia³. *Pseudomonas aeruginosa* is a typical bacterium which can cause infection in creatures and people. It is a slim gram-negative bacillus, oxygen consuming, and pole molded microbes with unipolar motility.

Plants and their various parts can use for the treatment of various infections mentioned above effectively. Also, these drugs not have an any adverse effects on the body. Various study suggest that the medicinal plant and their various parts also lemon grass is very effective against various disease-causing microbes as well as *Staphylococcus epidermidis*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa*. It is utilized as a customary therapeutic plant to fix wounds, cuts, consumes delicate tissue variations. It has wound mending property and furthermore advances blood coagulation. It is utilized to treat diabetes.

MATERIALS AND METHODS

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Lemon grass

The botanical name of lemon grass is *Cymbopogon citrates* and it belongs to the family Poaceae. It's a type of ornamental grass plant that can in the full exposure of sunlight. This plant does not have flowers and these plants are mostly available in India and Sri Lanka. According to toxic activities the leaves and other parts of this plant is toxic for insects as well as microbes. Apart from these the leaves of Lemon Grass are the rich source of some secondary metabolites and active compounds like Sponin, Tannin, Terpenoids, Phenolic compounds etc.

Collection of pyogenic bacteria

The Pyogenic microorganisms *Staphylococcus epidermidis* (MTCC 3068), *Streptococcus pyogenes* (MTCC 14289) and *Pseudomonas aeruginosa* (MTCC 741) were collected from the culture and subculture techniques.

Extraction method

Leaves of lemon grass are collected in sterile manner and wash with the sterile water after washing the leaves are placed in Hot Air-Oven for drying in sterile manner. Now the leaves are converted into powder form by using mixer grinder. The powdered specimen of leaves are dissolved into the solvent ethanol, after proper mixing the mixture content was filtered by Whatmann Filter Paper No. 1 and allow to mixture content at room temperature for evaporation of alcoholic contents. Then the extracts are stored at 4°C till the further use.

Phytochemical screening

The actives compounds and metabolites of Lemon grass like Terpenoids, Alkaloids, Tannin, Saponin and Phenolic compounds etc are qualitatively analyzed checked by the various methods.

Antimicrobial activity

Antimicrobial activity of Lemon grass laves against the selected pyogenic bacteria were tested by Kirby-Bauer disc diffusion method, in which the MHA plates are prepared in aseptic manner to grow the bacteria in plates and in same plates the wells are prepared by using the tips of micropipettes for the loading of plants extracts and standard antibiotics. As a control the Azithromycin (500mg) was used. For the testing of plant extracts first of all the extracts of plant are diluted by distilled water into 1.25, 2.5, 5, 7.5 and 10mL concentrations and then the plane antibiotic disc was dipped individually into these concentrations of extracts and applied into the wells of MHA plates. Then plates are incubated for growth at 37° C for 18-24 hours. After growth the zone of inhibition was measured in mm and reported as the value of MIC.

RESULTS AND DISCUSSION

Phytochemical assay

Table 1 Qualitative analysis result of ethanol extracts of lemon grass

Phytochemical tests	Presence
Flavonoid	+
Saponin	++
Phenol	++
Glycosides	++
Tannin	+++
Steroids	+

(Table 1) Represents the phytochemical analysis result of lemon grass where ethanol is extracts. Symbols Shows (-) Absent, (+) Slightly Present, (++) Moderate Present, (+++) Highly Present.



Fig 1 Represents the phytochemical analysis result of lemon grass where ethanol is extracts

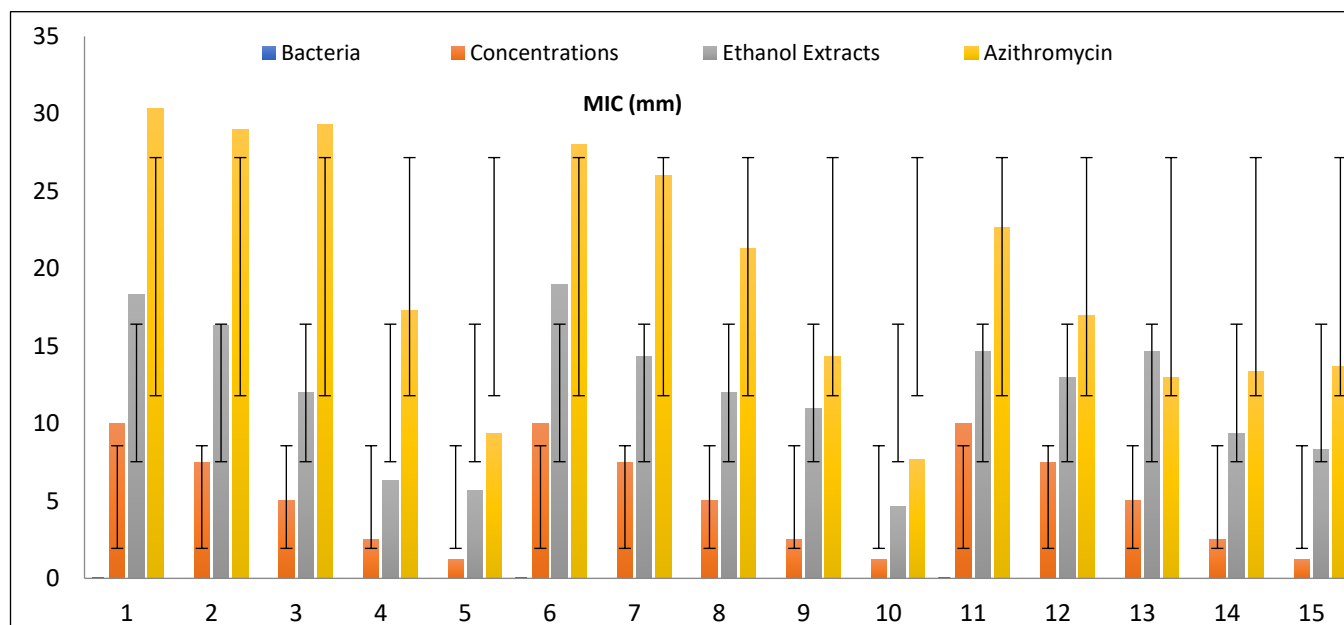
Antimicrobial assay

Antimicrobial assay of ethanol extracts are conducted by the Kirby- Bauer disc diffusion method against the selected

bacteria and after the incubation for specific period of the zone of inhibition is measured in mm and reported as the value OF MIC.

Table 2 Minimum inhibitory concentration of ethanol extracts

	<i>Staphylococcus epidermidis</i>	<i>Streptococcus pyogenes</i>	<i>Pseudomonas aeruginosa</i>
Ethanol extracts	10:18.33 ± 2.51 7.5:16.33 ± 2.51 5.0:12 ± 2.64 2.5:6.33 ± 5.50 1.25:5.66 ± 1.52	10:19 ± 1 7.5:14.33 ± 1.52 5.0:12 ± 2.64 2.5:11 ± 4.35 1.25:4.66 ± 4.50	10:14.66 ± 4.16 7.5:13 ± 2.64 5.0:14.66 ± 3.78 2.5:9.33 ± 1.52 1.25:8.33 ± 3.05
Azithromycin	10:30.33 ± 1.52 7.5:29 ± 1 5.0:29.33 ± 2.08 2.5:17.33 ± 2.08 1.25:9.33 ± 1.52	10:28 ± 2 7.5:26 ± 6.08 5.0:21.33 ± 6.11 2.5:14.33 ± 3.78 1.25:7.66 ± 1.52	10:22.66 ± 4.61 7.5:17 ± 1 5.0:13 ± 2 2.5:13.33 ± 4.93 1.25:13.66 ± 3.51



Graph 1 Shows the distance zone of inhibition (in mm) of lemon grass extracts of ethanol along with the standard antibiotics

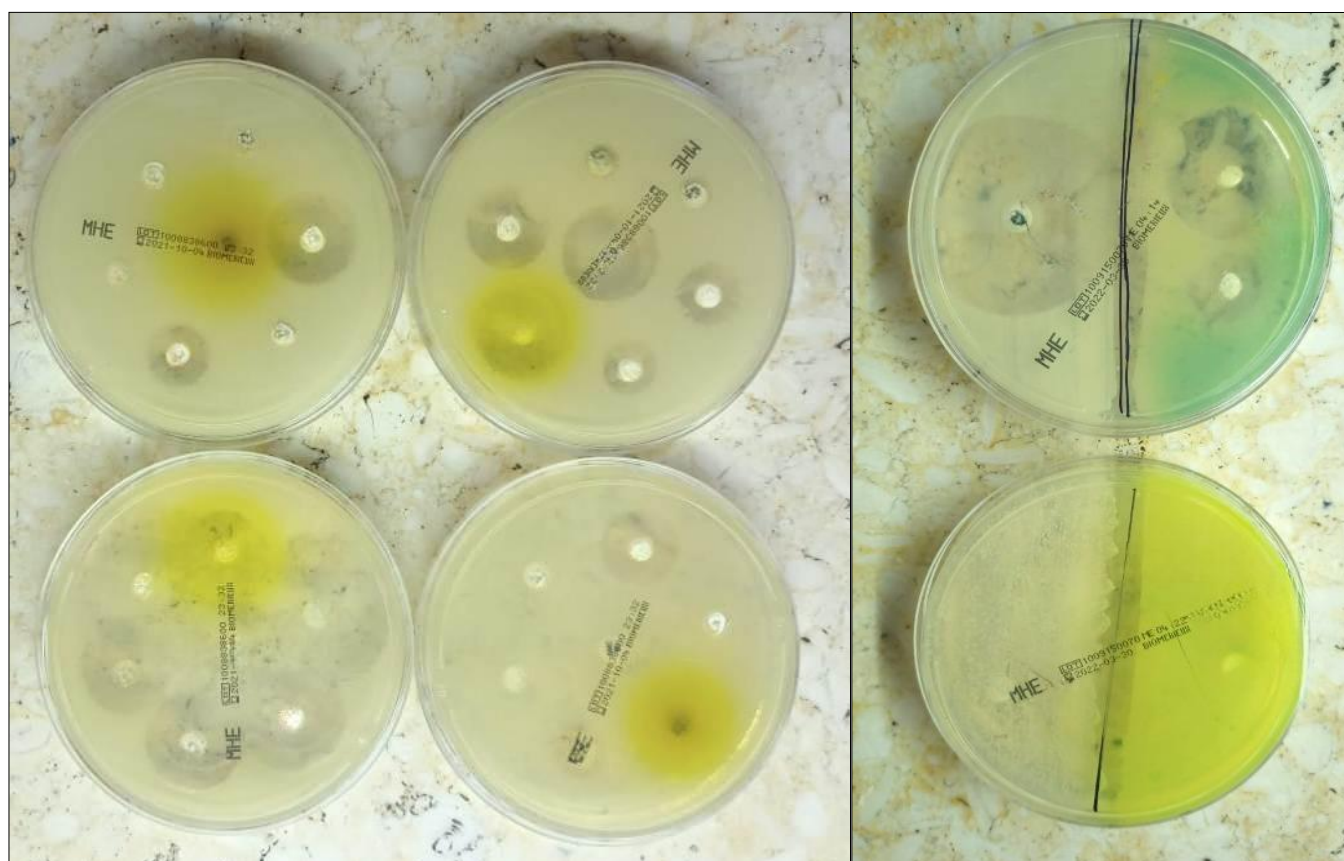


Fig 2 Shows the zone of inhibition where plant extracts used as an antimicrobial agent and Azithromycin as a standard

CONCLUSION

This study is conducted to check the antimicrobial activity of lemon grass against the pyogenic bacteria like *Staphylococcus epidermidis*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa*. So, this study ethanol used as the solvents to prepare the plant extracts due to their higher solubility with the metabolites. After the qualitative phytochemical activity, the results show the lemon grass have various active compounds like flavonoid, phenol, tannin, glycosides and steroids. These secondary metabolites are already reported as the antimicrobial activity against the various microbes. After the Phytochemical activity the antimicrobial

activity is checked by the Kirby-Bauer disc diffusion method against the selected pyogenic bacteria where leaves of lemon grass have marked antimicrobial activity maximum against the *Streptococcus pyogenes* followed by *Staphylococcus epidermidis* and *P. aeruginosa*. So finally, this study confirms the lemon grass leaves have antimicrobial properties that can be used for the treatment of various pyogenic infections caused by selected bacteria's and some other bacteria.

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