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Susceptibility of antibiotic resistant bacteria to plant extract (*Psidium guajava*)

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Abstract

Background and objectives: Methicillin Resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa* represent a worldwide threat because of their virulence, drug resistance and nosocomial infection. Bioactive compounds from traditional medicinal plants show promising role in treatment to control bacterial infections. We aimed to report the anti-bacterial activity of methanolic leaf extract of *Psidium guajava*.

Materials and Methods: The prospective study includes 50 MRSA and 17 Drug resistant *Pseudomonas aeruginosa*. Methanolic leaf extract was done by using soxhlet apparatus. These isolates were subjected to perform antimicrobial susceptibility testing by Well- diffusion method.

Results: Out of 50 MRSA, 45 are sensitive. Out of 17 *Pseudomonas aeruginosa*, 8 are sensitive to methanolic leaf extract.

Interpretation and conclusion: We need of alternative drugs to treat resistance organisms. Methanolic leaf extract of *Psidium guajava* has some antibacterial property.

Keywords: *Psidium guajava*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, anti-bacterial

Introduction

In developing countries, communicable diseases lead to high mortality and morbidity. These infectious diseases are caused by microorganisms such as bacteria, viruses, fungi and parasites. Bacteria developing resistance to drugs, due to indiscriminate use of antibiotics in man, farm animals, etc [1]. This has paved a way for the development of multidrug resistance.

Staphylococcus aureus is a Gram positive coccus. It causes abscess, osteomyelitis, hospital acquired pneumonia, gastroenteritis, scalded skin syndrome, toxic shock syndrome. This organism causes epidemics to great extent and MRSA is mostly associated with such epidemics [2]. *Pseudomonas aeruginosa* is a Gram negative bacilli. It is an opportunistic bacteria with high level resistance. It causes wound infection,

Urinary Tract Infection (UTI), sepsis and is fatal if it infects patients with ventilator associated pneumonia, cystic fibrosis and Chronic Obstructive Pulmonary Disease (COPD) [3].

From ancient times, plants played a vital role in life of human beings and animals. Man has been using plants in several aspects i.e. for food, medicines and many other purposes. The use of medicinal plants for healing is as old as mankind itself. Its healing properties are identified, noted and conveyed to the successive generations [4]. The plant *Psidium guajava* is basically from the Meso American area and also found in tropical and subtropical areas. It is a member of *Myrtaceae* family. All the parts of the plant are widely used in curing many health problems [5]. The plant has been used traditionally to treat diarrhoea, cough, ulcers, fever, pain relief, hypertension, hyperglycemia by folks. It contains flavonoids which has some antibacterial activity [6].

Materials and Methods

It is a prospective cohort study conducted at Sri Venkateshwaraa Medical College, Hospital and Research Center, from June 2015 to October 2015. A total of 50 consecutive MRSA and 17 multi- drug resistance *Pseudomonas aeruginosa* isolates obtained from various clinical specimens.

Preparation of Plant Extract [5]: 50g of *Psidium guajava* leaf powder is taken and 170 ml of solvent (Methanol) added in Soxhlet apparatus and kept for 6 cycles. The extract was collected and kept for concentration using rotary vacuum evaporator and gravimetrically measured to determine the quantity of extract obtained. Then stored at 4 °C for further use. Stock solution was prepared by dissolving known amount of crude extract in DMSO.

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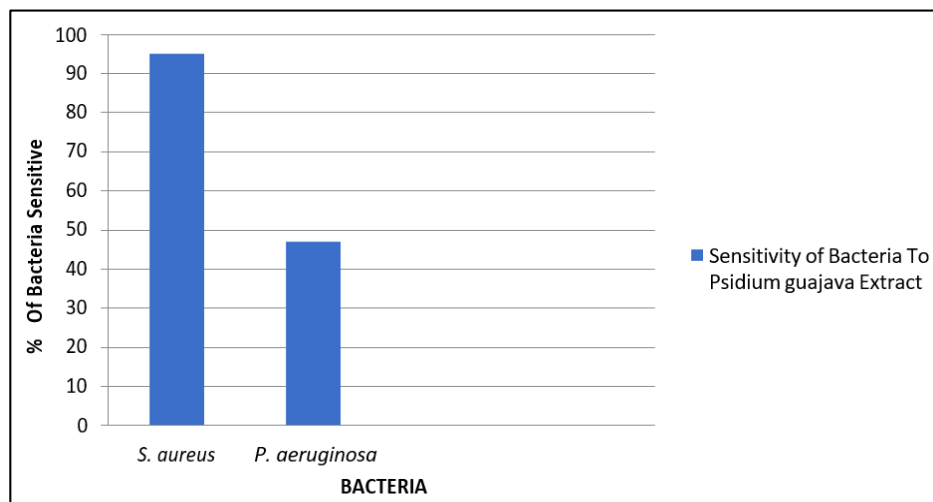
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Antimicrobial Assay [7]: Sensitivity test was performed by agar well diffusion method.

An inoculum size of 108 CFU/ml of bacterium, compared with 0.5 McFarland turbidity standards was used. It was spread on Muller Hinton agar plate. Wells of 10mm diameter were punched into the agar medium. 100µl of plant extract was added to a well. These plates were incubated at 37 °C for 24 hours. Zone of inhibition of bacterial growth around each well was measured in mm.

Results and Discussion

A total of 50 MRSA was obtained from various clinical specimens. Out of 50 isolates, 45 (90%) showed sensitive and 5 (10%) were resistant to *Psidium guajava* leaf extract. ATCC MRSA showed 20 mm of Zone of Inhibition. Out of 17 *Pseudomonas aeruginosa* isolates, 8 (47.06%) showed sensitive and 9 (52.94%) were Resistant to *Psidium guajava* leaf extract. ATCC *Pseudomonas aeruginosa* showed 19mm zone of inhibition.



Sensitivity of Bacteria to *Psidium guajava* Extract

The findings in our study was similar to study conducted by Ismail M *et al.* [6] *Staphylococcus aureus* was two times more susceptible to the *Psidium guajava* extract than *Pseudomonas aeruginosa*. According to the Bipul Biswas *et al.* [7], Gram negative bacteria were less susceptible to plant extract than Gram positive bacteria. This might be due to their cellwall structure.

The *Psidium guajava* leaf extract has antibacterial activity. The antibacterial action is more pronounced for *Staphylococcus aureus* than for *Pseudomonas aeruginosa*.

Our results support the use of these plants as traditional medicine and suggest that some of the plant extracts possess compounds with good antibacterial properties that can be used as effective antimicrobial agents in the field of Medicine.

Acknowledgement

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Reference

1. Nikaido H. Multidrug Resistance in Bacteria. *Annu Rev Biochem.* 2009; 78(1):119- 146.
2. Davies J, Davies D. Origins and Evolution of Antibiotic Resistance. *Microbiology and Molecular Biology Reviews.* 2010; 74(3):417-433.
3. Alicia Ballok E, George Toole AO. Pouring Salt on a Wound: *Pseudomonas aeruginosa* Virulence Factors Alter Na⁺ and Cl⁻ Flux in the Lung. *Journal of Bacteriology.* 2013; 195(18):4013-4019.
4. Biljana Bauer Petrovska. Historical review of medicinal plants usage. *Pharmacognosy review.* 2012; 6(11):1-5.
5. Vibha Porwal, Pallavi Singh, Devendra Gurjar. A Comprehensive Study on Different Methods of Extraction from Guajava Leaves for Curing Various Health Problem. *IJERA.* 2012; 6(2):490-496

6. Mohamed Ismail, Minhas PS, Fathima Khanum, Sahana VM, Sowmya C. Antibacterial Activity of Leaves Extract of Guava (*Psidium guajava*). *IJRPBS.* 2012; 3(1):2229-3701.
7. Bipul Biswas, Kimberly Rogers, Fredrick McLaughlin, Dwayne Daniels, Anand Yadav. Antimicrobial Activities of Leaf Extracts of Guava (*Psidium guajava* L.) on Two Gram-Negative and Gram-Positive Bacteria. *International Journal of Microbiology.* 2013, Article ID 746165, 7 pages.