

In-Vitro Antibacterial Activity of Leaf Extracts of *Psidium Guajava* against selected Pathogenic bacterial strains

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ABSTRACT: The research was assessed to evaluate the efficacy of crude extract of *Psidium guajava* against selected bacterial strains. The extract of *Psidium guajava* leaves was obtained by three different methods and the inhibition zones obtained through disc diffusion method. In this study, *P. guajava* extract displayed some degree of antimicrobial activity and presented compound. It was revealed from the results that *Psidium guajava* leaf extracts shows different degree of inhibition against different microorganisms. This investigation suggests the *Psidium guajava* to be a good antimicrobial agent against various pathogenic agents. Further investigation is required in this regards that can replace the plant with a very beneficial antimicrobial medicine and enhance its effects.

KEYWORDS: Antibacterial Activity, Leaf Extracts, *Psidium Guajava*, Pathogenic bacterial strains.

1 INTRODUCTION

Psidium guajava commonly known as guava in English of the family Myrtaceae is an evergreen small tree grown in tropics and subtropics and also cultivated commercially in Pakistan and India for its consumable fruits [1]. Different parts of the plant are used in the indigenous system of medicine for the treatment of various human ailments such as wounds, ulcers, bowels and cholera [2].

P. guajava is mainly known for its antispasmodic and antimicrobial properties in the treatment of diarrhea and dysentery. It has also been used extensively as an oral hypoglycemic agent. Several pharmacological studies have demonstrated the ability of this plant to exhibit antioxidant, hepatoprotection, anti-allergic, antimicrobial, antigenotoxic, antiplasmodial, cytotoxic, antispasmodic, cardioactive, antitussive, antidiabetic, anti-inflammatory and antinociceptive activities, hypertension, obesity, supporting its traditional uses ([1], [3], [4]).

Plants and plants product have antimicrobial activities and confirmed by different researcher around the globe ([5], [6], [7], [8], [9]). Reference [10] studied water, alcohol and chloroform extracts of leaves were effective against *Aeromonas hydrophila*, *Shigella* spp. and *Vibrio* spp, *Staphylococcus aureus*, *Sarcina lutea* and *Mycobacterium phlei*. Recently, Reference [11] had screened 13 Brazilian medicinal plants for antimicrobial activity against bacteria and yeasts. In this study, *P. guajava* extract displayed some degree of antimicrobial activity and presented compound.

The present study was undertaken to investigate the in vitro antibacterial activity of Hot and Cold water and Methanol extracts from leaves of *Psidium guajava*.

2 MATERIALS AND METHODS

Healthy fresh and disease free leaves of *Psidium Guajava* were collected in District Mansehra, KP Pakistan and brought to Microbiology research Laboratory, Department of Microbiology, Hazara University, Mansehra Pakistan. Firstly the leaves were washed with tap water and then dried in the room for further extract process.

Reference [12] method of extraction was used. Ten grams powdered samples of leaves and roots was soaked in 100 ml cold water and Ethanol in 250 ml sterile flask and rotated on shaker at 150 rpm for 24 hours at room temperature. The extract was filtered through a muslin cloth and then centrifuged at 4400 rpm for 7 minutes. The supernatant were collected and the pellet was discarded.

Nutrient Agar was enrichment medium for the growth of microorganisms. Medium was prepared by adding 27 g of dehydrated powder using electrical balance into 1 litter of distilled water. PH was adjusted by electrical pH meter at 7.4 and was boiled to dissolve completely. Media was poured in pre-sterilized glass Petri plates of 90mm.

Antibacterial activity of *P. Guajava* leaves and Roots extract was tested using agar well diffusion method. With the help of sterile micropipette tips *P. Guajava* leaf extract (cold water) 100µl were poured into the wells. The plates were incubated at 37 °C for 24 hours. After incubation, the diameter of the resulting zone of inhibition was measured with the help of Digital Vernier Caliper (Mitutoyo) and the average values were recorded.

3 RESULTS AND DISCUSSION

In current research, the antimicrobial activity of *Psidium guajava* leaf extract was checked out against two Gram positive and three Gram negative bacteria. The leaf extract was prepared by three ways; one was cold water extract and second was ethanol extract and Hot Water extract. Their potential antimicrobial activity was qualitative and quantitative, estimated by the presence and absence of zone of inhibition and MIC values.

Reference [11] had screened 13 Brazilian medicinal plants for antimicrobial activity against bacteria and yeasts. In this study, *P. guajava* extract displayed some degree of antimicrobial activity and presented compound. It was revealed from the results that *Psidium guajava* leaf extracts shows different degree of inhibition against different microorganisms. The diameter of zone of inhibition (ZOI) produced depends on several factors broadly classified as extrinsic and intrinsic parameters (Table 1, 2, 3 and figure 1).

Table 1. Zone of inhibition (in mm) of methanol leaf extract of *Psidium guajava*

Concentration(mg/ml)	<i>E. coli</i>	<i>S. aureus</i>	<i>P. aeruginosa</i>	<i>S. typhi</i>
0.125	-	-	-	-
0.25	-	-	-	-
0.50	-	-	-	-
1.0	-	-	-	-
2.0	-	-	-	5 mm
4.0	2 mm	-	3 mm	8 mm

Table 2. Zone of inhibition (in mm) of cold water leaf extract of *Psidium guajava*

Concentration(mg/ml)	<i>E. coli</i>	<i>S. aureus</i>	<i>P. aeruginosa</i>	<i>S.typhi</i>
0.125	-	-	-	-
0.25	-	-	-	-
0.50	-	-	-	-
1.0	-	-	-	-
2.0	-	-	-	2 mm
4.0	1 mm	-	1.25 mm	3 mm

Table 3. Zone of inhibition (in mm) of hot water leaf extract of Psidium guajava

Concentration(mg/ml)	<i>E. coli</i>	<i>S. aureus</i>	<i>P. aeruginosa</i>	<i>S. typhi</i>
0.125	-	-	-	-
0.25	-	-	-	-
0.50	-	-	-	-
1.0	-	-	-	-
2.0	-	-	-	3 mm
4.0	1.50 mm	-	2 mm	5 mm

Hot water extract was used against all the selected bacterial strains except *Staphylococcus aureus*. The hot water extract showed no activity against the bacterial strains. The reason for that were the degradation alkaloids (Coclaurine). Coclaurine has the boiling point less than the boiling point of water therefore that was degraded with the high temperature [7].

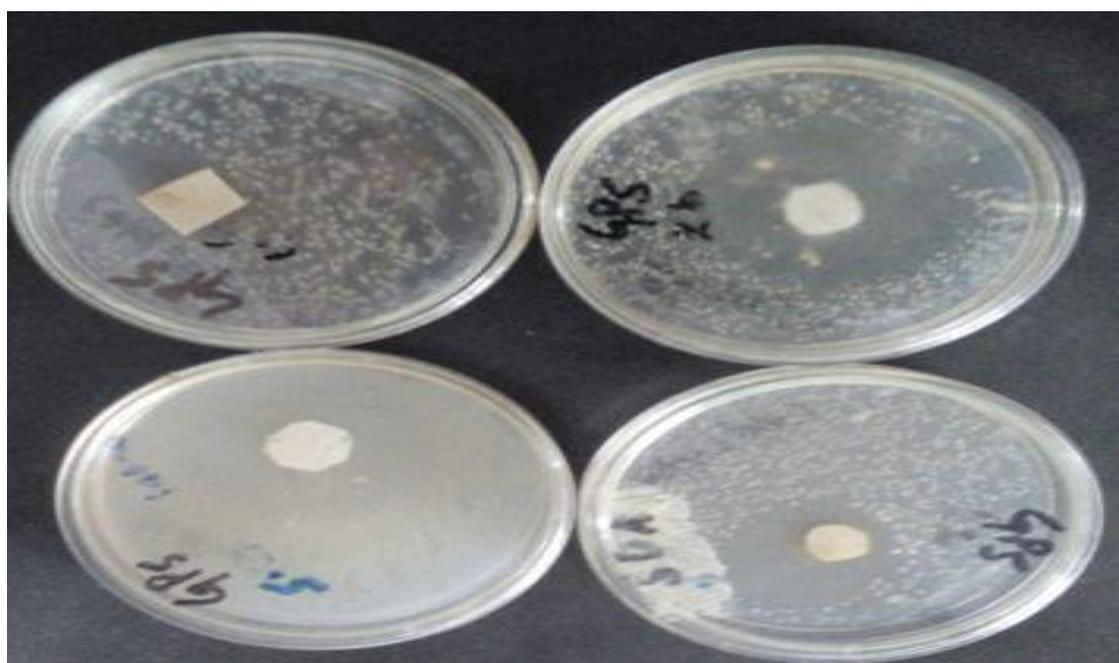


Fig. 1. Methanol Extract, Hot Water extract and Cold Water Extract and Zone of Inhibition on Nutrient agar Plate

4 CONCLUSION

This investigation suggests the *Psidium guajava* to be a good antimicrobial agent against various pathogenic agents. Further investigation is required in this regards that can replace the plant with a very beneficial antimicrobial medicine and enhance its effects.

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