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Study of antimicrobial potential of *Aegle marmelos*

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Aegle marmelos known for its treatment of various diseases and its overwhelming ethnomedical significance were screened for its antimicrobial activities. The principle objective of the present research work was to determine the antibacterial activity of three extracts of leaves of *Aegle marmelos* which was screened for its potential against five bacterial strains: *Lactobacillus, Pseudomonas aeruginosa, Staphylococcus aureus, Salmonella typhi, Escherichia coli* and three fungal strains *Pestolotia foedans, Paecilomyces variotii, Fusarium oxysporum*. Chloroform extract showed good antibacterial and antifungal against *E. coli* and *Fusarium oxysporum*.

Keyword: *Aegle marmelos*, antibacterial activity, antifungal activity, zone of inhibition.

1. Introduction

Medicinal plants were used by people of ancient culture without knowledge of their active ingredients. Developed and developing countries use traditional medicine at the primary health care level. Many currently used drugs are expensive or not readily available and a major setback to their continued usage in the development of resistance. This situation urgently forced scientists for searching new, inexpensive drugs that will be able to act for longer periods before resistance sets in [1].

Aegle marmelos (L.) Correa (*A. marmelos*), a tree belonging to the family Rutaceae, is commonly called vilvam (in Tamil) and often cultivated in temples for its leaves used in poojas. The leaves, stem, bark and fruits of this plant have long been used in traditional medicine for its medicinal value. The leaves are widely used to treat diarrhoea, dysentery, skin and eye diseases [2].

The present work was done to investigate the antibacterial and antifungal activity of the leaves of *Aegle marmelos* against human pathogenic bacteria and plant pathogens.

2. Materials and Methods

2.1 Collection of Plant

The plant material used in this study was collected from Tirupur, Tamil Nadu, India. The sample was identified and authentified by G.V.S. Murthy, Botanical survey of India, Tamil Nadu Agriculture University (TNAU), Coimbatore. Fresh leaves were collected and shade dried. The dried leaves were grinded to powder and stored in an air tight container for further use.

2.2 Preparation of Extract

The 20 grams of leaf powder was extracted with various organic solvents like chloroform, ethyl

acetate, petroleum ether (200 ml) used in soxhlet apparatus. They were air dried and dissolved in Dimethyl sulfoxide (DMSO) in 1mg/1ml concentration and stored in refrigerator.

2.3 Screening for Antibacterial Assay

The antibacterial activity was tested by agar-well diffusion method. Muller-Hinton broth was applied for growing and diluting the bacterial suspensions. They were grown at 37 °C for 24 hours.

For testing, 500 µl of Muller-Hinton broth was inoculated in to 250 ml of nutrient agar and allowed to cool under aseptic conditions. After the medium was solidified, a well was made in petri plates with the help of sterile metal borer (5 mm). 25 µl, 50 µl, 75 µl of each extracts were added in the wells. After that the plates were incubated at 37 °C for 24 hrs. After incubation, the zone of the inhibition was measured and, by that antibacterial activity was determined.

Table 1: Antibacterial Activity of *Aegle Marmelos*

Bacterial strains	Zone of inhibition (mm)								
	Ethyl acetate			Petroleum ether			Chloroform		
	25 µl	50 µl	75 µl	25 µl	50 µl	75 µl	25 µl	50 µl	75 µl
Pseudomonas aeruginosa	11	12	13	9	10	11	10	12	13
Staphylococcus aureus	8	9	10	9	11	12	7	8	9
Escherichia coli	7	8	11	9	12	13	10	12	15
Lactobacillus	7	8	9	10	12	13	9	11	12
Salmonella typhi	8	12	13	7	9	11	11	13	14

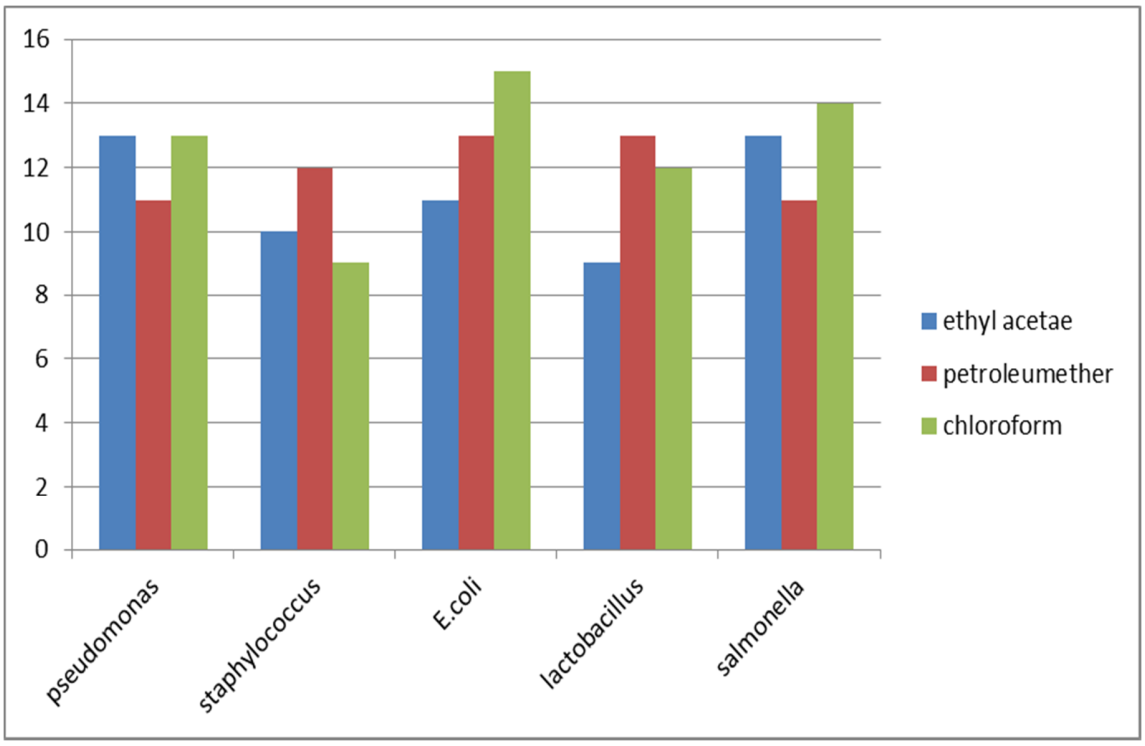

Fig 1: antibacterial activity of *Aegle marmelos*

Table 2: Antifungal activity of *Aegle marmelos*

Fungal strains	Zone of inhibition (mm)								
	Ethyl acetate			Petroleum ether			Chloroform		
	25 µl	50 µl	75 µl	25 µl	50 µl	75 µl	25 µl	50 µl	75 µl
Pestalotia foedans	12	13	14	10	11	12	10	11	14
Paecilomyces variotii	8	8	9	8	10	11	11	12	12
Fusarium oxysporum	10	11	12	11	12	14	11	14	17

2.4 Screening for antifungal assay

The antifungal activity of the leaves of *Aegle marmelos* were reported against *P. foedans, Paecilomyces variotii, Fusarium oxysporum*. *In vitro* antifungal activity was screened by using oats media, zapeks media, potato dextrose agar (PDA) using agar well diffusion method. Fungal strains were activated in several medias and incubated for 24 hours. 20 ul of inoculum was uniformly spread on agar plates. Petroleum ether, chloroform, ethyl acetate extracts were introduced in agar wells in concentration of 25 µl, 50 µl, 75 µl. Then incubated at room temperature for one week. Antifungal potential was then determined on the basis of diameter of zone of inhibition.

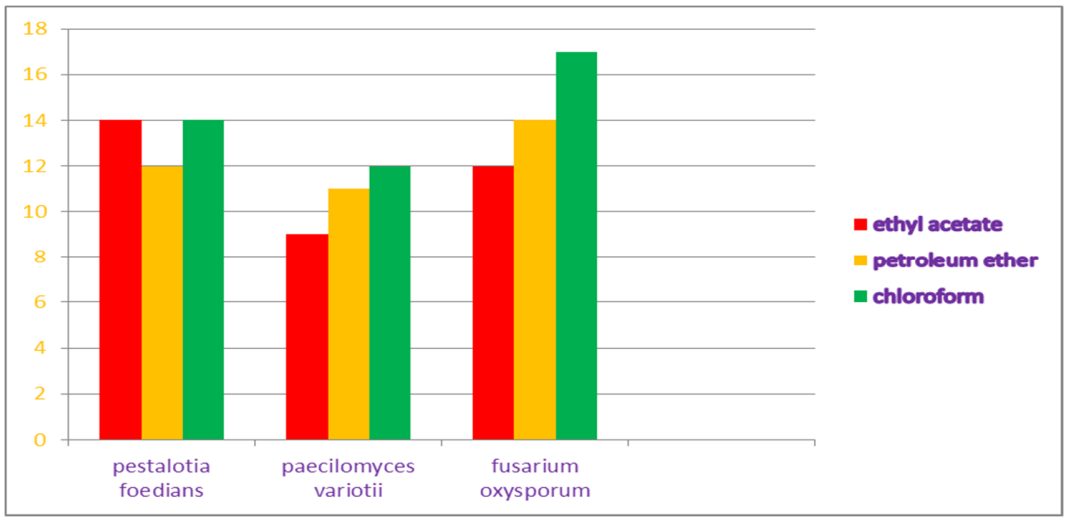

Fig 2: Antifungal activity of *Aegle marmelos*

3. Results

The antibacterial activity of chloroform extract showed a highest activity against *E. coli* by forming inhibition zone of 15 mm.

Chloroform extract also showed good result against *Salmonella typhi* by forming inhibition zone of 14 mm. Ethyl acetate leaf extract was found to be moderate against *Pseudomonas aeruginosa* forming inhibition zone of 13 mm.

The maximum activity against *Fusarium oxysporum* was shown to be as chloroform extract by forming inhibition zone of 17 mm. *P. foadens* showed a maximum inhibition zone of 14 mm in chloroform and ethyl acetate.

4. Discussion

This research work states the presence of phytoconstituents in the chloroform extract of *Aegle marmelos* were responsible for its antimicrobial activity.

This study concludes that the crude extract of chloroform has potent antibacterial and antifungal activity against clinical isolates of bacteria and plant pathogens of fungi. Traditional herbal

medicines must perforce be granted the benefits of modern science and technology to serve further global needs. The drugs derived from herbs may have the possibility of use in medicine because of their antimicrobial activity.
It is therefore, from above findings recommended the further investigation on isolation and purification of bioactive compounds responsible for the antimicrobial activity. [4].

5. Conclusion

The plant *Aegle marmelos* showed a good results in both antibacterial and antifungal activity of various extracts. Traditional herbal medicines must perforce be granted the benefits of modern science technology as a global needs. And also the plant contain phytomedicine, antioxidant and anti-depressive agents. This *Aegle marmelos* drugs may have the possibility of use in medicine.

6. Acknowledgement

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