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ANTIMICROBIAL ACTIVITY OF GARCINIA MANGOSTANA LINN

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Abstract: In South East Asia GML is used as phytomedicine for treatment of trauma, diahorrea, skin infection. The present study investigates antimicrobial activity of GML in different solvent extracts by broth dilution method by using six different solvent extracts showed inhibition activity against microorganisms. Antimicrobial activity of tested samples shown that highest inhibitory activity was produced by extract.

Keywords – Antimicrobial activity, GML, Broth Dilution Technique.

I. INTRODUCTION

Mangosteen (Garcinia mangostana linn) is a tropical tree belongs to Guttiferae family has dark purple or reddish fruit, also called as "queen of fruits. [Jung et al., 2006, Jose Pedraza- Chaverri et al., 2008]. A tropical tree distributed in India, Malasiya, China, Thailand, Srilanka, Myanmar, Indonesia, and Phillipines [Suksamrarn et al. 2003, Arasali Sulaiman Zarena et al. 2009]. Southeast Asians used it in treatment of wound, skin [Mahabusarakam et al., 1987] and urine infection, cardiovascular diseases, asthama, [Obolsskiy et al., 2009, Bulena- Chontal et al., 2011] amoebic dysentry,[Garnett et al., 1932] reduce pain and control fever. It's main constituent is class of polyphenolic compound xanthones which possess biological activities like antioxidant, antibacterial, antifungal, anti-inflammatory and anti-cancer activity. It shows different biological activities, hence used in herbal cosmetics, nutraceutical and pharmaceutical products.[Jose Pedraza- Chaverri et al., 2008].

II. MATERIAL AND METHOD

The antibacterial activity of the Ethyl acetate, ethanol, methanol, n-Hexane, and xylene soxhlet extracts of dried rind of Garcinia mangostana was investigated by testing the extracts against B. sublitis, P. aeruginosa, S.aureus and C.albicans. The minimum inhibitory concentration (MIC) of the extract was determined against the four bacteria strains using the broth dilution method at various concentration of (0.1% to 1.25%).

Determination of MIC-

The broth dilution technique was used to determine the MIC against the test organisms. Sterile test tubes containing 5 ml double strength nutrient broth were added graded concentrations of 0.1% to 1.25% of the fruit rind extract of Garcinia mangostana linn (0.1-1.25 %). The contents of the tubes were diluted with calculated volumes of sterile water and inoculated with 5mlof the test organisms previously diluted to contain approximately 10^5 cfu/ ml. A tube without an extract and another without a test organism were used as controls. The tubes were incubated at 37 °C for 24 h (bacteria) and at 30^0c for 72 hours (fungus) and observed for growth in the form of turbidity. The tube with the lowest concentration of the extract which showed no growth after incubation was taken and recorded as the MIC.

In vitro antimicrobial efficacy of topical products.

The cup-plate method was used to assess the relative antimicrobial efficacy of the six extracts [methanol, aqua ethanolic (50:50) ethanol, ethyl acetate, xylene and n-hexane] of the fruit rind of Garcinia mangostana linn against four bacterial strains. A molten nutrient agar stabilized at 45 °C, seeded with 0.1 ml of 24 h broth culture of the test organism (B. subtilis E. coli. P. aeruginosa, S. aureus and C.albicans) and containing approximately 10^5 cfu / ml was used and allowed for solidification. Wells of 5mm diameter were created and filled to three-quarters full with the topical products of the extract.1% strength of each extract were prepared in base cream. The plates were pre-incubated for 1 h at room temperature to ensure adequate diffusion and finally incubated at 37^0C for 24 hrs for bacterial strains and 30^0C for 72 hrs for fungus. Cetrimide cream was used as standard for the bacteria strains and fungus. Soya casein digest nutrient plates (Himedia) were used to test the antibacterial activity of the topical products against test organism (B.subtilis, E. coli, P. aeruginosa and S. aureus).The experiments were run in triplicate and the zones of inhibition were determined and recorded (mean SD, n = 3)

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The microbial organisms used for the study were Gram-positive bacteria: Bacillus sublitis Staphylococcus aureus; Gramnegative bacteria: Escherichia coli, Pseudomonas aeruginosa; and the yeast Candida albicans. The broth dilution technique was used to determined the MIC against the test organisms (Vishnu priya V et al., 2010).

RESULT

Table no. 1] Antimicrobial activity of Garcinia mangostana linn-
Table no. 6.5.1] Antimicrobial activity of Garcinia mangostana linn-

Sr. no.	Bacterial strain	Minimum inhibition concentration (MIC) of different solvent extracts by broth dilution technique					
		Ethyl acetate	Methanol	Ethanol	Xylene	n-Hexane	Aqua ethanol(50:50)
1)	B.subtillis	0.75%	1.0%	0.50%	1.0%	0.75%	1.0%
2)	E.coli	0.50%	0.75%	0.50%	0.75%	0.75%	0.75%
3)	P.aeruginosa	1.0%	1.0%	0.75%	1.0%	1.0%	1.0%
4)	S.aureus	1.0%	1.0%	0.75%	0.75%	0.75%	0.75%
5)	C.albicans	0.75%	1.0%	1.0%	1.0%	0.75%	0.75%

Table no. 1] Determination of minimum inhibition concentration of Garcinia mangostana linn:
Table no. 2] Determination of zone of inhibition of Garcinia mangostana linn:

Extract	Zone of Inhibition.(mm)				
	Bacillus subtillis	E.coli	Pseudomonas aeruginosa	Staphylococcus aureus	Candida albicans
Methanol	9.36±0.39	7.88±0.03	10.51±1.40	11.07±0.54	8.27±0.30
Ethanol	10.75±0.64	9.37±0.43	12.04±0.21	11.77±0.80	9.04±0.05
Ethyl Acetate	13.50±0.12	10.21±0.15	13.30±0.18	14.5±0.24	9.81±0.32
Xylene	8.0±0.04	9.45±0.20	10.14±0.38	8.92±0.20	10.02±0.12
n-Hexane	7.22±0.31	6.36±0.05	8.85±0.93	7.17±0.83	6.45±0.45
Aqua ethanolic (50:50)	9.33±0.14	7.41±0.18	10.21±0.23	8.23±0.52	8.23±0.20
Control	24.50±0.22	19.7±0.28	20.1±0.11	21.86±0.47	21.86±0.47

Table no.2] Determination of zone of inhibition of Garcinia mangostana linn:

CONCLUSION

The Ethyl acetate and ethanol extracts showed good activity while the methanol, aqua ethanol, xylene and n-Hexane showed moderate antimicrobial activity showed little activity.

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