ANTIMICROBIAL ACTIVITY OF PERICARP EXTRACT OF *GARCINIA MANGOSTANA LINN.*

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ABSTRACT

Garcinia mangostana Linn is used as a phytomedicine in South East Asia for the treatment of trauma, diahorrea and skin infections. In the present study anti microbial activity of Garcinia mangostana extract powder was carried out. Antimicrobial activity was examined by determining the minimal inhibitory concentration (MIC) using macro dilution broth technique. Garcinia mangostana extract powder at different concentrations were tested against Staphylococcus aureus, Staphylococcus albus, Micrococcus lutus.

KEY WORDS: Garcinia mangostana Linn, antimicrobial activity, Minimum Inhibitory Concentration.

INTRODUCTION

Garcinia mangostana Linn. commonly known as " mangosteen", is a tropical evergreen tree and is an emerging category of novel functional foods sometimes called "superfruits" presumed to have a combination of appealing subjective characteristics, such as taste, fragrance and visual qualities, nutrient richness, antioxidant strength (1) and potential impact for lowering risk of human diseases (2). Mangosteen is one of the most famous fruits in Thailand (3) and the pericarps of *G. mangostana* have been widely used as a traditional medicine for the treatment of diarrhea, skin infection and chronic wounds in South East Asia for many years (4). Extract from its pericarp has been demonstrated the antimicrobial activity against a wide variety of microorganisms (5 – 11). Previous studies have shown that the extracts from various parts contain varieties of secondary metabolites such as prenylated and oxygenated xanthones. Xanthones or xanthen-9H-ones is a secondary metabolite found in some higher plant that involves mangosteen (12). Xanthones could be isolated from peel, whole fruit, bark, and leaves of mangosteen. Several studies have shown that obtained xanthones from mangosteen have remarkable biological activities such as antioxidant, antitumoral, anti-inflammatory, antiallergy, antibacterial, antifungal, and antiviral activities (13, 14)

The present study was undertaken to study the anti microbial property **pericarp extract of mangosteen.**

MATERIALS AND METHODS

Test drug and chemicals

G. mangostana pericarp extract powder was obtained from Avasthagen Company, California, USA as a compliment and used for the present investigation. All other chemicals used were of analytical grade.

Protocols for anti-bacterial activity:

6 mg of the extract was mixed with 300 micro lit of DMSO so as to get a concentration of 20 micro gm in 1 micro lit of the suspension. 5ul, 10ul, 15ul, 20ul and 25ul volume of extract was loaded on to sterile discs corresponding to the concentrations as shown in the Table - I.

Table – I: IT SHOWS THE LOADING OF THE EXTRACT ON TO THE STERILE DISCS.

Volume	Concentration of extract
5µl	100µg
10 µl	200µg
15 µl	300µg
20 µl	400µg
25 µl	500µg

The herbal extract in different concentration (above mentioned) was tested against Staphylococcus aureus, S. albus and Micrococci for antibacterial activity separately. After 24 hours incubation period the plates were observed and the inhibition-zone was recorded as given in the Table - II.

TABLE – II: IT SHOWS THE RECORDING OF THE INHIBITION ZONE AFTER THE INCUBATION PERIOD.

Strain	Concentration of extract				
	100 µg	**200 µg**	**300 µg**	**400 µg**	**500 µg**
Staphylococcus aureus	8mm	8mm	9mm	10mm	12mm
Staphylococcus albus	9mm	10mm	12mm	13mm	17mm
Micrococci	8mm	9mm	10mm	11mm	14mm

MINIMAL INHIBITORY CONCENTRATION (MIC):

A serial 2-fold broth dilution method was performed to determine the MICs of herbal extracts against bacterial strains. Stationary-phase cultures of all strains were prepared by inoculating fresh broth tubes and incubating at 37°C till 0.5 Mc Farlands standard was achieved. Serial 2-fold dilutions were prepared from extract stock solutions and 1.0 mL of each standardized bacterial suspension was added to an equal volume of each extract dilution. After incubation for 24 h ± 1 h at 37 ° C, turbidity of the cultures was assessed visually by comparison to uninoculated controls. The MIC was defined as the lowest concentration of extract where bacterial growth was not detected. The MICs were determined from independent triplicate assays and were based on a serial 2-fold dilution starting with the initial concentration of 400 µg / ml.

TABLE – III: IT SHOWS THE MINIMAL INHIBITORY CONCENTRATIONS OF S. AUREUS, S.ALBUS AND MICROCOCCI.

Strain	**Concentration of extract**					
	400µg / ml	**200 µg / ml**	**100 µg / ml**	**50µg / ml**	**25µg / ml**	**12.5µg/ml**
S. aureus	NG	NG	Turbidity	Turbidity	Turbidity	Turbidity
S. albus	NG	NG	NG	NG	Turbidity	Turbidity
Micrococci	NG	NG	NG	NG	Turbidity	Turbidity

The MIC for S. aureus 200 µg / ml and S. albus and Micrococci is 50µg/ml.

RESULTS & DISCUSSION

Results obtained in our present study revealed the anti bacterial activity of Pericarp extract of Garcinia mangostana against Staphylococcus aureus, Staphylococcus albus, Micrococcus lutus (Table - II & Table - III). Microbial susceptibility assays using the disc diffusion method and the Minimal Inhibitory Concentration (MIC) were carried out for Staphylococcus aureus, Staphylococcus albus, Micrococcus lutus. When tested by the disc diffusion method, the Pericarp extract of Garcinia mangostana showed significant activity against Staphylococcus aureus, Micrococcus lutus and Staphylococcus albus at 12 mm, 14mm and 17mm respectively. The anti bacterial activity of the extract was especially notable. The Minimum Inhibitory Concentration (MIC) for Staphylococcus aureus is 200 µg / ml and Micrococcus lutus and Staphylococcus albus is 50µg/ml. The extract from mangosteen pericarp has been known for its broad-spectrum antibacterial activity against several Gram-positive and Gram-negative bacteria, especially those associated with skin infection, diarrhea, tuberculosis or acne (5 - 10). The active chemical components that are present in medicinal plants like Garcinia mangostana were responsible for its anti microbial activity (15). Among xanthone derivatives from mangosteen extract, α-mangostin has been known to exert the most potent antimicrobial activity (5 – 9, 11). Kitti Torrungruang et al showed the antibacterial activity of mangosteen Pericarp extract against cariogenic Streptococcus mutans (16).

CONCLUSION

The extract from mangosteen pericarp was effective against Staphylococcus aureus, Staphylococcus albus, Micrococcus lutus. The strong anti bacterial activity of the extract suggests that it is a good drug of choice for which might be helpful in preventing the progress of various diseases and it can be used in alternative system of medicine.

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