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Anti-microbial activity of *Asparagus racemosus, Curculigo orchioides* and *Tinospora cardifolia* against common micro-organisms

N.Raaman[1], S.Selvarajan[2], D.Balakrishnan[1], G.Balamurugan[3*]

[1]Centre for Advanced Studies in Botany, University of Madras, Guindy Campus, Chennai-25, (INDIA)

[2]Central Research Institute for Siddda, Arumbakkam, Chennai-106 (INDIA)

[3]Dept. of Pharmacology, C. L. Baid Metha College of Pharmacy, Thoraipakkam, Chennai-97, (INDIA)

E-mail : bala_pharm5@yahoo.com

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ABSTRACT

In the present study, *Asparagus racemosus Willd*. (Roots), *Curculigo orchioides Gaerten*. (Rhizomes) and *Tinospora cardifolia* Miers. (Stems) were dried, powdered together and extracted with methanol and the extract was studied for both antibacterial and anti fungal activities by paper disk diffusion method of analysis. The extract exhibited significant anti bacterial and anti fungal activities. Minimum Inhibitory concentration (MIC) required for the inhibition of microbial growth was also determined.

KEYWORDS

Asparagus racemosus;
Curculigo orchioides;
Tinospora cardifolia;
Anti bacterial;
Anti fungal;
Minimum inhibitory concentration.

INTRODUCTION

Antibiotic resistance has become a global concern[1]. In addition to the increased magnitude of emergence of bacterial drug resistance, high-dosage and prolonged antimicrobial therapy could eliminate beneficial bacteria commensals predisposing to pathogen invasion[2,3]. Thus there is a search for new antimicrobial agents that can overcome these drawbacks. In the present study three medicinal plant have been selected and their synergistic potential as an antimicrobial agent was evaluated.

Asparagus racemosus Willd. belonging to the family Asparagaceae is a climber found all over India, especially in Northern India. The root of this plant is extensively used as an anti-diarrheal, diuretic, aphrodisiac, antispasmodic and nutritive[4]. The roots also possess as an immuno adjuvant potential[5], ulcer protective[6] and an antitussive effects[7].

Curculigo orchioides Gaerten. belonging to the family Amaryllidaceae is a shrub found all over India, especially in sandy situations of hotter regions and in Ceylon. The rhizomes of this plant are extensively used as a demulcent, diuretic and aromatic tonic, aphrodisiac, in the treatment of leprosy and nervous disease[8]. The rhizomes also possess immune stimulant potential[9], hepato protective[10], antioxidant[11] and platelet regeneration effect[12].

Tinospora cardifolia Miers. belonging to the family Menispermaceae, is available throught India as a climbing shrub and the stem is widely used in Sidda, Ayurveda for its properties like general tonic, anti allergic and anti diabetic[13]. Various other uses are reported such as anti-hyperglycemic[14,15], anti-angiogenic[16], immune stimulator[17], anti-ulcerogenic[18], anti-stress[19], preventive role in brain neurotransmitter[20] and treatment of allergenic rhinitis[21].

MATERIALS AND METHODS

The well matured roots, rhizomes and stems of *Asparagus racemosus, Curculigo orchioides* and *Tinospora cardifolia* were collected from the outskirts of Chennai during the month of April. The extract was prepared by hot soxhlet method. All the plant parts were washed with water, dried under shade and powdered with the help of electric pulverizer. The powder was extracted with methanol (AR grade) by soxhlet apparatus. The percentage yield of the extract was found to be 16.98. The extract was subjected to antimicrobial studies such as antibacterial activity using *Staphylococcus aureus* NCCS 2106, *Bacillus cereus*, *Escherichia coli* NCCS 2065 and *Pseudomonas aeruginosa* NCCS 2200 and antifungal activity using Aspergillus niger NCCS1196 and Candida albicans NCCS 3471. The Minimum Inhibitory concentration required for the inhibition of the growth of the organisms was also calculated.

Antimicrobial activity

The antimicrobial screening was performed by agar diffusion method using a paper disc[22]. The sterilized (autoclaved at 120^{0}C for 30 min) medium (40-50^{0}C) was inoculated (1ml/100ml of medium) with the suspension of the microorganism (matched with McFarland barium sulphate standard). The paper impregnated with the extract (250 and 500 µg/ml in dimethyl sulphoxide) was placed on the solidified medium. The plates were preincubated for 1 h at room temperature and incubated at 37^{0}C for 24 and 48 h for antibacterial and antifungal activities respectively. Gentamicin (10 µg/disc) and Ketoconazole (10 µg/disc) were used as standards for antibacterial and antifungal activities respectively. The observed zone of inhibitions is presented in TABLE 1.

Minimum inhibitory concentration

The MIC for the above organisms was found by Agar streak dilution method[23]. Nutrient agar was used for bacterial pathogens and Sabouraud's dextrose for fungal strains. The media were sterilized by autoclaving at 15 lbs/sq inch pressure for 20 min. Stock solutions of the extracts were mixed with the known quantity of molten sterile agar media aseptically to provide the required concentrations. About 20 ml of the media containing the extract was poured into each sterile Petri dish and allowed for solidification. Thereafter Microorganisms were streaked one by one on the agar plate aseptically. After streaking all the plates were incubated at 37±1^{0}C for 24 and 48 h for antibacterial and antifungal activities respectively. Then the plates were observed for the growth of the microorganisms. The lowest concentration of the plant extract required for inhibiting the growth of the microorganism was considered as the MIC of the extract against bacterial and fungal strains. The MIC values of each extract against the tested microorganisms are presented in the TABLE 1.

RESULTS AND DISCUSSION

The antimicrobial screening implied that the extract was highly effective against the fungal organisms than the bacterial strains, which is indicating that this is a potential source for antifungal agent (TABLE 1). The antibacterial activity observed was significant and comparable with the standards, while the anti fungal activities were higher than the standard drugs. In the determination of MIC, the concentration of extract for the cessation of growth of the fungal organisms were needed lower than that of the bacterial organisms.

REFERENCES

TABLE 1: Zone of inhibition and minimum inhibitory concentration of asparagus racemosus, Curculigo orchioides and *Tinospora cardifolia*

Organisms	Standard (mm)	Zone of inhibition (mm)		MIC (mg)
		MECO (250 µg) (mm)	MECO (500 µg) (mm)	
S.aureus	32	20	27	19
B.cereus	28	20	28	20
E.coli	38	19	26	21
P.aeruginosa	36	17	22	25
A.niger	30	22	26	17
C.albicans	32	22	26	16

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