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POTENTIAL *EX-VIVO ANTIMICROBIAL EVALUATION OF BARKS OF PARMENTIERA CEREIFERA SEEM*

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SUMMARY

In antimicrobial screening, crude methanolic (ME) extract; carbon tetrachloride (CTCSF) soluble fraction; the choloroform (CSF) soluble fraction demonstrated strong antimicrobial activity against 17 pathogenic microorganisms used in the screening. In the barks methanolic (ME) extract demonstrate significant antimicrobial activity ranging from (6.67-13.34%) against gram positive, gram negative and fungi. Whereas CTSF demonstrate (7.60-14.67%) compared with standard Ciprofloxacin. Other barks fractions demonstrate mild to moderate antimicrobial activity.

KEYWORDS: *Parmentiera cereifera*; antimicrobial activities.

INTRODUCTION

Parmanteira cereifera also known as Candle tree is a small tree with rough bark belonging to the family Bignoniaceae. The leaves are acuminate and oblong. The flowers are nocturnal, cauliflorous, white, calyx spathaceous and slightly fragrant. The fruits and seeds of this tree are berry pale yellow, pendent, candle-like, smooth, edible and used as fodder source. The tree is native to Panama and cultivated for ornamental uses in many tropical countries.[1,2] As a part of our continuing search on medicinal plants of Bangladesh, the organic soluble materials of leaf of *P. cereifera* were subjected for antioxidant activity in terms of free radical scavenging activity using DPPH and poly phenolic composition,

thrombolysis, membrane stabilization, cyotoxicity and antimicrobial activities as well as for determining phytoconstituents for the first time.[3]

In previous studies barks fraction demonstrate saponins, tannins, triterpenoids and steroids. In fruits fraction indicate the presence of tannins, flavonoids, saponins, steroids, terpenoids, triterpenoids. This plant shows significant several pharmacological activities, due to presence of these phytoconstituents. Phytochemicals screening was conducted for first time in the world.[4,5]

MATERIALS AND METHODS

Plant Materials

The leaf of *P. cereifera* was collected from Botanical garden, Mirpur, Dhaka, Bangladesh, in November 2011. A voucher specimen was collected from Bangladesh National Herbarium, Dhaka, Bangladesh (Accession no.36569). The sun dried and powdered (500 gm) barks of *P. cereifera* was macerated in 2.5 L of methanol for 7 days and then filtered through a cotton plug followed by Whatman filter paper number 1. All extracts were concentrated with a rotary evaporator at low temperature (40-45 ºC) and reduced pressure. The concentrated methanolic extract (ME) was partitioned by modified Kupchan method[6] and the resultant partitionates i.e., pet-ether (PESF), carbon tetrachloride (CTCSF), chloroform (CSF), and aqueous (AQSF) soluble fractions were used for the experimental processes.

Antimicrobial Activity

The antimicrobial screening, which is the first stage of antimicrobial drug discovery, was performed by the disc diffusion method[7] against thirteen bacteria and one fungi (Table-1) collected as pure cultures from the Institute of Nutrition and Food Science (INFS), University of Dhaka, Bangladesh. Standard disc of Ciprofloxacin (30 µg/disc) and blank discs (impregnated with solvents followed by evaporation) were used as positive and negative control, respectively. The test material having antimicrobial activity inhibited the growth of the microorganisms and a clear distinct zone of inhibition was observed surrounding the discs. The antimicrobial activity of the test agents was determined by measuring the diameter of zone of inhibition expressed in mm.[8]

RESULTS AND DISCUSSION

The various extracts of barks partitioned of *P. cereifera* i.e. carbon tetrachloride (CTCSF), chloroform (CSF), methanolic extract (ME) were subjected to antimicrobial screening with a

concentration of 400 µg/disc in every case. Among these only chloroform partitionates exhibited any antimicrobial against the microorganisms. The results are given in the (Table-1). The presence of various potential phytochemicals like as flavonoids, saponins, tannins, triterpenoids as well as steroids. These compounds exhibit potential biological activities such as cardioprotective, antioxidant, hepatoprotective, analgesic, antidiabetics, antidiarrhoeal, antiasthmatic, anticancer activities as well as so on.[4]

Plants produce verious secondary metabolites that include flavones, phenolics, flavonoids, coumarins, tannins, lectins, tannins, lectins, polypeptides, alkaloids as well as other compounds which demonstrate the plant defense against the microorganisms. Previously these compounds have also been reported in anti-inflammatory, antioxidant, as well as antimicrobial properties.[9-13]

Table-1: Antimicrobial activity of test samples of barks.

Test microorganisms	Diameter of zone of inhibition (mm)					
	ME	HXSF	CTCSF	CSF	AQSF	Ciprofloxacin
Gram positive bacteria						
Bacillus cereus	-	-	-	-	-	46.3±4.49
Bacillus megaterium	6.67 ± 0.58	-	7.60± 0.57	-	-	40.3±5.55
Bacillus subtilis	6.34 ± 0.58	-	8.30± 0.57	-	-	41.6±2.35
Staphylococcus aureus	15.67± 0.58	-	18.60±0.57	-	-	46.3±1.24
Sarcina lutea	10.34 ±0.58	-	12.67±0.57	-	-	50.0±0.0
Gram negative bacteria						
Escherichia coli	11.00 ±1.00	7.67±0.57	12.34±0.57	-	-	46.3±.94
Pseudomonas aeruginosa	-	-	-	-	-	44.0±2.8
Salmonella paratyphi	-	7.34±0.57	8.67±0.57	-	-	56.6±6.23
Salmonella typhi	7.00 ±1.00	-	8.34±0.57	-	-	45.6±3.29
Shigella boydii	7.67 ±0.57	-	8.67±0.57	-	-	51.0±1.41
Shigella dysenteriae	11.67 ±0.57	11.00±1.00	12.67±0.57	-	-	48.0±2.82
Vibrio mimicus	7.34 ±0.57	-	8.67±0.57	-	-	48.3±5.32
Vibrio parahemolyticus	13.34 ±0.57	-	14.67±0.57	-	-	42.3±3.68
Fungi						
Candida albicans	6.34±0.57	-	7.67±0.57	-	-	44±3.51
Aspergillus niger	8.34±0.57	-	11.00±1.00	-	-	41±1.41
Sacharomyces cerevacae	7.67±0.57	-	7.67±0.57	-	-	40±1.41

ME= Methanolic extract; HXSF = Hexane soluble fraction; CTCSF= Carbon tetrachloride soluble fraction; CSF = Chloroform soluble fraction; AQSF =Aqueous soluble fraction of the methanolic extract of *P. cereifera*, S.D. = Standard deviation. The average values of three calculations are presented as mean ± S.D.

CONCLUSION

Present results indicate that barks fractions of *P. cereifera* has significant broad spectrum antimicrobial activity. Significant antimicrobial activity demonstrates due to presence of several lead compounds. Further studies may initiate identification, purification and isolation of the lead compounds.

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