ANTIBACTERIAL ACTIVITY OF BARK EXTRACT OF *ACACIA CONCINNA* (L)

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ABSTRACT

Antimicrobial properties of Bark extract of *Acacia concinna* (L) were investigated against laboratory isolates of bacteria using well diffusion method. Chloroform extract (13 mm zone diameter of inhibition) demonstrated the highest activity followed by methanol extract (12 mm zone diameter of inhibition.Phytoconstituents present included phenol, tannin, fat and fixed oil, flavanoids, saponin and quinone. The results of antibacterial activity revealed that all the extract showed good inhibitory activity against all the tested pathogens and the chloroform extract showed comparative by better activity than the other extracts against *P.aerogenosa and s. aureus*. The activities of the extract were compared with standard antibiotics. These results indicate that *A. concinna* Bark possesses potential broad spectrum antibacterial activity.

KEYWORDS

Acacia concinna, phytochemical screening, bioactive compounds, herbal remedies.

INTRODUCTION

Knowledge of the chemical constituent of plants is desirable for the discovery of therapeutic agents and in discovering the actual value of folklore remedies. Traditionally, screening methods have been used to study the pharmacological effects of phytochemical compounds. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body.

The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids, and phenolic compounds. Biologically active compounds from natural sources have always been of great interest to scientists working on infectious diseases. World Health Organization advocated that both developed and developing countries should interact with the traditional medicine with a view of safe and effective remedies of ailments.

Acacia concinna is a tree native of Asia. Its parts used as bark, leaves and pods. It is a common, prickly, scandent shrub, occurring in tropical jungles throughout India, especially in the Deccan. An infusion of the leaves is used in malarial fever. A decoction of the pods relieves biliousness and acts as a purgative. The pods are reported to be used in north Bengal for poisoning fish (Nathawat and Deshpande, 1973).The present study investigates the presence of secondary metabolites and antimicrobial activities against some human pathogens.

MATERIALS AND METHODS

Sample Collection and Preparation

Acacia concinna Barks were collected from Coimbatore district, Tamilnadu, India. The barks selected for the study were washed, air dried and powdered. 250 g of *Acacia concinna* bark yields 200 g powder.

Preparation of the Extract

About 50 g of dried powder samples were weighed and extraction process was carried out by using 200 ml of solvents (Ethanol, Methanol and Chloroform) in soxhlet apparatus for 18 hours. The extract was concentrated by evaporation at 100˚ C for 8 hours and then air dried. The concentrated extract were made in to a fine powder form and stored at room temperature prior to phytochemical screening.

PHYTOCHEMICAL AND BIOCHEMICAL ANALYSIS

The phytochemical tests were carried out using different solvents extracts using standard procedures to identify the constituents as described by (Harbone.J.U 1973). To assess the activity of selected medicinal plants, preliminary phytochemical analysis studies were carried out.

BACTERIAL CULTURES

Nine different bacterial cultures were tested for the activity of the extract.

Preparation of Bacterial culture

The stock culture of the bacteria used was subcultured on Nutrient Agar at 37˚ C for 24 hours. The culture was emulsified in sterile saline.

Sensitivity Test

The agar diffusion method was used. Wells (7mm) were cut by using gel puncture and the previously prepared cultured saline was swabbed on the culture plates containing Nutrient Agar plates. The same quantity of sterile water and solvents used acts as the negative control. A volume of 50µl plant sample with different extracts were tested in a concentration of 100 mg/ml and incubation was performed at 37˚ C for 24 hours. The assessment of antimicrobial activity was based on the measurement of the diameter of the inhibition zone formed around the well. Standardized streptomycin was used as the antibiotic control (Positive control). Triplicate plates were prepared for each extract and controls.

RESULTS

The phytochemical screening of the test plant was done for their active components present for their medicinal values. Many of the phytochemical analysis showed positive results which render the presence of their active compounds like phenol, tannin, fat and fixed oil, flavanoids, saponin and quinine.

The extracts of *A.concinna* obtained using different solvents were effective against the bacterial strains (Table 02). Among different extracts Chloroform exhibited maximum antimicrobial activity. The increased zone on inhibition was measured in *S. aureus* (13 mm) compared to other microorganisms, which was followed by *P.aerogenosa* (12 mm).

DISCUSSION

The ethanol extracts of *Balanites aegyptica* leaves, stem bark, root bark and fruit were tested for antimicrobial activities *Bacillus subtilis, Staphylococcus aureus, E.coli.Pseudomonas aeruginosa* and *Candida albicans* and the maximum inhibition zone was recorded in the leaf extract (Karuppuswamy *et al*., 2002).

Martins *et al*.(2001) showed that the essential from *Aframomum danielli,Zingiber officinale* and *Curcuma longa* have antimicrobial activity against both gram positive and gram negative bacteria, yeast and filamentous fungi.

Saini *et al*. (2007) found that the water and alcoholic extracts of leaves of *Melia dubia* when tested in gram positive and gram negative strains using agar gel diffusion method exhibited moderately good antimicrobial activity.

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Table 01: Phytochemical screening of *Acacia concinna* Bark

S.No	Reagent	Nature of colour change	Inference	Phytochemical changes
1.	Substance + alcohol + $FeCl_3$	Greenish yellow	Present	Presence of phenol
2.	0.5g substance + 20mL H_2O is boiled. Then 0.1% $FeCl_3$	Brownish green	Present	Presence of tannin
3.	Substance + Sudan III	Shining brown colour	Present	Presence of fat and fixed oil
4.	Substance + 10% NaOH	Light brown	Present	Presence of flavonoids
5.	Substance shaken in water	Frothing present	Present	Presence of saponin
6.	Substance + chloroform+ drop of acetic acid, heated + conc. H_2SO_4	Orange	Absent	Absence of steroids
7.	Substance + conc. HCl	brown	Present	Presence of quinone
8.	Substance + Iodine followed by H_2SO_4	Brown	Absent	Absence of cellulose
9.	Substance + 2 mL chloroform + conc. H_2SO_4	Light orange	Absent	Absence of terpenoids
10.	Substance + 2 mL glacial acetic acid + 1 drop of $FeCl_3$ + 1 mL conc. H_2SO_4	Brown	Absent	Absence of glycosides

Table 02: Antibacterial activity of Bark extract of *Acacia concinna* (L)

organism	Methanol (cm)				Ethanol (cm)				Chloroform (cm)			
	A(20µl)	B(40µl)	C(60µl)	D(100µl)	A	B	C	D	A	B	C	D
S.typhii	**0.1**	**0.4**	**0.6**	**0.7**	**0.3**	**0.4**	**0.5**	**0.7**	**0.2**	**0.3**	**0.5**	**0.6**
P.nirabilis	**0.1**	**0.2**	**0.4**	**0.6**	**0.1**	**0.2**	**0.4**	**0.6**	**0.3**	**0.4**	**0.6**	**0.7**
S.aureus	**0.2**	**0.3**	**0.5**	**0.6**	**0.1**	**0.2**	**0.4**	**0.5**	**0.3**	**0.8**	**1**	**1.3**
Yersinia	**0.1**	**0.3**	**0.5**	**0.7**	**0.2**	**0.4**	**0.5**	**0.7**	**0.2**	**0.4**	**0.6**	**0.8**
S.epidermis	**0.4**	**0.5**	**0.6**	**0.8**	**0.1**	**0.2**	**0.3**	**0.4**	**0.1**	**0.2**	**0.3**	**0.4**
K.pnemonia	**0.3**	**0.4**	**0.5**	**0.7**	**0.2**	**0.3**	**0.5**	**0.6**	**0.1**	**0.2**	**0.3**	**0.7**
P.aerogenosa	**0.3**	**0.5**	**0.8**	**1.2**	**0.1**	**0.4**	**0.8**	**1**	**0.4**	**0.5**	**0.7**	**1.1**
E.coli	**0.3**	**0.5**	**0.6**	**0.8**	**0.1**	**0.2**	**0.3**	**0.4**	**0.1**	**0.3**	**0.4**	**0.6**
B.subtilis	**0.1**	**0.2**	**0.3**	**0.5**	**0.3**	**0.4**	**0.6**	**0.7**	**0.2**	**0.3**	**0.5**	**0.6**