

Research Article

Antibacterial Bustle of Leaf Extract of *Cassia Fistula*

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Abstract: *In - Vitro* Antibacterial bustle of Ethanol Extract of leaf cassia fistula was premeditated. Four Gram-positive and Five Gram-negative bacteria namely Bacillus megaterium, Bacillus subtilis, Streptococcus β - haemolyticus, staphylococcus aureus, Salmonella typhi, Shigella dysenteriae, Shigella shiga, Escherichia coli and Pseudomonas aeruginosa were practiced. The Extract was unsuccessful at concentration of 30 μ g/disc but showed moderate to good activity at concentration of 200 μ g/disc against the tested pathogens. The leaf extract revealed better activity displaying their zone of inhibitions 9-18 mm and largest zone was shown against Shigella Dysenteriae (18 mm). From these findings it is investigative that Cassia fistula may have antibacterial principles that could be useful in microbial diseases.

Keywords: Antibacterial activity, Cassia fistula

INTRODUCTION

Microbial infection is a common health problem in Bangladesh. Peoples of rural areas usage different plant parts for the ailment of various bacterial infections [1, 2]. The medicinal plants continue to play an important role for the management of different microbial diseases. In recent years there has been a rebirth of scientific interest in the use of medicinal plants for the development of new phannacotherapeutic agents against different species of microorganisms including the resistance organisms [3, 4]. Effective, cheap and safe medicinal agents may appear as substitute potential source for controlling microbial infections particularly the resistant cases. *Cassia fistula* Linn. called in local Bangla "Banderlathi" is a medium sized tree of about 10-15 meter tall. It is planted as an ornamental tree in homesteads and along the roadside. Leaves fall during cold weather and the early part of hot season. The leaflets are 4-8 pairs, opposite, dark-green and shining above. Flowers are bright yellow in colour, appears in graceful hanging clusters. The pod is 30-60 cm long, chambered within; black when ripe and seeds are 40-100 in each pod [5]. Some investigators reported the medicinal values of this plant such as hypoglycemic properties of leaf, antibacterial and antifertility effects of seed extract [6- 8]. The present work was objected to carryout scientific study on antibacterial activity of the leaf extract of *Cassia fistula* against nine bacterial species in comparison with the contemporary commonly used antibacterial drug Cephadrine. Medicinal plants always played an important role in the health development of mankind. In developing countries, 80% of populations are totally dependent on plants for their primary health care [9].

MATERIALS AND METHODS

Preparation of the extracts

Fresh leaves of *Cassia fistula* were collected from Rajshahi locality. Adhering dirt's were removed by washing and were cut into small pieces. The plant parts were dried at room temperature avoiding sunlight. The dried parts were then milled to form powder (2kg). Dry powder of leaves was soaked in ethanol (absolute alcohol) for 7 days in a glass container closed by glass cork with occasional shaking and stirring. The extract was filtered through cotton and filter paper and concentrated by rotary evaporator under reduced pressure (below 50°C) to afford semisolid masses.

Antibacterial Screening

The ethanol extract (semisolid masses) were examined for their antibacterial potency by disc diffusion method against nine bacterial species (4 Gram- positive and 5 Gram-negative) [10]. The bacterial specimens were collected from Microbiology Laboratory, Department of Pharmacy, Rajshahi University, Rajshahi. The medium was (Nutrient agar, DIFCO, UK) poured into sterile petridishes and the inoculum was adjusted to contain 10⁵ to 10⁷ bacteria per ml. The extracts were dissolved in ethanol to obtain a concentration of 10 μ g/ μ l. The discs (6 mm in diameter) were prepared by sterile filter paper and dried in an oven to remove moisture. The solutions were applied on the dried filter paper discs by micropipette to obtain discs containing 30 and 200 μ g of extracts in each disc. Cephadrine discs (30 μ g/disc) were used as standard. The discs were then placed on the petridishes seeded with the bacterial inoculums over the medium and allowed to diffusion at 4°C for 5-7 hours. The petridishes were then incubated at 37°C for 18 hours and the zones of inhibitions observed were measured.

The data were analyzed by using the Duncan's multiple range tests and Analysis of Variance (ANOVA) test.

RESULTS AND DISCUSSION

Basic (crude) ethanol extract of the leaf of *Cassia fistula* were tested against 4 Gram-positive and 5 Gram-negative bacteria at concentrations of 30 µg and 200µg/disc and compared with standard antibiotic cephadrine. It was found that at the concentration of 30µg/disc the extract was ineffective against the tested

pathogens. Whereas, the same extract showed reasonable to good activity exhibiting their zones of inhibitions 9-18 mm, against the tested bacteria at concentration of 200µg/disc. The extract exhibited maximum zone of inhibition against *Shigella dysenteriae* (19 mm). The extract was not active against *Staphylococcus aureus* (Table-1). The standard cephadrine was found to have pronounced effect (zone of inhibitions 26-30 mm) at concentration of 30µg/disc.

Table I: Antibacterial activity of the ethanol extract of leaf of *Cassia fistula* and standard cephradine (C)

Test organisms	Diameter of zone of inhibition (in mm)		
	Leaf extract (30 µg/disc)	Leaf extract 200 µg/disc	Cephadrine (30 µg/disc)
Gram positive			
<i>Bacillus megaterium</i>	00	12	27
<i>Bacillus subtilis</i>	00	11	28
<i>Streptococcus β - haemolyticus</i>	00	9	27
<i>Staphylococcus aureus</i>	00	00	26
Gram negative			
<i>Salmonella typhi</i>	00	11	28
<i>Shigella dysenteriae</i>	00	18	26
<i>Shigella shiga</i>	00	12	27
<i>Escherichia coli</i>	00	10	28
<i>Pseudomonas aeruginosa</i>	00	10	27

Bacterial infections are rapidly becoming resistant to conventional drugs like Methicillin and Vancomycin-resistant *Staphylococcus aureus* (MRSA/VRSA). Scientists are now engaged to explore new antibacterial principles from plant source [11]. In the present study, leaf extract exhibited most promising activity. The results of the present study are in well agreement with the results of some workers. Abo *et al.*, revealed that pods of *Cassia fistula* exhibited significant antibacterial activity when compared to that of ampicillin [12]. Hatano *et al.*, [3] showed that methanol extract of *Cassia tora* seed exhibited potent antibacterial effects on methicillin-resistant *Staphylococcus aureus*. These observations correlate the findings of the present study. On the bases of above studies it can be concluded that *Cassia fistula* may play a valuable role in the management of bacterial infections. Conversely, comprehensive study may be needed for this purpose.

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