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Screening of Antibacterial Properties of Crude Leaves Extracts of Plant *Cassia* siamea Collected from Baglan Region

KEYWORDS: *Cassia siamea*, Antibacterial activity, Herbal Medicines

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ABSTRACT *Now a day there is demand for search of the effective beneficial natural antimicrobials from the plant sources with better potency and lesser adverse effects. Using plants as medicines provides significant advantages for treating many conditions. The plants have remarkable nature of metabolism and they also synthesize varieties of complex metabolites which have proven therapeutic significance since ancient time. In present study the antibacterial potential of crude leaves extracts of plant Cassia siamea was evaluated against Gram positive and Gram negative clinical isolates. In this study the acetone extract found remarkable antibacterial potential against test isolates. It exhibited higher zones of inhibition 22 and 20 mm against E. coli and Staphylococcus aureus respectively. The Gram positive test organisms were found more susceptible as compared to Gram negative to acetone and ethanol extracts.*

INTRODUCTION:

The World Health Organization (WHO) reveals that most percentage of the world's population still relies on traditional remedies including plants as their primary health care aid (HerbDay, 2007). Nature has been a rich source of medicinal plants for thousands of years and large numbers of effective medicines have been produced from these medicinal plants. Researchers are continuously concentrating for the development of biologically active extracts from various medicinal plants for development of herbal medicines. Using plants as medicines provides significant advantages for treating many conditions. There are numerous medicinal plants which has been recorded their importance in development of herbal medicines. The various parts of medicinal plants such as leaves, barks, stems, flowers fruits and roots evaluated the presence of variety of constituents which has medicinal properties (Mohammad A. M. M. et al., 2012).

Cassia siamea (*Senna siamea*) is widely distributed in different parts of world. It is considered one of medicinal and food plant. It is predominantly found in South regions of Asia (Pavananundt P. et al., 2013). There are many uses of *Cassia siamea* so far reported in research reports. It was initially classified in family Caesalpiniacae, and then now classified in family Fabaceae (Veerachari U. and Bopaiah A.K., 2011; Kamagate M. et al., 2014). The leaves of *Cassia siamea* used as a mild laxative (Sakulpanich, A. and W. Gritsanapan. 2009). It is found anti-hypertensive, antibacterial, anti-inflammatory, analgesic, antipyretic, antimalarial and antifungal activity (Bukar, A. et al., 2009; Kupitayanant, P. et al., 2001; Nsonde Ntandou G. F. et al., 2010; Kamagate M. et al., 2014). Traditionally *Senna siamea* is used for the treatment of typhoid fever, jaundice, abdominal pain (Mohammad A. M. M. et al., 2012; Kamagate M. et al., 2014). Present investigation deals with screening of antibacterial properties of crude leaves extracts of plant *Cassia siamea* from Baglan region of Maharashtra. Antimicrobial activity of plant extracts was analyzed and found effective against Gram positive and Gram negative bacteria.

MATERIALS AND METHODS:

The leaves of the plant *Cassia siamea* were collected from local region of Baglan, shade dried and powdered. Powder was soaked in water, ethanol and acetone to extract the bioactive material. Antimicrobial activity of all the extracts were analyzed and compared with the standard antibiotic Streptomycin.

TEST ORGANISMS USED:

Antibacterial activity against clinical isolates, Gram positive bacteria such as *Staphylococcus aureus, Streptococcus species* and Gram negative bacteria such as *E. coli, Salmonella paratyphi A, Salmonella paratyphi B, Pseudomonas aeruginosa* studied by diffusion assay using Muller-Hinton media. Sample impregnated discs of varying concentration used for assay along with standard antibiotic (Streptomycin) as a control.

EXTRACTION OF PLANT MATERIAL:

1. Aqueous extract:

The dried leaves were reduced to coarse powder and 100 gm of it infused in sterile distilled water. The extract was then evaporated in a rotary evaporator at 60°C (Kandil et al., 1994). The final dried samples were stored in labeled sterile bottles and kept at 4°C.

2. Ethanol extract:

Each dried plant sample was ground and extracted with 95% ethanol. About 10 ml of ethanol per gram of plant sample was used. The extraction process was carried out for 48 hours by continuous agitation on shaker. The ethanol extract was dried under a reduced pressure at 40 °C. The dried extract was stored in sterile bottles until further use.

3. Acetone extract:

Powdered sample (100 g) from plant leaves were extracted with acetone by continuous agitation for 48 hrs. The solvent was removed using a rotary vacuum evaporator at 40 °C to give a concentrated extract, which was then stored at 4°C till use.

CONCENTRATION OF EXTRACTS:

0.1 mg powder of extracts weighed and dissolved in dimethyl sulfoxide (Conc. 100µg/ml). Further crude extracts were diluted to make 10µg/ml and 50µg/ml. Three concentrations of crude extract were selected for antibacterial assay.

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ANTIBACTERIAL ASSAY:

Agar diffusion assay was performed as sample impregnated /control discs of size 5 mm were placed gently on solidified Muller-Hinton Agar plates, freshly seeded with test organisms under aseptic conditions. The plates were incubated at 37°C for 24 hrs. After incubation diameter of zone of inhibition was measured for each concentration.

RESULT AND DISCUSSION:

The antibacterial activity of the three extracts was evaluated against both Gram positive and Gram negative organisms. Aqueous extract showed less antimicrobial activity as compared to ethanol and acetone extracts. The 100 µg/ml concentration of all extracts found higher zone of inhibitions against all test organisms (**Table 1**). The clinical isolates, *Staphylococcus aureus, E. coli* were found more susceptible to acetone and ethanol extracts as compared to aqueous extract. All Gram negative test organisms *E. coli*, *Salmonella paratyphi A, Salmonella paratyphi B, Pseudomonas aeruginosa* were found susceptible. From this study it was found that plant extracts exhibited remarkable bactericidal activity against both Gram positive and Gram negative test organisms. The acetone extract exhibited higher bactericidal action as compared to aqueous and ethanolic extracts. Nsonde Ntandou G. F. et al., (2010) were evaluated that ethanol and aqueous extracts of *C. siamea* leaves and stem bark which exhibited significant pharmacological properties. It was previously used in treatment of infections caused by microorganisms. The methanol leaves extract exhibited antibacterial activity against test organisms (Nanasombat S. and Teckchuen N., 2009). According to Smith Alli Y. R., (2009) the leaves extract of *Cassia* species was found to content saponin, alkaloids, antraquinones and phylobatannins. The ethanolic extract of *C. siamea* contains phenolic substances and antibacterial properties (Nakanishi K. et al., 1965; Anuthida P. et al., 2014). The zone of inhibition were obtained against clinical isolates which suggests that plant leaves extracts contains various antibacterial components and analysis of them will contribute to identify the potential antibacterial constituents which may help in preparation of novel drugs.

Table 1: The antibacterial effect of Water, Ethanol and Acetone extracts of *Cassia siamea* against test organisms.

Test Organism	Concentration of Extract (µg/ml)	Diameter of Zone of Inhibition (mm)			Streptomycin 100(µg/ml)
		Water	Ethanol	Acetone	
Staphylococcus aureus	10	8	11	14	26
	50	10.5	13	17	
	100	13	17.5	20	
Streptococcus species	10	4	8	8.5	28
	50	10	12.5	15.5	
	100	12	12.5	16.5	
E. coli	10	10	11.5	12	32
	50	11.5	14	19	
	100	18	20	22	
Salmonella paratyphy A	10	9	10	10	28
	50	10	11	12.5	
	100	10.5	14	15.5	
Salmonella paratyphi B	10	6	8	10.5	26
	50	9.5	10.5	14	
	100	10	12	15	
Pseudomonas aeruginosa	10	5	4	8	22
	50	9	10.5	10	
	100	8	12	14	

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