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Antimicrobial activity of ethanolic extracts of leaves of *Sphaeranthus indicus*

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ABSTRACT

Leaves of *Sphaeranthus indicus* were extracted with ethanol. The antimicrobial activities of Ethanolic extracts were evaluated by using in vitro disc conc. of 1.25, 2.5 and 5mg/disc. The minimum inhibitory concentration was calculated using broth tube dilution method. Significant antibacterial and antifungal action was observed in Ethanolic extract of leaves against *B.subtilis*, *S.aureus* and *Candida* respectively. The MIC of *B.Subtilis* and *S.aureus* were 0.5 and 2.5/ml and MIC of *Candida* and *Aspergillus niger* were 0.5 and 5mg/ml respectively

Key words: Antimicrobial, Sphaeranthus indicus, Disc diffusion, Tube dilution

INTRODUCTION

Indigenous drugs always play a significant role in the treatment of various ailments. People all over the world have used various plant extracts for curing disease at different stages of human evolution.

Sphaeranthus indicus belongs to Asteraceae family and commonly known as GORAKH MUNDI or MUNDI [1].It is distributed throughout India. Literature search reveals that it is useful for treatment of various ailments like asthma, dysentery[2].There is also literature suggesting its immunomodulatory[3],anxiolytic[4],analgesic[5], anti-inflammatory[6] and wound healing[7]activity. Information from traditional healers throws lights on its use for skin diseases. Antibiotics are the back bone of infectious disease management but due to mindless and indiscriminate use of it, antibiotic resistance is developing menacingly[8].To counter this burgeoning problem there is a pressing need for development of newer antimicrobial agents from natural sources. Hence the present study was undertaken to assess the antimicrobial property of Ethanolic extract of leaves of *S. indicus*.

MATERIALS AND METHODS

The whole plant was collected from the outskirt of Sambalpur in Odisha in winter season. It was identified and authenticated by botany faculty of GM College Sambalpur. The Leaves were separated, dried in a shade but well ventilated space and powdered, than it was extracted by Soxhlet extraction procedure in dept. of pharmacology VSSMC Burla. This Study was done in collaboration with dept. of Microbiology VSSMC Burla.

The micro organisms selected for study were bacterias (*S.aureus*, *B. subtilis*, *E.coli*,) and fungi (*C.albicans*,*A.niger*, *C.neoformans*). All standards strains were obtained from department of Microbiology,VSS MC, Burla.

Nutrient agar (NA) and SDA (Sabroud dextrose agar) were used to maintain bacterial and fungal culture respectively. They were inoculated in Muller Hinton broth and incubated at 37°C for 18hrs.

Antimicrobial activity was screened by disc diffusion method. Sterile filter paper discs containing 1.25, 2.5 and 5mg/ml concentration of Ethanolic extracts of *Sphaeranthus indicus* were placed on Muller Hinton agar plates inoculated with respective culture of micro organism and incubated for 24hrs at 37°C. Assessment of antimicrobial activity was done by measuring diameter of zone of inhibition [9]. Kanamycin and Nystatin were used as standard drug for antibacterial and antifungal activity. Dimethyl Sulfoxide (DMSO) was used as solubilising agent.

Minimum inhibitory concentration was calculated by broth tube dilution methods and kanamycin was used as standard drug. [10]

RESULTS AND DISCUSSION

The zone of inhibition shown by Ethanolic Extract of *Sphaeranthus indicus* at strength of 1.25, 2.5 and 5 mg/ml conc. were 9, 13, 18 mm for *B. subtilis*, 8, 11, 15 mm for *S. aureus*, 2, 5, 6 mm for *E. coli*, 7, 10, 12 mm, for *Candida*, 6, 8, 10 mm for *A. niger* respectively (Table-1). It didn't show any effect on *C. neoformans*. There was no growth of organism by broth tube dilution method at a minimum concentration of 0.5mg/ml, 2.5mg/ml and 5 mg/ml for *B. subtilis*, *S. aureus*, *Candida* and *A. niger* respectively.

MIC of SIEE is 0.5mg/ml, 2.5mg/ml, 5mg/ml, 5mg/ml for *B. subtilis*, *S. aureus*, *Candida* and *A. niger* respectively. (Table 3)

Zone of inhibition shown against micro organisms were directly proportional to the conc. of extract used and was comparable to Kanamycin.

Ethanolic extract of *Sphaeranthus indicus* exhibited significant antibacterial and antifungal activity against *B. subtilis* and *S. aureus* as well as *Candida* and *aspergillus* respectively. Effect against Gram negative bacteria like *E. coli* was less and fungus like *Cryptococcus* were resistant. It has already been established by various researchers that *Sphaeranthus indicus* act best against Gram positive organism than gram negative organism. [11][12]

Table-1 Zone of Inhibition (in mm)

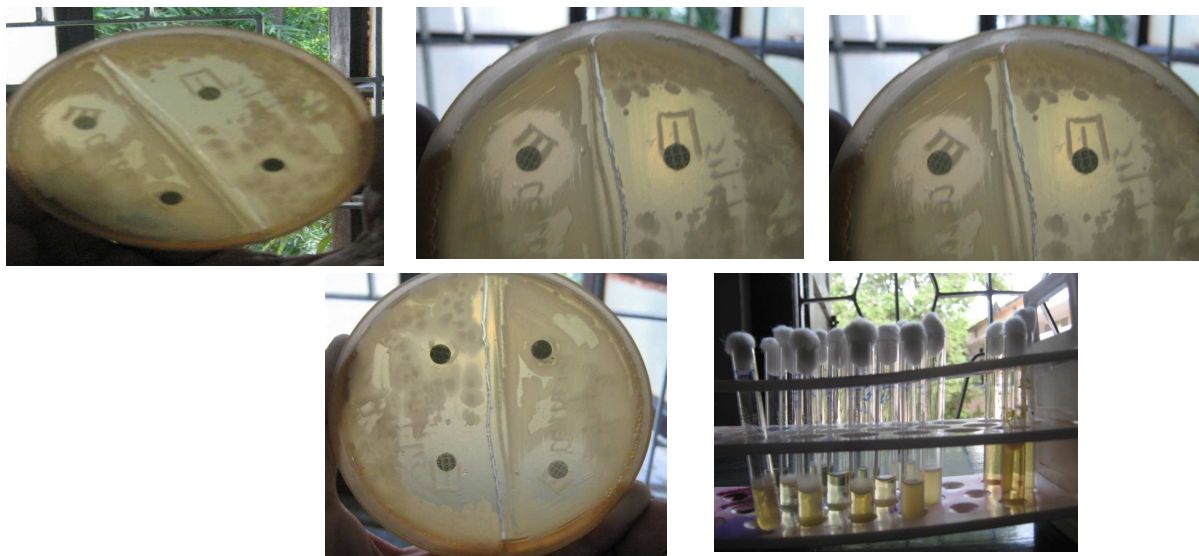
Bacteria	Kanamycin (30µg/disc)	EESI (mg/ml)		
		1.25	2.5	5
<i>B. subtilis</i>	14	9	13	18
<i>S. aureus</i>	12	8	11	15
<i>E. coli</i>	13	2	5	6
<i>Fungi</i>	Nystatin			
<i>Candida</i>		7	10	12
<i>A. niger</i>		6	8	9
<i>Cryptococcus</i>		-	-	-

Tab -2 Minimum Inhibitory Conc. (+, growth, -, no growth of organism)

Bacteria	5mg/ml	2.5mg/ml	0.5mg/ml	0.25mg/ml	0.05mg/ml
<i>B. Subtilis</i>	—	—	—	+	+
<i>S. aureus</i>	—	—	+	+	+
<i>C. albicans</i>	—	—	—	+	+
<i>A. niger</i>	—	+	+	+	+
<i>C. neoformans</i>	+	+	+	+	+

Table-3 Minimum Inhibitory Concentration

Micro organisms	MIC(mg/ml)
Bacteria	
<i>B.subtilis</i>	0.5
<i>S.aureus</i>	2.5
Fungi	
<i>Candida</i>	0.5
<i>A.niger</i>	5
<i>Cryptococus</i>	>5



CONCLUSION

SIEE posses good antibacterial activity against gram +ve organisms (*B.subtilis*,*S.aureus*) than gram –ve organism(*E.coli*) and good antifungal activity against *candida albicans* and *Aspergillus nigers* so further study on this may give us an effective antimicrobial agents.

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