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ANTIBACTERIAL ACTIVITY OF *LEUCAS ASPERA* SPRENG

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ABSTRACT

In this study, the whole plant of *Leucas aspera* was first defatted with hexane and discarded. Then the remaining marc was successively extracted with ethyl acetate and methanol and both the extract were concentrated under vacuum to yield corresponding ethyl acetate extract (EAE) and methanolic extract (ME). Extractive value was found to be 5.68% w/w and 9.73% w/w, respectively. Preliminary phytochemical screening reveals the presence of alkaloids, glycosides, terpenoids and sterols in both the extracts. Both EAE and ME were screened for its antibacterial activity against four gram positive and six gram negative bacteria at different concentrations of 50, 100, 200, 300 and 400 µg/disc by agar diffusion method. The activities of both the extracts were compared with standard antibiotics, by measuring the dimension of the zone of microbial growth (zone of inhibition) around the disc. Both the extracts exhibited a significant antibacterial activity against all the screened microorganisms.

Key words: *Leucas aspera,* Antibacterial activity.

INTRODUCTION

Leucas aspera S. (Labiate) has been reported to possess antipyretic and insecticidal properties[1]. Leaves of the juice is used as an external application for psoriasis, chronic skin eruption, and painful swelling[2,3]. An alcoholic extract of the leaves shows anti-bacterial activity against *Micrococcus pyogenes* and *Escherichia coli* [4].

EXPERIMENTAL

Plant material

The whole plant of *Leucas aspera S.* (Labiate) was collected from Siddha Medical College Campus, Chennai in March 2007. The sample was authenticated at our Pharmacognosy Department, where the voucher specimen (LA/01/92) has been preserved.

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Preparation of extract

Air dried and powdered, whole plant of *Leucas aspera* was defatted with hexane by maceration process. The defatted material was successively extracted with ethyl acetate and methanol. The extractive value was found to be 5.68% and 9.73% w/w, respectively. Preliminary phytochemical screening [5,6] reveals the presence of alkaloids, glycosides, terpenoids and steriods (Table 1).

Table 1. Preliminery phytochemical screening of extracts of *Leucas aspera*

Constituents	EAE	ME
Alkaloids	+++	+ +
Anthraquinones	-	-
Coumarins	-	-
Fatty acids	++	-
Steriods	+++	-
Terpenes	+++	++
Glycosides	++	-
Flavanoids	-	-
Carbohydrates	+	++
Tannins	++	-

- Absent, + Low concentration, ++ Medium concentration, +++ High concentration.

Activity

Ethyl acetate extract (EAE) and methanolic extract (ME) was studied for its anti-bacterial activity using different clinically important strains at different concentrations of 50, 100, 200, 300 and 400 µg/disc by agar diffusion method [7,8] against *Bacillus cereus Bacillus subtilis, Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Proteus vulgaris, Pseudomonas aeruginosa, and Salmonella typhi.* The activity of EAE and ME were compared with the standard antibiotics, mentioned in the Table 2. The plates were incubated at 37^{o}C for 48 hrs. The zone of inhibition was calculated by measuring the dimension of the zone of no microbial growth around the disc. For each value, averages of three determinations were recorded (Table 2).

Table 2. Antibectarial activity of extracts of Leucas aspera spreng[a]

Microorganisms		EAE					ME					Standards[b]
		IZ at mg/disc					IZ at mg/disc					
		50	100	200	300	400	50	100	200	300	400	
Bacillus cereus	G+	-	-	8	8.5	9.0	-	-	-	-	-	24(Am)
Bacillus subtilis	G+	8	10	12	13.0	13.5	-	-	-	-	-	33(Nv)
Staphylococcus aureus	G+	5	7	8	9.0	9.5	9	11	12	12.50	13.00	31(Nv)
Staphylococcus epidermidis	G+	17	19	21	22.0	24.0	10	12	14	15.00	16.00	36(Tr)
Escherichia coli	G-	10	12	13	14.0	16.0	20	22	24	25.00	27.00	28(Ch)
Klebsiella pneumoniae	G-	17	18	19	20.0	21.0	15	16	18	20.00	21.50	32(Nv)
Proteus mirabilis	G-	7	8	9	10.0	11.5	10	12	13	14.00	16.00	13(Cip)
Proteus vulgaris	G-	-	-	-	8.0	8.5	-	-	-	9.00	10.00	22 (Te)
Pseudomonas aeruginosa	G-	-	9	10	12.0	13.0	-	-	8	9.00	10.00	26(Ce)
Salmonella typhi	G-	-	10	11	12.0	13.0	-	12	13	15.00	17.00	23(Ce)

[a] values (mean of three replicates) are; IZ, inhibition zone (mm) ; -, no inhibition.

[b]Ce, Ceftriaxone (30 µg/disc); Ch, Chloramphenicol (30 µg/disc); Er, Erythromycin (15 µg/disc); Nv, Novobiocin (30 µg/disc); Tr, Trimethoprim (5 µg/disc); Te, Tetracycline (10 µg/disc); Ci, Ciprofloxacin (10 µg/disc); Am, Ampicillin (10 µg/disc).

RESULTS AND DISCUSSION

Both EAE and ME of *Leucas aspera* exhibited moderate to significant and concentration dependent antibacterial activity against all the tested microorganisms at the concentrations of 50, 100, 200, 300 and 400 μg/disc and comparable to the various antibiotics used for individual microorganism. This study also reveals that EAE was found to be highly active against *Staphylococcus epidermidis* and *Klebsiella pneumoniae,* where as ME was highly active against *Escherichia coli*. Our results indicate the potential usefulness of *Leucas aspera*, in the treatment of various bacterial infections. Further phytochemical studies are needed to identify the active principle responsible for the observed antibacterial activity.

The above results indicate that both the extracts possessed some antimicrobial activity against all the tested organisms. So it can be concluded that EAE was found to be much more active than ME. The results may support the uses of this plant in traditional medicines.

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