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ANTIMICROBIAL ACTIVITY OF BASELLA RUBRA LEAVES

K. SEN *[1], A. GOEL[1], S. RAWAL [1], N. MAHAJAN [1], S. BABOO [1], S. ALOK [2]

Department of Pharmaceutical Sciences, Lovely School of Pharmacy, Lovely Professional University[1], Phagwara (Punjab), India
Institute of Pharmacy, Bundelkhand University [2], Jhansi (U.P.), India

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***Correspondence for Author**

Kalyan Sen

Department of Pharmaceutical Sciences,

Lovely School of Pharmacy, Lovely Professional University,

Ludhiana-Jalandhar GT Road, Phagwara (Punjab), India

E-mail: kalyan_bpharm@rediffmail.com

ABSTRACT

The antimicrobial activities of aqueous, ethanolic and petroleum ether extracts of the leaves of *Basella rubra* were evaluated in the present study by measuring the inhibition zones using Cup Plate Diffusion method. The inhibition zones were significantly different (P<0.001) in each plant extract. The ethanolic extract showed maximum activity with zone of inhibition (14.3±1.82 mm) against *E.coli*, followed by aqueous extract (13.4±1.2 mm) and petroleum ether (5.6±0.62 mm) at a concentration of 50µg/ml. Ciprofloxacin was used as the standard drug having zones of inhibition(17±0.34 mm) against *E.coli* and 19±0.18 mm against *A. niger*. Microbial inhibition was in the order *E.coli* (12.57±0.99), *A. niger* (11.68±0.71), *V. cholera* (11.42±0.60), *S. aureus* (10.71±0.46), *S. typhi* (9.80±0.90) , respectively with all the extracts. The extracts were not able to inhibit the growth of *P. aeruginosa.*

INTRODUCTION:

Medicinal plants are used locally in the treatment of infections caused by fungi, bacteria, viruses and parasites[1,2]. Many people in Indian rural areas depend on the traditional medicine for the treatment of their ailments and since prehistoric times, various parts of plants has been used in the treatment and prevention of various diseases[3]. Different plants have been used as a source of inspiration in the development of novel drugs either in a pure compound form or their extract form and it provides unlimited opportunities to develop a variety of new drugs. Plant-derived medicines are widely used because they are relatively safer than the synthetic alternatives. Antibiotic resistance has become a global concern and is being threatened by emergence of multidrug resistance-pathogens[4, 5]. Therefore, increase in failure due to chemotherapeutics and antibiotic resistance leads to screening of several medicinal plants for their antimicrobial effect [6,7]. The present study is focused on *Basella rubra* which is a perennial herb and distributed throughout India. It is also known by the names Ceylon spinach, climbing spinach, gui, acelga trepadora, bretana, libato, vine spinach, and Malabar nightshade. It's rubifacient activity (paste of root) and aprient activity (juice) for pregnant women has been reported [1,2]. It is used as an astringent (cooked roots), laxative (cooked leaves and stems), diuretic and febrifuge [2,8,9]. However, relevant experimental work on the antimicrobial activity of the plant has not yet been explored. Therefore, the present study is designed to evaluate the antimicrobial activity of different extracts of the leaves of *Basella rubra*.

MATERIALS AND METHODS:

Plant Material:

The leaves of *Basella rubra* were collected from Asansol, West Bengal, India during September 2008 and were authenticated by Mr. M.S.Mondol (Additional Director), Botanical Survey of India, Howrah-711103.

Preparation of Plant Extracts:

Leaves were shade dried, powdered and then extracted with water, 95% ethanol and petroleum ether for 48 hours using soxhlet apparatus. The filterates were collected and evaporated to dryness under reduced pressure using a Rota evaporator. The dried extracts were stored in dry sterilized small containers at 4˚C until further use[10].

The extract was then kept in open air to get the crude extract. The different extracts of *Basella rubra* were freshly prepared and used at a concentration of 50µg/ml for evaluating their antimicrobial activity.

Microbial Strains & Culture media:

The organisms are *Staphylococcus aureus, Escherichia coli, Salmonella typhi, Pseudomonas aeruginosa, Aspergillus niger, and Vibrio cholerae.* Nutrient agar is used as culturing media.

Antimicrobial Screening Test:

The sensitivity of the test organisms to aqueous, ethanolic, petroleum ether & ciprofloxacin was determined by the Cup Plate Diffusion method[11]. The medium was prepared using nutrient agar and agar plates previously inoculated with 18 hours old broth culture or spores suspension in sterile distilled water of the test organisms, respectively. A sterile syringe was used to add 1ml/plate of broth

culture of test organisms to the medium holes of 15mm in diameter made in the seeded agar using sterile cork borer.
50µg/ml of each plant extract & 5µg/ml of Ciprofloxacin (control antibiotic) were introduced into each hole in the medium-containing petri dishes and allowed to stand on the bench for one hour for proper diffusin and thereafter incubated at 37˚C for 24-48 hrs. The resulting zones of inhibition were measured in millimeter.

Statistical Analysis:

All data are expressed as Mean SEM. The data were statistically analysed using One Way ANOVA with Tukey's Test. All statistical analysis has been carried out with the help of Sigmastat 2.03 software ans Instat software.

Table 1: Antimicrobial activity of *Basella rubra*

Microorganisms	Ciprofloxa-cin (5µg/ml)	Pet. Ether 50µg/ml)	Ethanol extract (50µg/ml)	Aqueous extract (50µg/ml)
Vibrio cholerae	16.2±0.21	8.1±1.12	11±0.95	10.3±0.15
Staphylococcus aureus	16±0.59	7.2±0.43	10.3±0.46	9.3±0.38
Escherichia coli	17±0.34	5.6±0.62	14.3±1.82	13.4±1.2
Salmonella typhi	7±1.19	9.2±1.25	12.4±0.66	10.6±0.51
Pseudomonas aeruginosa	-	-	-	-
Aspergillus niger	19±0.18	8.3±0.16	10.7±1.52	8.7±0.98

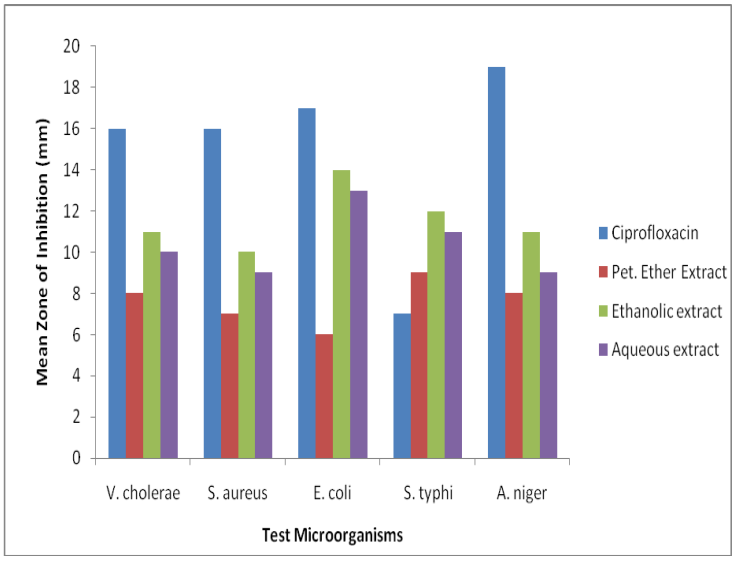

Fig.1. Mean Inhibition Zones of Plant Extracts on Test microorganisms

Table.2. Mean Inhibition Zones of Test Microorganisms

Test Microorganisms	Mean Inhibition Zones (mm)
Vibrio cholerae	11.42±0.60
Staphylococcus aureus	10.71±0.46
Escherichia coli	12.57±0.99
Salmonella typhi	9.80±0.90
Pseudomonas aeruginosa	0±0
Aspergillus niger	11.68±0.71

RESULTS AND DISCUSSION:

In the present study, the aqueous, ethanolic and petroleum ether extracts of the leaves of *Basella rubra* were found to exert the antimicrobial activity against all test organisms except *P. aeruginosa*. *E. coli* was best inhibited microorganism with a mean inhibition zone of (12.57±0.99) while *S. typhi* was the least inhibited with a mean inhibition zone of (9.80±0.90). All the three plant extracts showed no inhibitory effect on *P. aeruginosa* (table 2). The ethanolic extract showed maximum antimicrobial effect of the three extracts (table 1 and fig. 1).

Antimicrobial activity varied significantly ($p<0.001$) between different extracts of *Basella rubra*. This study confirms the potential antimicrobial activity of ethanolic extract of *Basella rubra.* This credit to maximum activity of ethanolic extract was supposed to ethanol being an organic solvent and will dissolve organic compounds better, hence liberate the active component required for antimicrobial activity[12]

CONCLUSION

Further studies are required to isolate the active compound from ethanolic extract of *Basella rubra,* responsible for this antimicrobial effect which might be a lead compound in anti-microbial arena.

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