STUDIES ON THE ANTIBACTERIAL ACTIVITY OF *RUELLIA PROSTRATA* (LINN)

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ABSTRACT

To investigate the antimicrobial activities of crude Pet ether, Ethylacetate, Methanol and aqueous extracts obtained from *Rullia prostrata (Linn).* All the extracts were prepared from fresh whole plant of *Rullia prostrata* by hot continuous percolation method in Soxhlet apparatus. All the extracts of *Ruellia Prostrata (Linn)* were tested for antibacterial efficacy against *Bacillus subtilis* NCIM 2063, *Bacillus pumilus* NCIM 2327, *Staphylococcus aureus* NCIM 2079, *Pseudomonas aeruginosa* NCIM 2036, *Escherichia coli* NCIM 2065, *Klebsiella Pneumonia* NCIM 2957. Antibacterial effect produced by Pet. ether, ethylacetate, methanol and aqueous extracts were comparable to that of Ciprofloxacin. The methanolic extract was found to be the most effective and showed antibacterial activity against all the organism tested. The Minimum Inhibition concentration of methanolic extract of *Ruellia prostrata* was found to the range 300 mcg/ml to 50mg/ml on tested all the test organisms. This study scientifically supports the usage of whole plant as a remedy for various superficial bacterial infections in traditional medicine.

KEYWORDS : *Ruellia prostrata*, antibacterial activity, hot continuous percolation, methanolic extract.

1.INTRODUCTION

Rulleia prostrata (linn), Family *Acanthaceae* is an herbaceous annual weed found in cultivated lands. The herbs is bell weed is a prostrate perennial herb, with stems often rooting at the nodes. Ovate green leaves, 2-10 cm long lower surface conspicuously paler and leaf stalk in 5-30mm long. Flowers(Kirtikar,1935) occur solitary in the leaf axils, each one subtended by oblanceolate to ovate bracts1.5-2.3cm long. Flowers are violet blue to occasionally nearly white, 2.4-3.2cm long. The petals slightly spreading. Capsules club shaped, 1.52cm long densely covered with fine hairs(Vaidyarathnam,1995). The whole plant used as anticancer against the epidermis of the nasopharynx region and slightly hypoglycemic. The present investigation is focused on the anti bacterial activity of *Ruellia prostrate*(Dadi Ma Ka Nuskha).

2.MATERIALS AND METHODS

Plant materials

Whole fresh plants of *Ruellia prostrata (linn)* were collected from Namanur, Sivagangai District of Tamilnadu, India. Taxanomic identification was made from Biological Survey of Medical Plants Unit Siddha, Government of India, Palayamkottai. The whole plants were dried under shade, segregated, pulverized by a mechanical grinder and passed through a 40 mesh sieve.

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Preparation of Extracts

The above powered materials (500g) were successively extracted with petroleum ether (35-45^0) ethyl acetate, methanol and water (100^{0}C) for 6 hrs by hot continuous percolation method in Soxhlet apparatus (Harborne,1984). The fractions were than distilled separately under reduced pressure of yield solid masses. The solid fractions were re-dissolved in Dimethyl Formamide (DMF) and their antimicrobial efficiency was noted.

Micro Organisms Used

The following bacterial strains were obtained from National Chemical Laboratory, Pune, India, and used to study the antibacterial activity of various extracts of *Ruellia prostrata (linn) (Umadevi,2003).*

Bacilllus subtilis NCIM 2063, *Bacillus Pumilus* NCIM 2327, *Stapylococcus aureus* NCIM 2079, *Pseudomonas aeruginosa* NCIM 2036, *Escherichia coli* NCIM 2065, *Klebsiella pneumonia* NCIM 2957.

Evaluation of Antibacterial Activity:

Filter paper disc diffusion method

The test solutions of all the extracts with a concentration of 5% w/v were prepared using sterile dimethyl formamide as solvent.Ciprofloxacin (100mcg/ml) was taken as the standards for antibacterial activity. Antimicrobial activity was tested by using the filter paper disc diffusion method(Saha,1995), employing 24 hours cultures of the above mentioned organisms. The test hours organism were seeded into sterile nutrient agar medium by uniformly mixing one ml

of inoculum with 20 ml sterile melted nutrient agar cooled to 48-50^{0}c in a sterile petridish. The medium was allowed to solidify.

The different extracts of test and standard drugs as well as blank were impregnated in whatmann filter paper disc and placed on solidified medium in the petridish and the petridishes were left undisturbed for two hours at room temperature. The petridishes were then incubated at 37^{0}C for 24 hours and the zone of inhibition was measured.

Minimum inhibitory concentration (MIC) determination

The methonolic extract exhibited maximum antibacterial activity when compared with other two extracts were further tested against all the organisms for evaluation of its antibacterial efficiency at different concentration (300 mcg/ml, 500 mcg/ml, 1mg/ml, 10mg/ml, 50mg/ml) by using the filter paper disc diffusion method. The zone of inhibition was calculated by measuring the minimum dimension of the zone of no bacterial growth around the filter paper disc.

3.RESULTS AND DISCUSSION

Pet. ether, ethyl acetate, methanol of *Ruellia prostrata* were tested for antimicrobial activities. Antibacterial activity of various solvent extract of *Ruellia prostrata* are shown in table 1. The methanolic extract exhibited maximum antibacterial when compared with other two extracts. The minimum inhibitory concentration was determined only by using methanolic extract of *Ruellia prostrata*. The zone of inhibition obtained with different concentration of the methanolic extract and the standard drug are shown in table 2.The minimum inhibitory concentration of the methanolic extract range from 100 mcg/ml to 50 mg/ml on tested bacteria and fungi. Significant activity was found with the extract at a concentration of 100mcg/ml as compared with standard.

The active principle of *Ruellia prostrata* are responsible for antibacterial activity. hence it can be concluded that the methanolic extract of *Ruellia prostrata* possess a significant antimicrobial activities. This also stand as a scientific support for the usage of this plant for treating wound healing and in traditional medicine.

Table 1: Antimicrobial activity of different extracts of *Ruellia Prostrata* (Linn)

Test Micro organisms	Zone of Inhibition (mm)				
	Pet.ether extract (300mg/ml)	Ethyl acetate extract (100mg/ml)	Methanol extract (100mg/ml)	Ciprofloxacin standard (100mcg/ml)	Blank DMF
Bacillus subtilis	6±1	9±0.5	15±1	19±1	0
Bacillus pumilus	5±0.5	10±1	16±1	21±0.5	0
Staphylococcus aureus	6±1	9±1	16±0.5	19±1	0
Pseudomonas aeruginosa	7±1	8±0.5	15±1	20±1	0
Escherichia coli	7±1	10±1	14±1	19±1	0
Klebsiella pneumoniae	6±0.5	10±0.5	17±0.5	20±1	0

* Zone are mean ± SD for n =3

Table 2 : Minimum inhibitory concentration value of Methanolic extract of *Ruellia Prostrata* (Linn) on the selected microorganisms

Test Micro organisms	Zone of Inhibition (mm)					
	100 mcg/ml	500 mcg/ml	1 mg/ml	10 mg/ml	50 mg/ml	Standard*
Bacillus subtilis	6	8	11	12	14	19
Bacillus pumilus	6	9	11	13	15	21
Staphylococcus aureus	5	8	10	12	14	19
Pseudomonas aeruginosa	-	7	8	10	14	20
Escherichia coli	-	7	9	10	12	19
Klebsiella pneumoniae	6	9	11	12	15	20
Aspergillus niger	6	-	7	-	10	17
Microsporum gypseum	5	-	7	10	12	18

* Standard for Antibacterial-ciprofloxacin

\- No zone of inhibition

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