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Research article

INVITRO ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF *ACMELLA PANICULATA* PLANT ESTRACTS

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ABSTRACT: The plant *Acmella Paniculata* commonly known as Akala Kara belonging to family of Asteraceae mainly found in tropical and subtropical regions around the world. Annual herb grown upto 30 cm tall with pungent taste. All parts of this plant are being used to traditional medicine to treat various diseases. Pet ether, chloroform, ethyl acetate and methanol extracts from whole plant of *Acmella Paniculata* Were investigated for their antioxidant and antimicrobial activities In case of antioxidant activity methanol extracts shows 96.66% of radical scavenging activity at 100µg/ ml. In case of antimicrobial activity chloroform extracts shows 30mm zone of inhibition against the *Enterobactum aurogenosa*. Methanol extracts shows 25 mm zone of inhibition.

Key words: *Acmella paniculata,* antioxidant, antimicrobial, Phytochemical.

INTRODUCTION

The most critical problem related with health and causes of morbidity and Mortality rates in society are infectious diseases. Since last decade, there has been an increasing evidence of bacterial and fungal infections due to pollution and this fact coupled with the resistance developed in microorganisms to allopathic agents, antibiotics with increasing toxicity in human beings and animals during prolonged treatment with several antimicrobial drugs but herbs always have been the principal form of the medicine in Indian and presently they are become popular throughout the world (Moleyar and Navasimham, 1992; Ashwal *et.al.*, 1996). Antibacterial properties of various plants parts like roots, steams, leaves, fruits, and seeds well documented for some of the medicinal plants for the past two decades (Syed Mansoor Ahamed *et.al.*, 2010). In recent year antibacterial properties of Indian medicinal plants have been increasingly reported (Bhiswal *et.al*, 2011 and Bharti *et al*, 2010). Higher plants have been shown to be a potential source for new antimicrobial agents.

The antimicrobial compounds from plants may inhibit bacteria through different mechanisms than the conventional antibiotics and therefore be of clinical value in the treatment of microbial infections. These facts motivated us to find out a new herbal moiety, which can acts as an antibacterial agent to treat bacterial infections. This paper reports the *invitro* antibacterial potentials and antioxidant of crud extracts obtained from *Acmella paniculata.*

MATERIALS AND METHODS

Collection and preparation of plant extract

The flowering whole plants were collected from Kakatiya University Warangal. Prof. Vastsavaya. S. Raju. Plant systematic laboratory, Kakatiya University, identify the plant voucher during the month of July-August. A specimen was deposited in S.R. College of Pharmacy, Anathasager, Hasanparthy, and Warangal. Fresh plant, after collection was shade dried, and extracted with pet ether, chloroform, ethyl acetate and methanol by soxhlet apparatus.

Evaluation of Antimicrobial activity

The extracts were reconstituted in Dimethyl sulphoxide (DMSO) as this does not demonstrate any antibacterial activity by itself. The antibacterial tests were carried out at against Grams positive and Gram negative bacteria. Nutrient broth was used for sub culturing of bacterial culture and sterilized molten nutrient agar medium was poured into the Petri plates to form a uniform depth of 5mmm and allow to solidify then 100µg/0.1ml of bacterial suspension was spread over the sure face of each nutrient agar plate using a sterile cotton swab by swab culture technique. 50µl of DMSO is used as negative control and standard antibiotic is tetracycline 50µl as a positive control.

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Bacterial growth inhibition was determined as the diameter of inhibition zone around the bores all the tests were performed in triplicates. The results clear zone around the bores were measured in millimeter and compared against tetracycline standard drug. Results are presented in Table-1.

Antifungal activity

Antifungal studies were carried by paper dise method for the petroleum ether, chloroform, ethyl acetate and methanol extracts of the whole plant of *Acmella Paniculata* against *Aspergillus niger, Aspergillus tevatus, Pencillium notatum* and *Colletrotricum coffeanum.* After preparing the medium agar was dissolved and distributed to boiling tubes in 20ml quantities and sterilized in autoclaved. The medium was inoculated with 0.5ml of suspension of 48 hrs culture test organism. The agar medium was poured in Petri dishes that are previously sterilized then thy were allowed to set at room temperature for 30min into uniform thickness the zone of inhibition in millimeter was recorded and compared with the standard drug griesofulvin of 50µg/ml. Concentration the test and standard solutions aseptically and then followed for 24 hrs incubation at 37^0c to note down the zone of inhibition.

Antioxidant activity

Inhibition of DPPH radical the free radical scavenging activity of pet ether, chloroform, ethyl acetate and methanol extracts of *Acmella paniculata* was measured by 1,1- diphenyl-2- picrylhydrazil (DPPH) using the method of Robeat A Turner (1998). 0.1 Mm solution of DPPH in methanol was prepared and 1ml of this solution was added to 30ml of various concentrations of four extracts and the reference compounds (10.25.50.75 and 100µg/ml). After 30 min, absorbance was measured at 517nm. Ascorbic acid was used as standard material. All the tests were performed in triplicate and the graph was plotted with the mean values the percentage of inhibition was calculated by comparing the absorbance values of the control and test sample.

RESULT AND DISCUSSION

Antimicrobial activity of whole plant extracts of *Acmella paniculata* was evaluated Invitro against twelve bacterial and four fungi species. Among the four extract used in the study. Chloroform extracts shows high zone of inhibition at 30mm against *Enterobactum aerogenusa.* Pet ether and methanol extracts shows moderate zone of inhibition against the *Enterobactum aerogenusa.* Methanol extracts shows low activity against *Lactobacillus* the results are present in table- 1.

Table 1: Anti-bacterial activity of *Acmella paniculata* plant extracts on different bacteria

S.No	Diameter of zone of inhibition (mm)					Tetracycline
	Crude extracts					
	Test organism	P.E	C.E	EA.E	M.E	
1	*E.coli*	24$	23	21	20	25
2	*Lactobacillus*	23	23	20	15#	25
3	*Proteus merabilis*	-	-	18	19	20
4	*Proteus vulgaris*	20	21	20	23	24
5	*Bacillus subtillis*	-	-	-	-	30
6	*Staphylococcus aureus*	20	20	23	20	28
7	*Staphylococcus pyrogenus*	20	23	20	21	25
8	*Salmonella paratyphi*	-	-	-	-	20
9	*Klebsiella pneumoniae*	-	-	19	17	20
10	*Enterobactum aerogenusa*	25$	30***	20	25$	35
11	*Pseudomonas*	23	25	20	21	32
12	*Bacillus magaterium*	25$	20	23	21	30

P.E= Pet ether extract, C.E = Chloroform extract, EA.E = Ethyl acetate extract,
M.E = Methanol extracts, - = shows no antibacterial % activity, *** = Shows good % activity, $ = Shows moderate % of activity, # = Shows less % activity

In case of antifungal activity methanol extracts shows high zone of inhibition against the *Aspergillus tevatus.* Ethyl acetate shows low activity against *Aspergillus tevatus* the results are present in table- 2. Among the test organisms, high inhibition zone were observed in *Aspergillus's tevatus* (Methanol extract 39 mm), *colliteoitricum coffeanum* (Pet ether extract 24mm).

Pet ether chloroform, ethyl acetate and methanol extracts were tested for antioxidant activity using the 1,1diphenyl-1-picrylhydrazil assay. In case of antioxidant activity methanol extracts shows high radical scavenging activity against 96.66 % at 100 µg/ml (Figure-1) where moderate activity was observed for chloroform and ethyl acetate at concentrations of 25µg/ml, 50µg/ml. As for the methanol extract exhibit the highest antioxidant activity (99.6%) at 75µg/ml, while ethyl acetate (10µg/ml), pet ether (25µg/ml), methanol (100µg/ml) showed good activity.

Table 2: Anti-fungal activity of *Acmella paniculata* plant extracts on different fungal organisms

S.No	Diameter of zone of inhibition (mm)					Griseofulvin
	Crude extracts					
	Test organism	P.E	C.E	EA.E	M.E	
1	*Aspergillus niger*	-	-	-	-	20.54
2	*Aspergillus tevatus*	-	-	10#	39	40.00 **
3	*Pencillium notatum*	-	-	20	20	20.56
4	*Colletotrichum coffeanum*	24	20	17	15	20

P.E = Pet ether extract C.E= Chloroform extract EA.E = Ethyl acetate extract
M.E = Methanol extract mm = millimeters, - = shows no antibacterial activity
** = Shows mode rate activity, # = Shows less activity

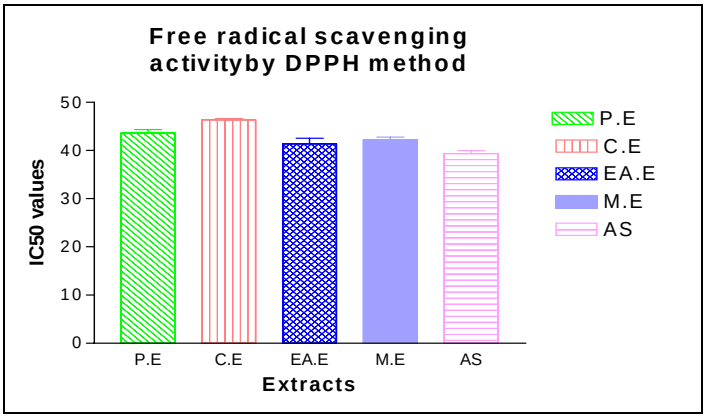

Figure 1: Free radical scavenging activity by using DPPH method

CONCLUSION

The present study reports the successful extracts of bioactive metabolites from *Acmella paniculata*. Phytochemical screening was carried out in *Acmella paniculata* whole plant extracts contains alkaloids, tannins, saponins and flavooides. The chloroform, pet ether and methanol extracts completely inhibited Antimicrobial activity. The results showed that all the tested extracts exhibited activity in assay. Particularly, methanol extract display very potent antioxidant properties with 99.6% radical scavenging activity. Antifungal activity of 1mg/ml concentration of *Acmella paniculata* whole plant extract tested against four different fungi. Among the test organisms *Aspergillus's niger* does not show activity. Pet ether and chloroform extracts dose not shows activity towards *Pencillium notatum* and *Aspergillus's tevatus*. As a result, the data support the use of a *Acmella paniculata* as a rich source of compounds with high therapeutic values for medicines and food supplement and as a health food.

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