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PHYTOCHEMICAL AND ANTIMICROBIAL ACTIVITY OF *ACMELLA PANICULATA* PLANT EXTRACTS

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ABSTRACT

Many medicinal plants were with a long history of use in folk medicine against a variety of diseases. Recently, many researchers have taken a great interest on medicinal plants for their phytochemical constituents and biological activities including antimicrobial activity. The pet ether, chloroform, ethyl acetate and methanol extracts of *Acmella paniculata* were tested for antimicrobial activity against 12 strains of microorganisms using agar dilution method. The present study was aimed to evaluate phytochemical analysis, and antimicrobial activity of *Acmella Paniculata* plant extracts. The extracts of different parts of plant used as antimicrobial activity. Flavonoids were detected in petroleum ether, ethyl acetate and methanol extracts. Alkaloids were detected in petroleum ether, chloroform, ethyl acetate, and methanol extracts and saponins in petroleum ether, chloroform, ethyl acetate, and methanol extracts. The results indicated that the plant exhibited antibacterial activity against more than one pathogen and chloroform, pet ether, and methanol extracts completely inhibited the growth of *Enterobactum aerogenusa.* The Chloroform extract was found to be active against *Enterobactum aerogenosa.*

Keywords: *Acmella Paniculata, Phytochemicals, Antimicrobial activity, Microorganisms.*

Number of Tables : 1 **Number of Figures: 1** **Number of References : 10**

INTRODUCTION

According to World Health Organization (WHO), traditional medicine as practices, knowledge and belief systems which use plants and animal based remedies and maintain well being (WHO, 2003). Medicinal plants are believed to be an important source of new chemical substances with potential therapeutic effects. Plants are being an effective source of both traditional and modern medicines are genuinely useful for primary healthcare. Plants have been rich source of medicine because they produce wide range array of bioactive molecules Agharkar, S.P. (1991).The World Health Organization (WHO) estimates that about 80% of the population living in the developing countries relies almost exclusively on traditional medicine for their primary health care needs. The people of India have a very long-standing tradition in the use of natural medicines and the local practices are still quite common in the treatment of diseases Srinivasan D *et.al*., (2001). However studies on plants are very limited. It is estimated that 2, 65,000 flowering species grace the earth, of these less than 1% have been studied exhaustively for their chemical composition and medicinal values Until early 20thcentury, plants are the only known antimicrobials Aboaba *et.al*., (2006). However, since the advert of antibiotics from, bacterial and fungal sources in 1950s, the use of plant derivatives antimicrobials is virtually nonexistent. It is reported that an average two to three antibiotics derived from microorganisms are launched every year Atlas M.R (1997). After a down turn in the discovery of new microbial agents from microorganisms, it was quickly realized that plants were an excellent source for new antibiotics. There are several reports on the antimicrobial activity of different herbal extracts in different regions of the world Nair *et.al*., (2005).

Acmella Paniculata is an annual hairy herb up to 32-60 cm tall, with numerous stems and marigold eye flowers. Stem is glandular and hairy with pungent taste. The whole plant is acrid in taste. The flowers are chewed to relieve toothache and the crushed plant is used in rheumatism. The leaves are also eaten raw or as a vegetable by many tribes of India. This species is famous as a folklore remedy for toothache and for throat and gum infections (Orapin Wongsawatkul *et.al.* 2008). There is need to isolate antimicrobial compounds from *Acmella Paniculata.* The present study was aimed to evaluate the antimicrobial activity and phytochemical analysis and to quantify the total alkaloid, flavonoid and saponin contents for different extracts of *Acmella Paniculata* whole parts. The findings from this work may add to the overall value of the medicinal potential of this plant.

MATERIALS AND METHODS

Plant material collection

Plant was selected for this study is based on its traditional medicinal use. Fresh whole plant parts of *Acmella Paniculata* were collected from Chintoor mandal of Khammam district, Andhra Pradesh, India.The plant voucher specimens identification was done with the help of

Prof.Vastsavaya.S.Raju Department of Botany Kakatiya University, Warangal and the same was deposited at Infectious Diseases & Metabolic Disorders Research Lab, Department of Zoology,Kakatiya University, Warangal.

Preparation of the plant extracts

The plant materials taken out of the respective collections were washed with water and chopped into small pieces then kept on news paper and shade dried at room temperature for two weeks.The dried air plant material is powdered by using grinder and stored in air tight sealed plastic container at room temperature and till the time of extraction. After placing the cotton plug the powdered plant material of 2kg each was placed in the soxhlet apparatus sufficient quantity of different type of solvents as the base of polarity was poured into the soxhlet till the powder is submerged. A cotton plug is placed over it before fixing the soxhlet over the mantle. When the soxhlet was drained colorless, the extraction process of that material was stopped. The solvent was then removed and using rotary flash evaporator a semi-solid mass is obtained for analytical study.

Microorganisms used

Test organisms were collected from the Department of Microbiology, Kakatiya University, Warangal.These include the standard cultures of gram-positive *Bacillus subtillis*, and *Staphylococcus aureus, Lacto bacillus, Streptococcus pyrogenus, Staphylococcus aureus* and *Enterobacter aerogenusa* and gram-negative *Klebsella Pneumonia, Escherichia coli, Proteus Vulgares and Salmonella paratyphi* species.

Antimicrobial activity

The disc diffusion assay was used to screen the herbal extracts for antibiotic activity Prescott *et al*., (1990). Antibacterial activity of test compounds were detected by observing the growth response of various micro-organism to those test extracts which are placed in contact with them, using by Agar diffusion method. In this method the petridishes were filled with inoculated liquefied agar medium to uniform thickness the pits or bores were made using core borer which filled with test drug and a standard drug and inoculated at 37 ± 1^0C hrs. The drug will diffuse into the agar medium are prevents the growth of microbes and produce a clear zone of inhibition.

RESULTS AND DISCUSSION

Phytochemical analysis

Phytochemical assessment and antimicrobial activity of *Acmella Paniculata* were conducted using petroleum ether, chloroform, ethyl acetate, and methanol. The pet ether extracts contains alkaloids, flavonoids, tannins and saponins. The chloroform extracts contains alkaloids and saponins. The ethyl acetate extracts contains flavonoids, alkaloids, and saponins. Methanol extract contains alkaloids, flavonoids, tannins and saponins (Table 1)

Table 1: *Phytochemical screening of Acmella paniculata*

S.No	Tests	Extracts			
		P.E	C.E	EA.E	M.E
1	Phenolic	-	-	-	-
2	Flavonoids	+	-	+	+
3	Alkaloids	+	+	+	+
4	Tannins	+	-	-	+
5	Amino acids	-	-	-	-
6	Saponins	+	+	+	+
8	Carbohydrates	-	-	-	-
9	Proteins	-	-	-	-
10	Anthra-cyanosides	-	-	-	-

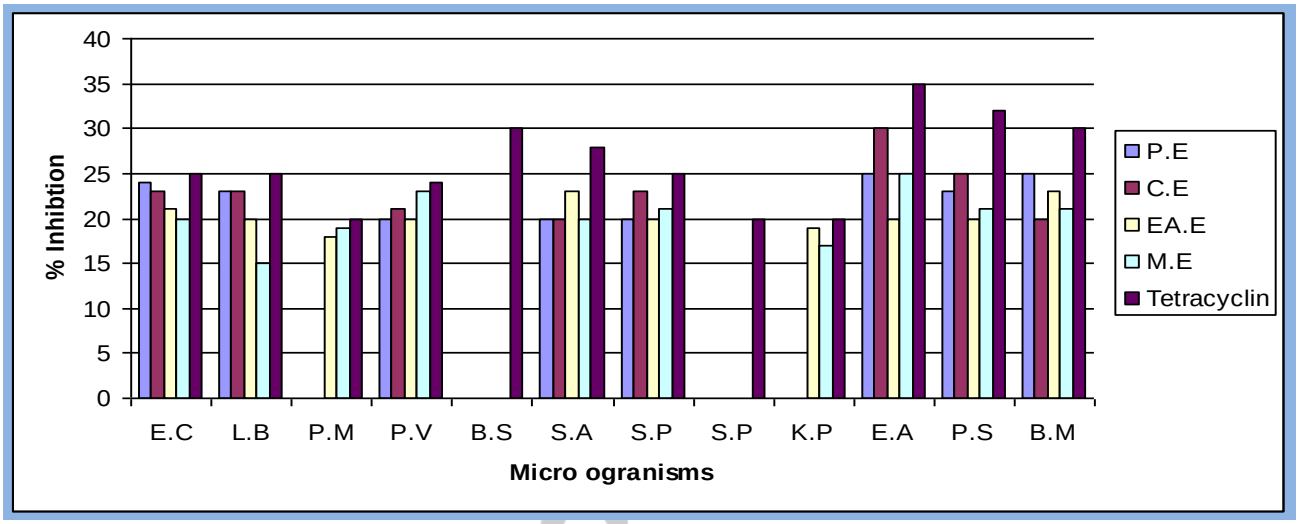
(a) **P.E = Pet ether extract , (b) C.E = Chloroform extract , (c) EA.E = Ethyl acetate extract (d) M.E= Methanol extracts , - shows absence of constituents & + shows presence of constituents**

Antibacterial activity

The pet ether, chloroform, ethyl acetate and methanol extracts of *Acmella paniculata* were tested for antimicrobial activity against 12 strains of microorganisms using agar dilution method. The results showed that chloroform, pet ether, and methanol extracts completely inhibited the growth of *Enterobactum aerogenusa* with 30mm. The chloroform extract also completely exhibited anti growth activity against *Bacillus magaterium*, *Pseudomonas*. Pet ether and chloroform extracts does not show activity towards *Proteus merabitus*. Pet ether, chloroform extracts does not show activity towards *Klebsella pneumonia*e. All extracts dos not show activity against *Bacillus subtiles, Salmonella paratyphi* (Fig.1).

According to Berghe D.A and Vlietinck (1991) *Acmella Paniculata* used as a fish poison, in dysentery and against scurvy. Methanolic extract of herb were found to affect blood pressure of dog, cat and isolated ileum of guinea pigs. The herb exhibits general immune modulator properties when used internally, boosting production of leukocytes and antiviral interferon, as well as promoting phagocytes. The present result supported the ethnobotanical role of the plant in controlling skin diseases as reported by Agharkar, S.P. (1991) and Verma *et al*.,(1993). Purification and characterisation of active principles followed by a detailed study are necessary prior to its medicinal application.

Fig 1: *Antibacterial activity zone of inhibition*



P.E = Pet ether extract , (b) C.E = Chloroform extract , (c) EA.E = Ethyl acetate extract (d) M.E= Methanol extracts

CONCLUSION

The present study reports the successful extracts of bioactive metabolites from *Acmella paniculata*. In this studies these extracts possessed marked better contrle of these pathogens used.Thus it is concluded that the whole parts of *Acmella paniculata* is a potential source for antibacterial activity and provide some idea about phytochemical evaluation on *Acmella paniculata*. Phyto chemical screening was carried out in *Acmella paniculata*, whole plant extracts contains alkaloids, tannins, saponins and flavonoides. The chloroform, pet ether and methanol extracts completely inhibited Antimicrobial activity. Further studies should be under taken to elucidate the exact mechanism of action by which extracts exert their antibacterial effect and to determine the degree of toxicity of these extracts.

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