https://africanjournalofbiomedicalresearch.com/index.php/AJBR
Afr. J. Biomed. Res. Vol. 27(September 2024); 482-485

Research Article

Phytochemical Profiling and Anti-Bacterial Activity of Erycibe Paniculata ROXB.

Malipeddi Supriya[1], Thupurani Murali Krishna[2*]

[1,2]Department of Biotechnology, Chaitanya (Deemed to be University), Himayath nagar, Moinabad, Ranga Reddy, Hyderabad, Telangana, India*

Abstract:
Erycibe paniculata Roxb. Is an ethno medicinal climber belongs to family Convolvulaceae commonly called Unamkodi in Tamil and Putta palatige in Telugu. It is found in India, Himalayas and Andaman Islands, has many ethno medicinal properties. Survey of literature on pharmacognosy and phytochemistry has elucidated that there are several ethnomedicinal plants which have been systematically studied for their pharmacognostic and phytochemical profiles. Crude drugs of a large number of ethnomedicinal plants are not investigated scientifically. Keeping this scenario in mind, the present study is planned to investigate phytochemical profile and also antibacterial activity of leaf extracts of *Erycibe paniculata Roxb*. Solvent extraction is carried by soxhlet method using different solvents based on their polarity and their yield percentages are calculated. Acetone and n-hexane showed high yield percentages compared to other solvents. The phytochemical tests were performed using standard methods that were reported and antibacterial activity is done by agar well diffusion method. For antibacterial activity we used two gram positive methicillin resistant *Staphylococcus aureus* and *Bacillus subtilis* and two gram negative bacteria- *Pseudomonas aeruginosa* and *Escherichia coli.* Ethyl acetate has shown maximum zone of inhibition towards all the bacteria tested and least is shown by toluene.

KEYWORDS: Ethnomedicine, crude drug, pharmacognosy, phytochemcial screening, anti-bacterial activity, *Erycibe paniculata Roxb.*

***Author for correspondence:** Email:- tmkrishna@chaitanya.edu.in*

Received: 30/05/2024 Revised – 25/07/2024 Accepted: 28/08/2024

DOI: https://doi.org/10.53555/AJBR.v27i3.2314

INTRODUCTION

In recent years, reliability and demand on natural resources specially of herbal origin had increased many folds. The exploration on plant based medicines is increased now-a-days in modern health care system as most of the synthetic drugs exhibit harmful effects and are expensive compared to that from natural drugs. Therefore, current scenario of research is shifted towards developing ethno medicine to provide eco-friendly nature, harmless and cost affordable to the human beings (Chin et al. 2006). Day by day a general trend among the people is evident in substituting many of the allopathic medicines with the herbal ones for a long term health benefit. Hence there is a steady increase in the percentage of using the botanicals of therapeutic importance among the people all over the world. (Ekor M et.al 2014).

Erycibe paniculata Roxb. Is a climbing shrub belongs to family Convolvulaceae, commonly found in the forest of Odisha (India), Sri Lanka and the surrounding region and called as Unamkodi in Tamil, Putta palatige in Telugu and also known as Chain Katho, Kari and Khoil Khamar in odiya (Saxena HO et.al, Brahmam M et.al 1995).Various parts of *E. paniculata* were reported for their medicinal properties for treating several health problems like cholera, fever, diarrhea, constipation, etc. Bark of this plant is used for treatment of cholera; (Khare CP et.al 2007) roots are used to treat post-delivery complications; young leaf extracts used to treat night blindness (Sharma RK et.al 2017). Many of these ethno medicinal properties might be due to its antioxidant properties which have not been reported yet. Therefore, the present study is planned to investigate phytochemistry and anti-bacterial

activity of leaf of *E. paniculata Roxb*. through established methods.

MATERIALS AND METHODS

Collection of plant material

Fresh leaves of *E. paniculata Roxb*. are collected from Guntur, Andhra Pradesh. The species is identified and authenticated by Prof. Mustafa Taxonomist, plant systemic Laboratory, Department of Botany, Kakatiya University, Warangal.

Extraction of plant material

Leaves of this plant are washed with water, shade dried and is homogenized into coarse powder. The leaf powder of 200gms is weighed and packed in filter paper and placed in Soxhlet. The solvent Extraction is carried out with five different solvents like n-hexane, toluene, chloroform, ethyl acetate and acetone respectively, based on their polarity and air dried for evaporation of solvents.

Calculation of yield percentages of solvent treated crude extracts

The crude extracts are collected after extraction, weighed using electronic balance (Pine labs) and their yield percentages are calculated using standard formula. High yield percentage is found with acetone crude extract.

PRELIMINARY PHYTOCHEMICAL SCREENING

Phytochemical screening is done to reveal the phytoconstituents of the plant extracts which is helpful in searching for bioactive agents that can be used in synthesising useful drugs. The screening tests were carried out with n-hexane, toluene, chloroform, ethyl acetate and acetone crude extracts of the leaves of *E. paniculata Roxb.* through the standard procedure to categorize the phytochemical constituents or secondary metabolites (Harbone- 1973 and Trease and Evans- 1989).

The crude leaf extracts were separately dissolved using 5% DMSO and used for determination of different phytochemicals present in leaf extracts. The tests performed for screening of carbohydrates are Molisch, Benedicts, Fehling's, Bial's, Barfoeds. Cobalt chloride, selwinoffs and Tollens Phluroglucinol assays to screen Hexose sugars. To screen proteins we have performed Biuret, Xanthoproteic, Ninhydrin assays. Finally tests performed to detect secondary metabolites are used to screen phenols(FeCl3), Tannins(NaCl), Glycosides(Legals), Alkaloids(Wagners and Mayers assays), Terpenoids(Salkowski), Saponins(froath and foam assays) and phlobatannins(1% aqu.HCl).

ANTI-BACTERIAL ACTIVITY

BACTERIAL STRAINS

To evaluate anti-bacterial activity of *E.paniculata Roxb.* Leaf extracts, four strains of microorganisms are selected namely two Gram positive Strains of Methicillin- resistant *Staphylococcus aureus* (MRSA, NCTC 13616), *Bacillus subtilis* (ATCC 6633) and two Gram negative strains like *Pseudomonas aeruginosa* (ATCC 27853), *Escherichia coli* (ATCC 8739) are from American Type Culture Collection, USA. All bacterial strains are subcultured in nutrient agar medium and is used for testing anti-bacterial resistance.

ANTI-BACTERIAL ACTIVITY

The in vitro antimicrobial studies were carried out by agar well diffusion method against test organisms (Chung et al. 1990; Azoro 2002). Into the sterile petri plates nutrient agar medium is added and the media is allowed to get solidified. Onto the petri plates, the bacterial cultures are inoculated by spreading method. Using a sterile borer 6mm wells are punched in the medium and then the plant crude extracts (100mg/ml) were directly applied to the well. Standard was maintained with antibiotic Gentamycin sulphate. Now the petri plates were incubated overnight at 37°C to allow bacterial growth and the diameter of zones of inhibition are measured (mm) to check the activity of extracts against all the bacteria tested.

RESULTS

CALCULATION OF YIELD PERCENTAGES OF COLLECTED CRUDE EXTRACTS

The crude solvent extracts of plant material obtained are weighed in order to know how much yield percentage we get for each different solvent treated crude extracts. Table 1.1 represents results of yield percentages for various solvents treated leaf extracts of *E.paniculata Roxb.* The yield percentage is considerably high for both acetone and n-hexane, is least for ethyl acetate. The yield percentage is calculated by the formula given below.

$$yield\% = \frac{weight\ of\ dry\ extract}{weight\ of\ dry\ plant\ powder} \text{x } 100$$

Table 1.1 yield percentages of collected crude extracts

Solvents	Wt. of dry plant powder (gm)	Wt. of dry extract (gm)	Yield%
n-Hexane	200	2.06	1.03%
toluene	200	1.7	0.85%
chloroform	200	1.5	0.75%
ethyl acetate	200	1.3	0.65%
acetone	200	2.1	1.05%

PHYTOCHEMICAL SCREENING

According to the investigation, the results obtained for tested crude extracts contains different types of secondary metabolites in *E.paniculata Roxb* leaf. Table 1.2 represents the phytochemical screening of leaf extracts of *E.paniculata Roxb.* Carbohydrates, alkaloids and terpenoids shows positive for all the solvent treated extracts. Proteins shows positive for n-hexane, toluene and chloroform crude extracts whereas tannins and glycosides are positive to chloroform, ethyl acetate and acetone crude extracts.

Table 1.2 Phytochemical analysis of *E .paniculata Roxb.* leaf extracts.

Test	n-hexane	Toluene	Chloroform	Ethyl acetate	Acetone
CARBOHYDRATES	+	+	+	+	+
PROTEINS	+	+	+	-	+
PHENOLS	+	+	+	+	+
TANNINS	-	-	+	+	+
GLYCOSIDES	-	-	+	+	+
ALKALOIDS	+	+	+	+	+
TERPENOIDS	+	+	+	+	+
SAPONINS	-	-	-	-	-

(positive +, negative -)

ANTI-BACTERIAL ACTIVITY

In the present study, leaf extracts of *E.paniculata* are determined for their efficacy towards antibacterial resistance against four bacteria namely, two Gram-positive bacteria *Bacillus subtilis, Staphylococcus aureus* and two Gram-negative bacteria *Escherichia coli, Pseudomonas aeruginosa*. The activity is determined by measuring the zones of inhibition (mm) and it is dependent upon concentration. Ethyl acetate has shown maximum zone of inhibition towards all the bacteria tested (16.3mm, 12.1mm, 18.5mm and 11mm). The least zones of inhibition are shown by toluene extract against all the bacteria tested (3.5mm, 3mm, 7.2mm and 3.9mm). Chloroform and acetone solvent crude extracts had also shown considerably effective anti-bacterial activity. Gentamycin sulphate is used as a standard antibiotic (10 µg/ml concentration). Table.1.3 shows the results of anti-bacterial activity for various solvent treated crude extracts in *E.paniculata Roxb*. leaf.

Table 1.3 Antibacterial activity of leaves of *E.paniculata Roxb* against *Bacillus subtilis, Staphylococcus aureus, and Escherichia coli, Pseudomonas aeruginosa.*

crude extract (100mg/ml)	***Bacillus subtilis***	***Staphylococcus aureus***	***E. coli***	***Pseudomonas aeruginosa***
n-Hexane	-	-	-	-
toluene	3.5	3	7.2	3.9
chloroform	7.2	7.9	12.6	10.3
ethyl acetate	16.3	12.1	18.5	11
acetone	11.8	8.5	13.3	9.8
Gentamycin sulphate (10 µg/ml)	23.6	21.8	24.6	22.5

(Zone of inhibition is measured in mm**)**

DISCUSSION

The exploration on plant based medicines is increased now-a-days in modern health care system as most of the synthetic drugs shows harmful effects and are expensive compared to that from natural drugs. Therefore, current scenario of research is shifted towards developing ethno medicines that provide eco-friendly nature, harmless and cost affordable drugs to the human beings. According to my study on phytochemistry and anti-bacterial activity of *Ercybie paniculata Roxb.* leaf extracts, it revealed that there are many phytochemical constituents present like phenols, alkaloids, terpenoids, tannins, glycosides, carbohydrates and proteins. The leaf extracts of this plant showed effective inhibitory zones against all the tested bacteria. Thus, the significant activity against two gram positive bacteria- *Bacillus subtilis, Staphylococcus aureus,* and gram negative bacteria *Escherichia coli, Pseudomonas aeruginosa* might be due to presence of some phytochemical compounds or secondary metabolites. Survey of literature on phytochemistry and pharmacognosy of this plant concluded that there are many ethnomedicinal plants which are studied to find pharmacognostic and phytochemical profiles (Swarnendu Mondal and Chowdhury Habibur Rahaman). According to investigation it also highlights the scientific research towards traditional use of this ethnomedicinal plant for various healing purposes and also there is a very little or negligible research done on this plant. The review of literature on *E. Paniculata* leaf crude extracts have found no reports on their phytochemical analysis but found research on their stem extracts. It is also stated that *E. paniculata* needs further investigation in the line of phytochemistry and pharmacology (Patel et al). Therefore, the present study might become the leading report. Hence further study is planned to explore pharmacologically active compounds from leaf extracts of *E.paniculata Roxb.*

CONCLUSION

Erycibe paniculata Roxb. leaf extracts are having greater potential as antibacterial compounds against various bacteria. It also has a large number of secondary metabolites showing antibacterial activities which provide natural sources for bioactive molecules to control human pathogens that cause diseases. Based on the results obtained, we conclude that this plant exhibited phytoconstituents and antimicrobial property for different solvent extracts. Further work on isolation, structural characterization of active compounds and their pharmacological study using latest techniques is planned to explore. Therefore, it is suggested that further studies should

be carried out to isolate the active compounds responsible for many activities of these plants.

CONFLICT OF INTRESET

Authors declare no conflict of interest.

ACKNOWLEDGEMENT

Authors thank to the Management of Chaitanya (Deemed to be University) for providing all the chemicals and instruments required for finishing this work.

REFERENCES

Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. Frontiers in Pharmacognosy. 2014; 4:177.

Saxena HO, Brahmam M. The Flora of Orissa. Vol. 2. Bhubaneswar: Orissa Forest Development co. ltd; 1995. pp. 1163–64.

Khare C. Indian Medicinal plants- an illustrated dictionary, Springer, 2007, 244.

Sharma RK. Study of ethnomedicinal of plants used for various ailments of Bagicha Jashpur (C.G) India Europ J Biotechnol Biosci. 2017;5:41–3.

Saha S, Rahaman CH. Pharmacognostic and anatomical studies of Antigonon leptopus Hook. and Arn.: A promising medicinal climber. International Journal of Research in Ayurveda and Pharmacy. 2013; 4(2):186- 191.

Ghosh P, Rahaman CH. Pharmacognostic studies and phytochemical screening of aerial and root parts of Cyanotis tuberosa (Roxb.) Schult. & Schult. f. – an ethnomedicinal herb. World Journal of Pharmaceutical Research. 2016; 5(2):1580-1601.

Ray AS, Rahaman CH. Pharmacognostic standardization and phytochemical investigation of Cajanus scarabeoides (L.)Thouars. Research Journal of Pharmacognosy and Phytochemistry. 2018; 10(1):120-131.

Studies in pharmacognostic characters of the climber *Erycibe paniculata* Roxb. of Convolvulaceae. (Swarnendu Mondal and Chowdhury Habibur Rahaman).JMPS 2020; 8(2): 112-125.

Patel MR, Patel AG, Gamit RV, Nariya MK, Acharya R. In vitro antioxidant activity of Erycibe paniculata Roxb. – An ethnomedicinal plant. AYU 2019;40:256-61.