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Evaluation of extracts of the root of *Seidenfia rheedii* (Sw.) Szlach. for antibacterial activity

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ABSTRACT

In the present investigation, aqueous, ethanol and petroleum ether, ethanol (1:1) root extracts of *Seidenfia rheedii* were tested against 12 different human pathogenic bacteria for antibacterial activity. It was found that ethanolic extracts inhibited the growth of all the bacterial strains tested whereas moderate antibacterial activity was associated with petroleum ether, ethanol (1:1) root extracts. The aqueous extract did not show antibacterial activity. Thus the present investigation reveals that the selected plant extracts have potential of bactericidal effect on test bacteria.

Key words :*Seidenfia rheedii*, Antibacterial activity, Bactericidal, root extracts

INTRODUCTION

Infectious diseases represent a critical problem in developing as well as developed countries[14,13]. During the past several years, there has been several synthetic antibiotics are used in the treatment of infectious diseases. However, in recent years a number of studies progressing seriously to identify the alternative antibiotics. This fact coupled with the resistance to antibiotics and with their toxicity[3.] In addition antibiotics are also known to disturb the natural intestinal microflora thus depriving the benefits of these microbes to human body[13.] Medicinal plants exhibit antibacterial activity due to the presence of biologically active compounds and these plants play an important role in conventional as well as western medicine[9,1.] They are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials[4,6.] In view of the rich values of medicinal plants it is expected that screening and scientific evaluation of plant extracts for their antibacterial substance may more beneficial for the human beings. One of the plants known for having many medicinal uses in traditional system of medicine is *seidenfia rheedii* (Sw.) szlach. (orchidaceae). It is Herbacious orchid found in kolli hills of Eastern Ghats. In Tamil it is called 'Kairaykai Ellai' Formely it is known as *Malaxix*

rheedii. The roots of the plant have been claimed to possess medicinal properties in traditional system of medicine. The medicinal value of the present study plant was also reported in "charaka samhita" a classic ancient Indian medicinal treatise in Sanskrit. So in the present study an attempt has been made to screen the antibacterial potential of root extracts (aqueous and organic) of *Seidenfia rheedii against human pathogenic bacteria.*

MATERIALS AND METHODS

Plant collection

The plants were collected during their growing season (August-November) from Kolli hills, Eastern Ghats of Tamil Nadu and their identity was confirmed through voucher specimens available in the Rapinat Herbarium, St. Joseph's College, Tiruchirappalli.

Preparation of Extracts

Twenty gram of powdered plant roots were soaked separately in 100 ml of water ethanol and petroleum ether, ethanol (1:1) for 72 hours. Each mixture was stirred every 24 hours using a sterile glass rod. Then each extract was passed through Whatman No.1 filter paper. The extracts thus obtained were used for the *in vitro* study.

Culture media and microorganisms

Nutrient Broth and Nutrient Agar medium manufactured by Himedia Laboratories, Mumbai, India were used for the cultivation of Bacteria. The test bacteria namely *Escherichia coli, Proteus vulgaris, Enterobacter faecalis, Salmonella typhi, Serratia marcescens, Staphylococcus aureus, E. coli* mutant strains viz. KL96, 3006 KL96, C_2H_57, HFrc, Pi/345 tr Kany and $Y_{10}90$.

Inoculum preparation

Culture of bacteria were inoculated into Nutrient Broth (liquid medium) and incubated at 37° C for 4 hr and suspension was checked to provide approximately 10^5 CFU/ml.

Determination of zone of inhibition

The antibacterial activity of the root extracts were tested *in vitro* using disc diffusion assay[11.] A diluted (0.2 ml) bacterial culture of respective strains poured in sterile 9 cm petriplates containing 15 ml of Nutrient Agar medium and spread over agar plates using sterile glass L-rod. 0.2 ml of the each extract was applied per filter paper disc (Whatman No.1, 6 mm diameter) and was allowed to dry before being placed on to the top layer of the agar plates. The plates were incubated at 37° C for 24 hours. The experiments were carried out in triplicate and the average diameter of zone of inhibitions were recorded. Results were expressed as mean ± standard deviation.

Results and Discussion

Results of antibacterial screening of root extracts of *Seidenfia rheedii* were measured in terms of zone of inhibition (Table 1). It is revealed that ethanol extracts exhibited greater antibacterial activity whereas petroleum ether, ethanol (1:1) having less antibacterial activity. The ethanolic root extract of the *Seidenfia rheedii* showed great inhibition against *E. coli, Proteus vulgaris* and less antibacterial activity associated with *Enterobacter faecalis, Salmonella typhi,* L;96, 3006 KL96, C_2H_57, HFrc, $Y_{10}90$ and also poor

inhibition was observed against *Staphylococcus aureus* and *Serratia marcescens* and Pi/345 tr Kany on the other side root extracted with petroleum ether, ethanol (1:1) showed less antibacterial activity against *E. coli*, *Proteus vulgaris, Enterobacter faecalis* and poor activity was associated with *Salmonella typhi*, KL96, 3006 KL96, C_2H_57, HFrc, $Y_{10}90$, Pi/345 tr Kany, *Staphylococcus aureus* and *Serratia marcescens.* The aqueous extract did not show antibacterial activity on test organisms. The activity of *Seidenfia rheedii* root extract varied with the solvent used for the extraction when we interpret from different solvent extraction and its effect on the test organisms is that different chemical constituents or active compounds are derived through different boiling points and varied solvents.

The outcome of the present study observation is the active principle of plant species which exhibit antibacterial activity is highly extracted in ethanolic solvent. They may be either aromatic[8.] or some other secondary metabolites. Many compounds such as alkaloids, tannins, saponin, steroidal, aglycon, cardiac and cynagenetic glycosides have been associated with the antibacterial activities of several herbs[7.]. The studies made by Okeke *et al*[11]using aqueous and organic extracts of *Landolphia owerrience* for antibacterial activity is in accordance with the present study. Similar conclusions were drawn by Essawi and Srour[2] and John Britto[5.] This is only a preliminary evaluation of antibacterial activity of *Seidenfia rheedii*. Although the tested plant extracts did possess antibacterial properties further phytochemical studies will be necessary to isolate the compounds responsible for antibacterial activity.

Table 1
Antibacterial activity of *Seidenfia rheedii* root extracts

S. No.	Test Bacteria	Extraction	Inhibition zones (cm)
1.	*Escherichia coli*	Aqueous	–
		Ethanol	0.3 ± 0.00
		Pet. ether, ethanol (1:1)	0.2 ± 0.04
2.	*Proteus vulgaris*	Aqueous	–
		Ethanol	0.3 ± 0.00
		Pet. ether, ethanol (1:1)	0.2 ± 0.04
3.	*Enterobacter faecalis*	Aqueous	–
		Ethanol	0.2 ± 0.00
		Pet. ether, ethanol (1:1)	0.2 ± 0.04
4.	*Salmonella typhi*	Aqueous	–
		Ethanol	0.2 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.00
5.	*Serratia marcescens*	Aqueous	–
		Ethanol	0.1 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.04

6.	*Staphylococcus aureus*	Aqueous	–
		Ethanol	0.1 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.04
7.	KL 96	Aqueous	–
		Ethanol	0.2 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.00
8.	3006 KL96	Aqueous	–
		Ethanol	0.2 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.04
9.	$C_2H_5$7	Aqueous	–
		Ethanol	0.2 ± 0.04
		Pet. ether, ethanol (1:1)	0.1 ± 0.04
10.	HFrc	Aqueous	–
		Ethanol	0.2 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.04
11.	Pi/345 tr Kany	Aqueous	–
		Ethanol	0.1 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.04
12.	Y_{10}90	Aqueous	–
		Ethanol	0.1 ± 0.00
		Pet. ether, ethanol (1:1)	0.1 ± 0.04

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