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ORIGINAL RESEARCH ARTICLE

Antibacterial Potential of Crude Leaf Extract of *Clerodendrum philippinum Schauer*

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ABSTRACT

The genus *Clerodendrum* is very widely distributed throughout the world and has more than five hundred species. Many species of this genus have been described in various indigenous systems of medicines for the treatment of various life-threatening diseases. Roots and leaf extracts of *Clerodendrum philippinum* Schauer have been used for the treatment of rheumatism, asthma and other inflammatory diseases. The present study is intended to show the antibacterial activity of crude ethanolic leaf extract of *C.philippinum* Schauer against *E.coli, S.aureus, Bacillus* and *Klebsiella* and minimum inhibitory concentration of *C. philippinum* Schauer. It provides the scientific data base line and also gives particular importance for the local practioners as well as for the local people using these herbs for a variety of disorders.

Keywords: C*lerodendrum philippinum Schauer*, Antibacterial activity, minimum inhibitory concentration, ethanolic extract

INTRODUCTION

The WHO estimated that about 80% of populations in developing countries rely on traditional medicine for their primary health care needs [1]. The use of plants for prevention and treatment of various health ailments has been in practice from time immemorial and it is estimated that about 25% of drugs prescribed are derived from plants, moreover, WHO's essential medicine list contains 252 drugs out of which 11% is exclusively of plant origin. Medicinal plants played a key role in health promotion of world. It is estimated that about 25% of all modern medicine are directly or indirectly derived from higher plants. A certain interest in medicinal plants has been reborn, even though the emphasis persists in research of synthetic compounds [2]. These substances are potentially toxic and are not free of side effects on the host. This has urged microbiologist all over the world formation of new antimicrobial agents and evaluation of the efficacy of natural plant product as the substitute for chemical antimicrobial agents. Also pharmacopoeia still contains at least 25% drugs derived from plants and many other which are synthetic analogues built on prototype compounds isolated from plants. These are estimated to be around 25,000 effective plant based formulation are available in the indigenous medical texts formulation used in folk medicine and known to rural communities all over India and around 10,000 designed[3].

In the present scenario, pharmaceutical companies are involved in research on plant materials for their potential medicinal value as the demand for herbal products is growing exponentially due to its fewer side effects as compare to other system of medicines [4,5].

The pathogenic micro organisms play an important role in human life. Infections disease caused by microbes in an important health hazard all over the world both in developing and developed countries. Several synthetic antibiotics and drugs are employed in the treatment of the microbial infections but the microbial pathogens are always trying to develop resistance to various synthetic antibiotics. New scientists are searching for now antimicrobial agents from plant used in ethno talk medicine to control the ever increase menace of the micro organisms. The screening of plant extracts and plant products for antimicrobial activity has shown that higher plants represent a potential source of novel antibiotic prototypes. Numerous studies have identified compounds within herbal plants that are effective antibiotics. Traditional healing systems around the world that utilize herbal remedies are an important source for the discovery of new antibiotics [7].

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Studies on the extracts of different species of the genus *Clerodendron* have been carried out by a number of researchers round the globe [6]. Roots and leaf extracts of C. *indicum,* C. *phlomidis,* C. *serratum,* C. *trichotomum***,** C. *chinense* and C. *petasites* have been used for the treatment of rheumatism, asthma and other inflammatory diseases [8,9]. The common name of *Clerodendrum philippinum Schauer* (*clerodendrum fragrans* co.T.Aiton) is Chinese Glory Bower, it is a member of Verbenaceae family, known as scent malli in India; it was distributed in southern Asia. It is Semi-woody shrub to 10 ft tall. Leaves broad, up to 1 ft long and nearly as wide, margins toothed, somewhat lobed. Flowers in tight clusters, white with pink or red tinge, fragrant. No fruits. Grown as ornamental. Spreads vegetatively. Roots and leaf extracts of C.philippinum have been used for the treatment of rheumatism, asthma and other inflammatory diseases [10,11]. From the existing information it is evident that the plant may possess important biological activities. The main objective of this study was to evaluate the Antibacterial activity in dried leaves of *Clerodendrum philippinum* Schauer.

Fig 1: *Clerodendrum philippinum Schauer*

MATERIALS METHOD

Collection of plant leaves:

The leaves were collected from Udumalapet, Tirupur District. The leaves were authenticated by Dr.Gopalan, Department of Botany, Karpagam University, Coimbatore. The plant leaves were thoroughly washed with tap water, shade dried, crushed in a homogenizer to fine powder and stored for further studies.

EXTRACT PREPARATION

The plant leaves were shade dried and powdered. The extraction was done with petroleum ether, ethyl acetate, chloroform, ethanol and water by cold percolation method[12].10g of dried powder was taken and 100mL of solvents (Petroleum ether, Ethyl acetate, Chloroform, Ethanol and Water) were added in a tight closed container and kept for 72 hours incubation. After the 72 hours incubation, the extracts were filtered by using Whatmann's filter paper.

Test Organisms

The bacterial cultures were received from Karpagam Microbial culture collection center (KMCCC). The bacterial isolates used were *E.coli, S.aureus, Bacillus* and *Klebsiella.* All bacterial strains were cultivated in nutrient agar medium (NA), and incubated at 37°C for 24 hr. This was used for the antibacterial activity in the well diffusion assay.

Antibacterial activity

The antimicrobial activity was determined by agar well diffusion method [13]. The five bacterial cultures namely *Escherichia coli, Staphylococcus aureus, Klebsiella pneumon* and *Bacillus substillus* were maintained in the medium. The wells were cut by using gel puncture and the previously prepared cultured organisms were swabbed on the culture plates. A volume of 20µl from 100µg, 200µg of the plant extracts were added into the well.

RESULTS AND DISCUSSION

Antibacterial activity

The ethanolic extract of plant showed antibacterial activity against *Escherichia coli, Staphylococcus aureus, Klebsiella,* and *Bacillus substillus* at the concentration of 100µg/ mL and 200 µg/mL. Comparing to others Escherichia *coli* and *Staphylococcus aureus* showed higher MIC value (**Table 1**).

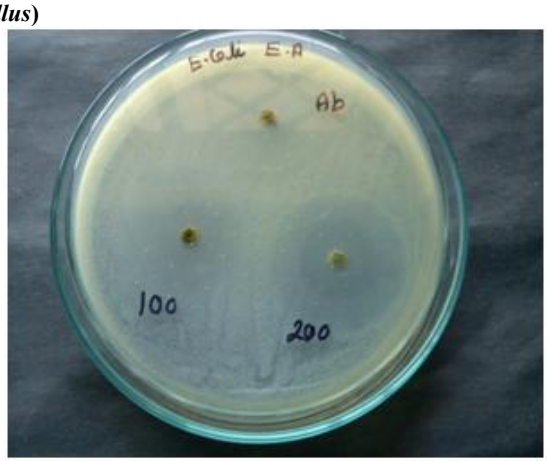
The present results indicated that *C.philippinum* schauer could effectively inhibit the growth of *E.coli, S.aureus, Bacillus* and *Klebsiella* showed the strongest antibacterial activity with inhibition zones of more than 20 mm (**Table 1**). Subsequent experiments were conducted to determine inhibitory concentrations of *C.philippinum* Schauer leaves. It reveals the highest antibacterial effect as they possessed the MIC value of 20mm in the concentration of 100µg/mL for all of 4 strains bacterial tested. Vidya *et al*., reported that the different bacterial strains tested root extract of *Clerodendrum serratum* L. produced maximum zone of growth inhibition against Enterobacter aerogenes. The zone of inhibition was moderate against Pseudomonas aeruginosa and Bacillus subtilis. The inhibition zone was less against Escherichia coli when compared to reference standard antibiotic streptomycin. The zone inhibition was increased with the increase in concentration of the extract and thus exhibiting concentration dependent activity [14].

Praveen *et al*., reported that the chloroform extract of *Clerodendrum paniculatum* Linn had great in vitro potential for anti microbial activity against tested microorganism used during the analysis. Amikacin at the concentration of 100 µg/ml was used as control for antibacterial [15].

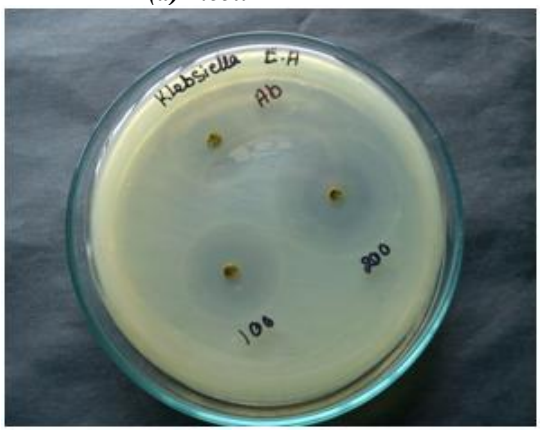
Table 1: Antibacterial activity of *Clerodendrum philippinum* Schauer leaves

Test organisms	Zone Of Inhibition (mm)		
	Standard Antibiotics (Tetracycline)	Concentration	
		100µg/Ml	200µg/mL
E.coli	25	30	35
S.aureus	28	28	36
Bacillus	19	25	32
Klebsiella	25	25	32

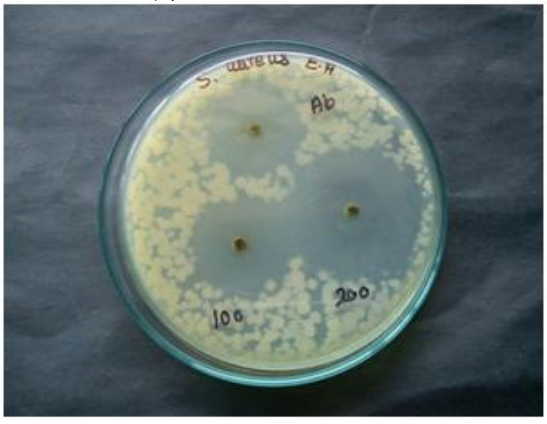
Fig: 2 a, b, c and d indicates Antibacterial activity of *C. philippinum* Schauer leaves (*E.coli, Klebsiella, S.aureus and Bacillus*)



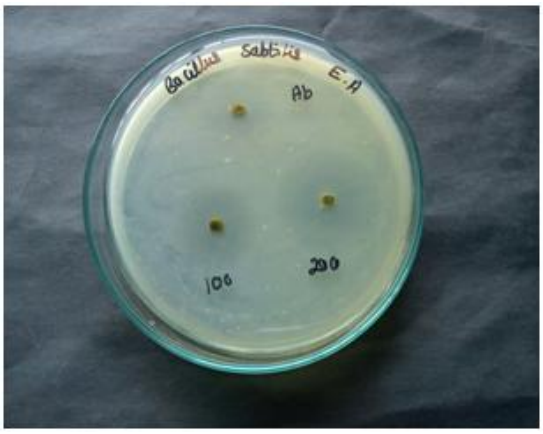
(a) E.coli



(b) Klebsiella



(c) *S.aureus*



(d) *Bacillus*

CONCLUSION

The above results suggest, the medicinal property of the leaves might be due to the presence of these antibacterial activities present in *Clerodendrum philippinum Schauer*. Since, the leaves possess antibacterial activity; it can be used to cure various diseases. The ethanolic extracts of plant possess the very good antibacterial activity for common pathogenic bacteria's. The findings in the present study offer a scientific support to the use of leaves of *Clerodendrum philippinum* Schauer as an antibacterial in new drugs for therapy as it showed promising antibacterial activity. Further pursuit on the isolation of bioactive compounds would enable more potential and natural antibacterial against several strains.

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