



RESEARCH ARTICLE

BIO TECHNOLOGY

**PRELIMINARY PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF  
*PERGULARIA DAEMIA* FORSK**



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**ABSTRACT**

*Pergularia daemia* forsk (Asclepidaceae) is used in Indian traditional medicine to cure various human ailments. The plant is described as anthelmintic, laxative , antipyretic, expectorant and to treat Malarial intermittent fever. The (*invitro*)  
Anti-bacterial activity of the leaves of *Pergularia daemia* was studied by agar disc diffusion method using aqueous and methanolic extract. The activity was tested against *Bacillus subtilis*, *E.coil*, *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* at different concentrations of 50-200µl. The preliminary phytochemical screening of the plant revealed the presence of alkaloids, flavonoids, saponins, tannins, triterpenes, phenolic compounds and steroidal compounds.

## KEYWORDS

Antibacterial, Aqueous extract, Methanolic extract, Phytochemical.

## INTRODUCTION

Microorganisms are the causative agents of almost all kinds of acute and chronic diseases. Medicinal plants represent a rich source of antimicrobial agents. Plants are used medicinally in different countries and are a source of many potent and powerful drugs<sup>1</sup>. For a long period of time, plants have been a valuable source of natural therapies. The use of plant compounds for pharmaceutical purpose has gradually increased in the world. A special feature of angiospermic plants is their capacity to produce a large number of organic chemicals of high structural diversity. These so called secondary metabolites have contributed more than 7000 different compounds in use today as cardiac drugs, anticancer agents, hormones, antibiotics, laxatives, diuretics, analgesics, anesthetics, drugs for ulcer treatment and antiparasitic compounds. In USA 74% of drugs are based on plants<sup>2</sup>. According to the world health organization medicinal plants would be the best source to obtain a variety of drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants therefore, such plants should be investigated to better understand their properties, safety and efficiency<sup>3</sup>. A wide range of medicinal plant parts are used for extract as raw drugs and they possess varied medicinal properties. The different parts include root, stem, flower, fruit, twigs exudates and modified plant organs. While some of these raw drugs are collected in smaller quantities by the local communities and folk healers for use, many other raw drugs are collected in larger quantities and traded in

market as the raw material for many herbal industries<sup>4</sup>

## MATERIALS AND METHODS

### **Collection of plant material**

Mature plant leaves of *Pergularia daemia* were collected from road sides in Thanjavur, Tamilnadu, India. After identification, authentication the specimen was deposited and the plant was shade dried and powdered.

### **Preparation of plant extract**

The leaves of the plant were shade dried and powdered. 20g of air dried powder of was added to 100ml of distilled water. It was then filtered using whatmann no.1 filter paper and centrifuged at 5000 rpm for 10 min. The supernatant were pooled together and concentrated to make the final volume one fourth of the original volume<sup>5</sup>

### **Methanolic extract**

20g of air dried powder was taken in 100ml of methanol in a conical flask, plugged with cotton wool and then kept on rotary Shaker at 199-220 rpm for 24hrs. After 24hrs the supernatant was collected and the solvent was evaporated to make the final volume one fourth of the original volume<sup>5</sup>.

### **Test organism**

The extracts were tested on the following bacterial species (i.e.) *Staphylococcus aureus*, *E.coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis* and *Klebsiella pneumoniae*. All the



strains were obtained from the Hi- Media laboratory.

### **Preliminary Phytochemical Analysis**

Phytochemical analysis of the extract was conducted and the analysis shows the presence of Alkaloids, flavonoids, saponins, tannins, Phenolic compounds, triterpenes and steroidal compounds.

### **Antibacterial Assay**

Four different concentrations of the plant extracts were tested for antibacterial activity using agar disc diffusion method. The strains were inoculated in a conical flask containing 100ml nutrient broth. The nutrient broth was incubated at 37°C for 24 hours. 36g of Muller-Hinton agar (Hi-media) was mixed with distilled water and then sterilized in autoclave at 15lbs pressure and then the sterile media was poured in to Petri dishes. Sterile discs of six millimeter width has been impregnated with aqueous and methanolic extract after dissolving it in sterile distilled water to form dilutions such as 50,100,150 and 200ul. Each concentrations of the plant extracts were tested against the different bacterial pathogens. The plates were incubated over night at 37°C. Anti bacterial activity was assigned by measuring the inhibition zone formed around the disc. The experiment was done in triplicate and the mean values were tabulated. Streptomycin (10µg/disc) was used as standard.

## **RESULTS AND DISCUSSION**

The preliminary phytochemical analysis of the extract revealed the presence of alkaloids, flavonoids, triterpenes, tannins, saponins, phenolic compounds and steroidal compounds as illustrated in table 1. Tabel 2 summarizes the microbial growth Inhibition of both aqueous and methanolic extract of the plant. The low concentration of aqueous extract does not shows

any inhibitory activity on the bacterial strains. As the concentrations increases the zone of inhibition all so increases. On the other hand methanolic extract of the plant exhibits anti bacterial activity towards all the bacterial strains. The results obtained shows that the methanolic extract has increased inhibitory activity against *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* (i.e.) 9mm and 10mm.

Plant based anti microbials have enormous therapeutic potential as they serve the purpose with lesser side effect that are often associated with synthetic antimicrobials<sup>6</sup>. Plants are important source of potentially useful structures for the development of new chemotherapeutic agents. The first step towards this goal is in the *In vitro* antibacterial activity assay. The antimicrobial activity is probably due to the membrane disruption by terpenes and their activity might be due to their ability to form complex with extra cellular, soluble proteins and bacterial cell walls and disrupt microbial memberane<sup>7</sup>. Further researches are needed to find new clinically effective antibacterial compound from the plant.

## **CONCLUSION**

Hundreds of plant species have been tested for antimicrobial properties, the vast majority have not been adequately evaluated. From the above studies it is concluded that the traditional plants may represent new sources of anti-microbials with stable, biologically active components that can establish a scientific base for the use of plants in modern medicine. Further researches are needed to find new clinically effective antibacterial compound from the plant.

**Table 1**  
***Phytochemical Screening of Pergularia daemia***

S.No	Phytochemicals	Aqueous extract	Methanolic extract
1	Alkaloids	Present	Present
2	Flavonoids	Present	Present
3	Cardiac glycosides	Present	Present
4	Saponins	Absent	Present
5	Tannins	Absent	Present
6	Triterpenes	Absent	Present
7	Steroidal Compounds	Absent	Present
8	Phenolic Compounds	Present	Present
		Present	

**Table 2**  
**Antibacterial activity of Aqueous and Methanolic extract of Pergularia daemia**

S.No	Name of the Organism	Concentration of Methanolic extract & Zone of inhibition in mm				Concentration of aqueous extract and Zone of Inhibition in mm			
		50µl	100µl	150µl	200µl	50µl	100µl	150µl	200µl
1	E.coli	3	5	7	8	-	-	-	2
2	Staphylococcus aureus	-	3	4	5	-	-	-	2
3	Bacillus subtilis	-	-	2	4	-	-	-	-
4	Pseudomonas aeruginosa	2	4	7	9	-	-	3	4
5	Klebsiella pneumoniae	3	5	8	10	-	-	-	2

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