



Full Length Research Article

PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF *WATTAKAKA VOLUBILIS* (L.F) STAPF

\*<sup>1</sup>Shibu, A. and <sup>2</sup>Dr. Dhanam, S.

<sup>1</sup>Department of Botany, Government Thirumagal Mills College, Gudiyattam

<sup>2</sup>Department of Botany, Arignar Anna Arts College, Villupuram

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ABSTRACT

**Objective:** To promote the Phytochemical screening and Antibacterial evaluation of *Wattakaka volubilis* (L. f) Stapf.

**Scope:** The medicinal plant used in the present study is regarded as a potentially safe drug and a bioactive natural product.

**Results:** The root, stem and leaf extracts were prepared from the following solvents such as Alcohol, Benzene, Chloroform, Ether and Water. Phytochemical screening and Antibacterial activity were examined in the nine Gram positive and Gram negative human pathogenic bacteria. In particular, the Root extract from Benzene have shown the maximum inhibitory activity.

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INTRODUCTION

Plants have been used as a traditional medicine for several thousand years (Abu-Rubia, 2005). The knowledge of medicinal plants have been accumulated in the course of many centuries based on different medicinal systems such as Ayurveda, Unani and Siddha. In India, it is reported that the traditional healers use 2500 plant species and 100 species of plants serve as a regular sources of medicine (Pei, 2001). These plants' extracts are used as a source of medicinal agents to cure urinary tract infections, cervicitis, vaginitis, gastrointestinal disorders and skin infections such as herpes simplex virus type (Meyer *et al.*, 1999).

MATERIALS AND METHODS

The present investigation evaluates the preliminary phytochemical characters and antibacterial activity of *Wattakaka volubilis* (L. f) Stapf Asclepiadaceae. The plant material was collected at Thenkan thottam in Dindigul District.

Preparation of plant extracts

The plant materials were washed with water to remove the adhering dust particles and were shade dried at room-temperature & ground into a fine powder in an electric blender. (Audu *et al.*, 2000). Then 5g each of fine powdered sample was weighted and soaked separately in 15ml of different solvents (Alcohol, Benzene, Chloroform, Ether, and Water) in the ratio of 1 : 3 weights for volume (W/V). And were allowed to stand for 24 hrs at ambient room temperature. The soaked plant powder was filtered through filter paper (Whatman No.1) and the filtrate was used as a crude extract.

Preliminary phytochemical screening

Phytochemical screening was carried out to assess the qualitative chemical composition of crude extracts using commonly employed precipitation and coloration reaction to identify the major natural chemical groups (Brinda *et al.*, 1981).

Antibacterial assay

Collection of microorganisms & Preparation of inoculum

The following microbes were selected for the present study (*Bacillus subtilis*, *Escherichia coli*, *Salmonella typhi*,

\*Corresponding author: Shibu, A.

Department of Botany, Government Thirumagal Mills College, Gudiyattam

*Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Micrococcus luteus*, *Zymomonas mobilis*, *Lactobacillus sp.* and *Vibrio cholerae*.) and were obtained from the research laboratory, Department of Microbiology, Bharathiyar university, Coimbatore, Tamil Nadu, India. Each organism was recovered for testing by sub-culturing on fresh media. A loopful inoculum of each bacterium was suspended in 5 ml of nutrient broth and incubated overnight at 37°C. These cultures were used as inoculum.

## RESULTS AND DISCUSSION

### Phytochemical screening of crude extracts

Steroids were present in the alcoholic extracts of leaf, stem and root powders, whereas phenols and anthracene glycoside in both the stem and leaf extracts, tannins and flavonoids in stem and root. Phenols, saponins and tannins were present in the benzene extracts of all the three parts of the plant. However, sugar and flavonoids were present only in benzene extracts of root, Alkaloids in extracts of stem, Anthracene glycosides in extracts of leaf. Saponins were present in the chloroform extracts of all the three parts of the plant. Steroids, sugar, alkaloids, phenols and anthracene glycosides in the extracts of stem. Alkaloids, phenols & saponins in the root. Phenols, saponins, tannins and anthracene glycosides were present in the ether extracts of all the three parts of the plant. Steroids in the extracts of leaf and stem. However, sugar and flavonoids in the root extracts. Phenols and flavonoids were present in the aqueous extracts of all the three parts of the plant.

Steroids and sugar in the extracts of leaf. Tannins present in the root extracts alone.

### Antibacterial activity

Alcoholic extracts of root showed a well profound inhibitory activity against *Zymomonas mobilis*, *Lactobacillus sp* and *Salmonella typhi*, while stem extract showed maximum activity against *S. typhi*, *Micrococcus luteus*, *Staphylococcus aureus*. Whereas, leaf extracts showed maximum inhibitory activity against *Lactobacillus sp*, *Bacillus subtilis*.

Benzene extract of root showed the highest inhibitory activity against *Salmonella typhi*, *Vibrio cholerae*, while stem extracts have shown the maximum inhibitory activity against *Pseudomonas aeruginosa*, *Vibrio cholerae*, and *Lactobacillus sp*. Leaf extracts have shown the maximum inhibitory activity against *Staphylococcus aureus*, *Vibrio cholerae*.

Chloroform extracts of root have shown the maximum inhibitory activity against *Lactobacillus sp*, *Escherichia coli*. Stem extracts showed the maximum inhibitory activity against *Micrococcus luteus*, *Escherichia coli* and *Staphylococcus aureus*. Leaf extracts have shown the maximum inhibitory activity against *Micrococcus luteus*, *Escherichia coli*.

Ether extracts of root have shown a well profound inhibitory activity against *Escherichia coli*, *Staphylococcus aureus*, while leaf extracts showed the maximum inhibitory activity against *Micrococcus luteus*, *Salmonella typhi*, and *Bacillus subtilis*. Stem extracts showed the maximum inhibitory activity against *E. coli*, *Staphylococcus aureus*.

**Table 1. Preliminary phytochemical screening of Leaf, Stem and Root extracts of *Wattakaka volubilis* (L. f) Stapf.**

Extracts	Plant parts	Presence (+) and absence (-) of bioactive compounds							
		St	Su	Alc	Ph	Sa	Ta	Fla	An
Acetone	L	+	-	-	+	-	-	-	+
	S	+	-	-	+	-	+	+	-
	R	+	-	+	-	-	-	+	+
Benzene	L	+	-	+	-	+	+	-	+
	S	+	-	-	+	-	-	-	-
	R	-	+	+	-	+	-	-	+
Chloroform	L	+	-	-	+	-	+	+	-
	S	+	+	+	+	+	-	-	+
	R	-	-	+	-	+	+	-	+
Ethanol	L	+	-	+	-	-	+	-	-
	S	+	-	+	-	-	+	+	-
	R	-	+	-	+	-	+	+	-
Ether	L	+	+	-	+	+	+	-	+
	S	+	-	-	+	+	+	-	+
	R	-	+	-	-	+	+	+	-
Water	L	+	+	-	+	-	-	+	-
	S	-	-	-	+	-	-	+	-
	R	-	-	+	+	-	+	+	+

St-Steroids, Su-Sugar, Alc-Alkaloids, Ph-Phenols, Sa-Saponins, Ta-Tannins, Fla-Flavonoids and An-Anthracene glycosides

**Table 2. Antibacterial activity of *Wattakaka volubilis* (L. f) against pathogenic bacteria**

Microbes	Inhibitory Zone(mm)														
	Leaf				Stem				Root						
	A	B	C	E	W	A	B	C	E	W	A	B	C	E	W
<i>B. subtilis</i>	1.8	-	-	1.5	1.8	-	-	-	1.2	-	-	-	-	2.5	-
<i>E. coli</i>	1.6	-	-	1.5	1.6	-	-	1.9	1.5	1.5	-	-	1.9	1.6	1.6
<i>S. typhi</i>	1.9	1.5	-	1.6	1.3	2.2	-	-	-	1.7	2.1	5.0	2.1	2.0	1.8
<i>S. aureus</i>	0.8	3.0	1.3	-	-	1.9	-	1.4	1.3	-	-	-	-	2.5	-
<i>V. cholera</i>	-	2.2	1.5	1.7	-	1.7	2.3	-	1.2	-	-	3.7	-	1.7	1.7
<i>P. aeruginosa</i>	-	-	-	-	-	1.5	2.4	-	2.0	2.6	-	2.2	-	-	1.6
<i>M. luteus</i>	-	-	2.0	1.7	-	2.1	-	2.1	1.3	-	-	-	-	-	-
<i>Z. mobilis</i>	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-
<i>L. sp.</i>	2.0	-	-	1.5	-	1.4	1.9	-	-	-	2.4	-	2.0	1.5	-

Solvents: A-Alcohol, B-Benzene, C-Chloroform, E-Ether, W-Water.

Aqueous extracts of root have shown the greatest inhibitory activity against *Vibrio cholerae*, *Pseudomonas aeruginosa*, while Stem extracts showed the maximum inhibitory activity against *Pseudomonas aeruginosa*, *Salmonella typhi*. Leaf extracts showed the maximum inhibitory activity against *Bacillus subtilis*, *Escherichia coli* and *Salmonella typhi*.

## Conclusion

In total, the Benzene extract of root have shown the maximum inhibitory activity against *Vibrio cholerae*. So, this part can be well used as a bioactive natural products. The young leaves in the treatment of pyodermas and fever in children. Hence this plant serves for the development of new pharmaceuticals that address bither to unmet therapeutic needs.

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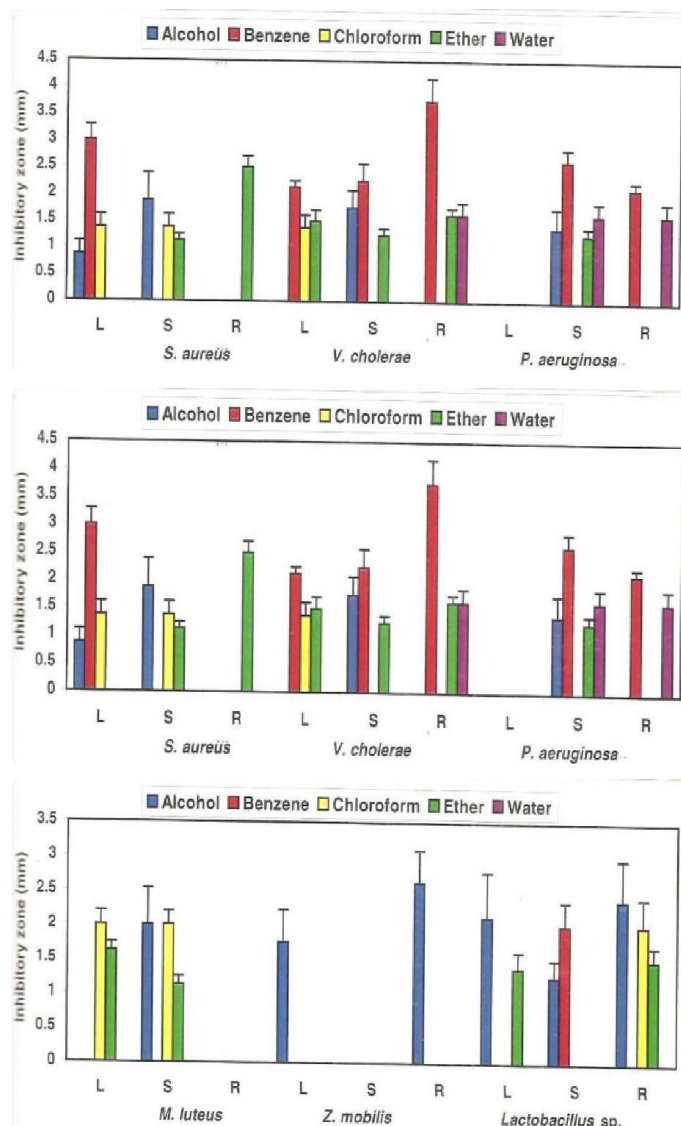


Fig. Antibacterial activity of leaf(L), stem(S) and root(R) extracts of *Wattakaka volubilis* against pathogens

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