

ORIGINAL ARTICLE

ANTIMICROBIAL AND PHYTOCHEMICAL STUDIES ON *PHYLLANTHUS SINGAMPATTIANA* (SEBASTINE & A.N.HENTRY) KUMARI & CHANDRABOSE

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ABSTRACT

(Friedelin, epi-fridelinol, n-octacosanol, α -amyrin, β -sitosterol, luteolin and β -sitosterol-3- β -D-glucopyranoside were isolated from the dried stem of *Phyllanthus singampattiana*. The aqueous and methanol extracts showed high and concentration dependent antibacterial and antifungal activity. The maximum activity was recorded against *Salmonella typhi* in MeOH extract and *Pseudomonas aeruginosa* in aqueous extract. The results corresponded to the ethnic uses of the plant against diarrhea and dysentery.

Keywords: *Phyllanthus singampattiana*; Antimicrobial activity; Phytochemistry; Diarrhea; Dysentery; Skin infections.

1. INTRODUCTION

Plant. *Phyllanthus singampattiana* (Sebastine & A.N.Hentry) Kumari & Chandrabose [Henry et al., 1987], locally known as Aathuchadai by the Kani tribe in Malayalam mixed Tamil language [Ramesh et al., 2004], was collected from Tirunelveli district of Tamil Nadu in India. The plant was identified by Dr.M.B. Viswanathan, Professor, Department of Plant Science, Bharathidasan University, Thiruchirappalli-620 024,

Uses in traditional medicine. The plant is used for jaundice, diarrhea and dysentery [Ramesh et al., 2004].

New-isolated constituents. Friedelin (0.05%), epi-fridelinol (0.1%), n-octacosanol (0.06%), α -amyrin (0.04%), β -sitosterol (0.15%), luteolin (0.03%) and β -sitosterol-3- β -D-glucopyranoside (0.16%) from shade-dried stem powder.

2. MATERIALS AND METHODS

Tested material. The shade-dried stem powder was successively Soxhlet-extracted with hexane (yield 0.60%), chloroform (1.23%), and methanol (4.62%). The extracts were tested for phytochemical screening [Ramesh et al., 2004; Harborne, 1984; Trease and Evans, 1989; Kokate et al., 1996] and antimicrobial activity. Fresh plant (30g) was chopped, divided into three portions, ground and transferred into suitable glass bottles and treated with 50ml each of distilled water. The first bottle was autoclaved at 10 lbs for 20 min, the second was boiled (100°C) for 20min and the third was mechanically shaken (200rev./min) in cold conditions for 2h [Sen and Nandi, 1957].

Studied activity. Antibacterial and antifungal by agar-well diffusion method [Perez et al., 1990]. The inhibitory values (in mm) were calculated from the mean of three replicates.

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Used micro-organisms. Listed in Table-2.

3.RESULTS

Reported in Table-1 (phytochemical screening) and Table-2 (antimicrobial activity of aqueous and MeOH extract). CHCl₃ and hexane extracts did not exhibit any inhibition in the range of tested concentration from 5 to 20mg/ml.

Table-1: Preliminary phytochemical screening of *Phyllanthus singampattiana* stem extracts

Test	Hexane	CHCl ₃	MeOH
Alkaloid	-	+	+
Coumarin	+	+	-
Flavone	+	+	+
Lignin	-	+	+
Phenol	-	+	+
Protein	-	-	+
Quinine	-	-	+
Saponin	-	-	+
Starch	-	-	+
Steroid	+	+	-
Sugar	-	-	+
Tannin	-	-	+
Triterpine	+	+	+

+ present; - absent

4.CONCLUSION

The aqueous and MeOH extracts of *P. singampattiana* stem showed concentration dependent inhibitory activity against all tested bacteria (Table-2). The MeOH extract alone acted against *C. albicans*. The activity was maximum in MeOH extract against *E. aerogenes*, *S. enteritidis*, and *S. typhi* and moderate against *E. coli*, *P. vulgaris*, *P. aeruginosa*, *V. parahaemolyticus*, *S. aureus* and *C. albicans*. The aqueous extract showed activity differently such as maximum against *P. aeruginosa*, and *S. aureus* and moderate against *E. aerogenes*, *K. pneumoniae*, *P. vulgaris*, *S. enteritidis*, *S. typhi* and *B. subtilis*. The present study provides scientific evidence for the ethnic uses of the plant against diarrhea and dysentery.

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Table-2: Antimicrobial activity of aqueous and MeOH extracts of *Phyllanthus singampattiana* stem

Microorganisms	Diameter of Zone of inhibition (mm)									
	Aqueous extract						Methanol extract (mg/ml)	Standard ^a		
	Cold (%)		Boiled (%)		Autoclave (%)					
	100	50	100	50	100	50	20	10	5	
<i>Aeromonas hydrophila</i>	18	14	20	18	20	18	20	18	14	20 (Tr)
<i>Enterobacter aerogenes</i>	20	16	24	20	23	20	29	22	18	22 (Tr)
<i>Escherichia coli</i>	18	14	22	18	21	18	24	20	16	30(K)
<i>Klebsiella pneumoniae</i>	22	18	26	22	26	22	20	16	14	30(K)
<i>Proteus vulgaris</i>	20	15	24	20	24	20	24	17	15	20(K)
<i>Pseudomonas aeruginosa</i>	24	17	30	24	29	24	24	19	22	25(E)
<i>Salmonella enteritidis</i>	20	16	24	20	23	20	32	25	22	22(Na)
<i>Salmonella typhi</i>	22	18	26	21	25	21	28	24	20	20(Na)
<i>Vibrio cholerae</i>	18	14	22	18	20	18	22	17	14	31(Tr)
<i>Vibrio parahaemolyticus</i>	16	12	20	15	20	14	24	18	16	14(K)
<i>Vibrio vulnificus</i>	15	12	20	15	20	15	20	16	12	16(R)
<i>Bacillus subtilis</i>	20	14	24	18	24	17	22	16	12	30(A)
<i>Staphylococcus aureus</i>	24	16	29	24	29	22	26	18	12	45(M)
<i>Aspergillus flavus</i>	-	-	-	-	-	-	-	-	-	-
<i>Aspergillus niger</i>	-	-	-	-	-	-	-	-	-	-
<i>Candida albicans</i>	-	-	-	-	-	-	25	22	18	18(Tr)

^a Ampicillin- A¹⁰ - 10mcg/disc; Erythromycin - E¹⁰ - 10 mcg/disc; Kanamycin - K³⁰ - 30mcg/disc; Methicillin - M⁵ - 5mcg/disc; Nalidixic acid - Na³⁰ - 30mcg/disc; Rifampicin - R³⁰ - 30mcg/disc; Trimethoprin - Tr¹⁰ - 10mcg/disc.