

Preliminary phyto chemical screening and anti microbial activities of *grewia tiliaefolia* (aerial parts)

T.Sheela Rani*^a, Annapoorna Vadivelu ^a, Dr.K.Chitra ^a, Dr.C.Uma Maheswara Reddy ^a

^a Faculty of Pharmacy, Sri Ramachandra University, Porur, Chennai, India – 600116

Corresponding author :- Lecturer, Faculty of Pharmacy, Sri Ramachandra University.

Email ID: sheelathiru@yahoo.co.in

The study was aimed to evaluate preliminary phytochemical screening and in vitro anti microbial activities of Grewia tiliaefolia. The literature review reveals its usage in folk medicine in the treatment of rheumatism, vitia ted conditions of pita and kapha, burning sensation, hyperdipsia, pharyngopathy, cough, skin diseases, pruritis, wounds, ulcers, diarrhoea, hematemesis, epistaxis, haemorrhages, seminal weakness and general debility¹. The literature review reveals that no scientific systematic evaluation has been done in alcoholic extract; so, an attempt has been made to study anti-microbial activity. The aerial parts of the selected medicinal plant was chosen for the study. Further preliminary phytochemical screening indicates the presence of flavones, steroids, glycosides, sugars, alkaloids, quinines, phenols, tannins, saponins in methanolic extract. The methanol leaf extracts of Grewia tiliaefolia., showed significant antibacterial activity against Bacillus subtilis, Escherichia coli, Pseudomonas Aurignosa , Escherichia Feacalis, Staphylococcus aureus, Salmonella Typhi A, Salmonella Typhi B, Vibrio cholera and Coagulase negative staphylococci . Signifiacant antifungal activity was seen against Aspergillus flavus, Aspergillus niger, candida albicans and Fusarium verticillioides . Grewia tiliaefolia exhibits good activity and percentage inhibition as comparable to the standard.

KEY WORDS:

Grewia tiliaefolia, invitro anti bacterial, anti fungal acivity.

INTRODUCTION:

Many efforts have been made to discover new antimicrobial compounds from various kinds of sources such as micro-organisms, animals and plants. One of such resources is folk medicines. Systematic screening of them may result in the discovery of novel effective compounds The increasing prevalence of multidrug resistant strains of bacteria and the recent appearance of strains with reduced susceptibility to antibiotics raises the specter of untreatable bacterial infections and adds urgency to the search for new infection fighting strategies.

The chronic ailments like diabetes, rheumatism, and hypertension, bacterial and viral infection have attracted the use of herbs. Moreover the search for plant constituent activity may result in identification of potential lead molecule for the treatment of various diseases. Considering the vast potentiality of plants as sources for antimicrobial drugs with reference to antibacterial and antifungal agents, a systematic investigation was undertaken to screen the methanolic extracts of *Grewia tiliaefolia* for antibacterial and antifungal activity. The plant belongs to the family Tiliaceae whose root, bark and fruit are the traditionally used in the treatment of various diseases.

MATERIALS AND METHODS:

MATERIALS USED

Name : *Grewia tiliaefolia*

Synonym : *Grewia tiliifolia*

Family : Tiliaceae

Parts used : Whole aerial parts

Grewia tiliaefolia was collected and authenticated by Dr.V.Chelladurai , Research Officer-Botany (retired), C.C.R.A.S. Govt.of India.

PHYTOCHEMICAL SCREENING

The freshly collected plant materials were cut into small pieces shade dried and coarsely powdered. The powdered material was successively extracted with several organic solvents based on their increasing polarity by cold percolation method for 72 hours. The subsequent extracts were dried in desiccator. The results of phytochemical screening are represented in **table1**.

S.No	Constituents	Methanol	Ethyl acetate	Chloroform	Pet ether
1.	Triterpenoides	+	-	-	+
2.	Flavones	+	+	+	-
3.	Steroids	+	+	+	-
4.	Anthraquinones	+	-	-	+
5.	Glycosides	+	-	-	-
6.	Sugar	-	+	+	+
7.	Alkaloids	+	-	-	+
8.	Quinines	+	-	-	-
9.	Phenol	+	+	-	+
10.	Tanin	+	+	-	+
11.	Saponins	-	+	-	+

Table 1:Phytochemical screening of methanolic extract

Growth and maintenance of microbial organisms for Anti microbial studies.

The various organisms used in the present study include Micro cocci, Bacillus subtilis, Escherichia coli, Pseudomonas Aurignosa , Escherichia Feacalis, Staphylococcus aureus, Salmonella Typhi A, Salmonella Typhi B, Vibrio cholera, Coagulase negative staphylococci, Aspergillus flavus, Aspergillus niger, candida albicans and Fusarium verticillioides were obtained from life tech research centre vadapalani, Chennai.

Anti Bacterial Study

Stock cultures were maintained at 4°C on slant of nutrient agar. Active cultures for the experiment were prepared by transferring a loop full of cells from stock cultures to testtubes of nutrient broth for bacteria were incubated for 24 hors at 37°C. The assay was performed by agar disc diffusion method. The extracts were dissolved in DMF(Dimethyl formamide) and used. The results were read for the presence or absence of growth of microorganism. Zone of inhibition was carried out using Antibiotic Disc Diffusion method Amikacin 5ug/ml was used as control. The results are shown in **table 2 and 3**.

S.No	Name of the organism	100 ug/ml	200 ug/ml	300 ug/ml	400 ug/ml
------	----------------------	-----------	-----------	-----------	-----------

1	Micro cocci			+	
2	Bacillus subtilis,				+
3	Escherichia coli		+		
4	Pseudomonas Aurignosa		+		
5	Escherichia Feacalis				+
6	Staphylococcus aureus				+
7	Salmonella Typhi A		+		
8	Salmonella Typhi B		+		
9	Vibrio cholera			+	
10	Klebsiella pneumoniae			+	+

Table 2: Minimum Inhibitory Concentration

S.No	Name of the organism	Zone Of Inhibition(mm)	
		Control	Test
1	Micro cocci	32	30
2	Bacillus subtilis,	18	16
3	Escherichia coli	32	24
4	Pseudomonas Aurignosa	18	19
5	Escherichia Feacalis	25	23
6	Staphylococcus aureus	28	20
7	Salmonella Typhi A	28	22
8	Salmonella Typhi B	30	32
9	Vibrio cholera	25	24
10	Klebsiella pneumoniae	30	31

Table 3: Zone of Inhibition

Anti Fungal study

Antifungal activity was determined by antifungal susceptibility test. Saborund dextrose agar media was used for the study. The test solution was introduced aseptically into sterilised tubes and the volume was made upto 3 ml with SDA and the slopes were prepared by slanting the tubes. The tubes with different concentrations were inoculated with fungal strains, incubated and results were read for the presence or absence of growth of microorganism. The results are indicated in **table 4**.

S.No	Name of the organism	Test concentration
------	----------------------	--------------------

		100 ug/ml	200 ug/ml	300 ug/ml	400 ug/ml
1	Aspergillus flavus	+			
2	Aspergillus niger		+		
3	candida albicans			+	
4	Fusarium verticillioides		+		
5	Microsporeum gypseum	+			

Table 4: susceptibility test

Results and Discussion

The preliminary phytochemical screening of the aerial parts of the plant indicated presence several active constituents such as triterpenoids, flavanes, anthraquinones, glycosides, alkaloids and phenol in methanolic extract compared to other extracts.

The methanol extract of the aerial parts was used in different concentrations for performing anti-bacterial studies on both gram positive (*S.aureus* and *B.subtili*) and gram negative (*E.feacalis* and *B.subtilis*) micro-organisms. The extract showed marked activity which was compared with the standard drug.

The methanolic extract of *Grewia tiliaefolia* exhibited antibacterial activity to varying degrr against the organisms tested.All the organisms tested were susceptible to the methanolic extract but the minimum inhibitory concentration for the compounds varied between 200-400ug/ml. It exhibited significant activity against Escherichia coli, Salmonella Typhi A, Salmonella Typhi B and Pseudomonas Aurignosa. Compared to control the extract showed high sensitivity against Pseudomonas Aurignosa, Salmonella Typhi B, Klebsiella pneumonia, Micrococci and Escherichia Feacalis.

The methanol extract of the aerial parts was used in a concentration of 1mg/ml for performing antifungal activity The methanolic extract of *Grewia tiliaefolia* exhibited significant antifungal activity against the organisms tested. The extract showed a good activity on *Candida albicans* which was compared with the standard Amphotericin B drug. The extract showed good sensitivity against Aspergillus flavus and Microsporeum gypseum at a concentration of 100ug/ml.

ACKNOWLEDGEMENTS

Management and faculty of Pharmacy, Sri Ramachandra University for providing all necessary facilities and encouragement.

REFERNCES

1. **Ethno medical information from *Kattunayakas* tribes of Mudumalai Wildlife Sanctuary, Nilgiris district, Tamil Nadu.** PS Udayan (Centre for Medicinal Plants Research, Arya Vaidya Sala, Kottakkal, Kerala. *Indian Journal of Traditional Knowledge*. Vol. 6(4), October 2007, Pg. 574-578.
2. **Pharmacognostical evaluation of *Grewia tiliaefolia* bark.** Badami, S.; Gupta, M.k.; Suresh, B. (Department of Pharmaceutical Chemistry and Department of Pharmacognosy, J.S.S. College of Pharmacy, Ootacamund, TN, India). *Indian Journal of Natural Products*, V. 18(2): Pg No. 6 – 11, 2002.

3. **Anti microbial activity of some important medicinal plants against plant and human pathogens**
B Mahesh¹ and S Satish² (¹Department of studies in applied Botany and Biotechnology , ²Herbal Drug Technology Laboratory , Department of studies in Microbiology ,University of Mysore, Manasagangotri , Mysore-570006.) *World Journal of Agricultural Sciences*. 4(s), 2008: pg no: 839-843.
4. **Antibacterial, antifungal and tumor cell suppression potential of *Morinda citrifolia* leaf extracts.** Satish Kumar Jayaraman (Life tech Research Centre, Vadapalani, Chennai.) *International Journal of Integrated Biology*. V 3 (1), 44, 2008.
5. **In Vitro anti microbial activity of the extract of *Mitracarpus scaber* leaves formulated as syrup.**
T.A.Aber., et al., Department of pharmacognosy, faculty of pharmacy, university of benin, Nigeria, *Tropical journal of pharmaceutical research* march 2007; 6(1); 679-682

