

PHARMACOGNOSTICAL AND ANTIBACTERIAL STUDIES
ON *CORDIA OBLIQUA* Willd.

M.S.SHREE DEVI^{1*}, M.S.SIVA SHANKAR², B.SAMPATH KUMAR³.

1. Ph.D., Scholar Vel's University, Chennai.

shreemd@gmail.com

2. Ph.D., Scholar IVRI Barielly, Uttarkhand.

3. Professor, Dept of Pharmacology, Tirunelveli.

Summary

Any part of the plant may contain an active component. For instance, the roots of Ginseng plants contain the active saponins and essential oils, while Eucalyptus leaves are harvested for their essential oils and tannins. Some trees such as the balsam yield useful substance from their bark, leaves and roots. In this present study, the plant species *Cordia oblique* Willd(**Boraginaceae**) is subjected for the study of pharmacognosy. The main objective of the present study is to carry out for Preliminary phytochemical, and Antibacterial studies of the species.

KEYWORDS: *Cordia oblique* Willd, Boraginaceae, Physico- chemical, Preliminary phytochemical, Antibacterial studies.

Correspondence: SHREE e-mail: shreemd@gmail.com.

Introduction

The biological evolution of substance from plant source is highly relevant for the identification of leaf compounds which can result in the development of novel and safe medicinal agents. In the past decades extensive studies on different medicinal plants have resulted in the isolation and characterization of a large number of natural products. Pharmacognostic studies are required to determine the comparative morphoanatomical and micrographic features, for identification and quality control purpose. The aim of **pharmacognosy** is to analyse comparative morphoanatomical and micrographic features which might provide assistance in the identification, analysis and standardization of medicinal plants. Ultimately, pharmacognosy provides the quality standard for identification of medicinal plants. *Cordia oblique* is reported to be useful against the diseases of the lungs. The fruits are also useful in treating coughs, the diseases of the chest, chronic fever and joint pain. Keeping the above aspects in mind, the present work on the preliminary phytochemical and anti microbial activity have been undertaken.

Materials and Methods

The experimental material selected for the present study is *Cordia oblique* Willd. belongs to the family

Boraginaceae. The plant material was collected from the survey of Medicinal plant Unit (SMP), Govt. Siddha medical college, Palayamkottai, and it was subjected to the pharmacognostic and anti bacterial activity studies.

PHYTOCHEMICAL SCREENING

Mature and healthy plant was collected and dried at room temperature (25-30°C) for about 2 weeks. The dried plant was ground to powder, about 30gms of plant powder of each plant species were taken in a digestion flask and fitted to the soxhlet apparatus and was separately extracted with petroleum ether, benzene, chloroform, and methanol. The aqueous extract was prepared from directly boiling the powder with distilled H₂O. These extracts were concentrated and kept in brown bottles for the preliminary phytochemical screening. The results are tabulated in Table 1.

ANTIMICROBIAL STUDIES

TEST ORGANISMS

Cultures were selected from the range of gram- positive and gram- negative bacteria and fungal strains listed in Indian pharmacopoeia. Gram- positive bacteria, gram- negative bacteria were used for the experiment by using Streptomycin as standards. Muller Hinton agar medium were used for bacterial culture.

ANTIMICROBIAL ASSAY

The Antimicrobial assay was carried out by using agar cup plate method. Plant extracts at the concentration of 200µg/ml was prepared by dissolving the extracts in the respective solvents. The Streptomycin used as standards for gram- positive, gram-negative bacteria respectively. The required volume of the medium was poured in to the sterilized petri dishes. After solidification of the medium bacterial strains were streaked on it. Four wells were made in petri dishes and filled with the test samples of 0.1ml of extract solution. The bacterial culture in Muller Hinton agar media was incubated at 37°C for 24 hours. The zone of the inhibition produced by the different crude extracts was measured and compared with standards. The results are tabulated in table 2,3&4.

Results and Discussion

The results obtained are tabulated in table 1 & 2. Preliminary phyto chemical analysis of the aqueous and successive extracts of *Cordia oblique* Willd showed the presence of alkaloids, phenols, tannins and reducing sugar.

The antibacterial activity of cordial oblique was assayed by the filter paper disc diffusion method on the following bacteria. The distilled water, petroleum ether, benzene, chloroform, and methanol extracts of the dried plant powders were used for the anti bacterial activity. Almost all the extracts showed some activity against the various bacteria.

LEAF: The distilled water extract showed antibacterial activity against all the selected bacterial strains (Table 2). Among the leaf extracts highest inhibition zone was observed in benzene extract against *Salmonella typhii*(1.5cm). The methanol extract showed some antibacterial activity against all the selected strains except *Staphylococcus aureus* and *Serratia marcescens*, whereas the control antibiotic showed inhibition zone all the chosen bacteria. The chloroform extract showed a maximum activity of (1.1cm) against *Pseudomonas aeruginosa*. The petroleum ether extract was active against some pathogens but it had a maximum inhibition of (1.4cm) against *Klebsiella pneumoniae*.

STEM: The inhibitory activity of the various extracts presented in the table 3. The petroleum ether extract was active against one of the ten pathogens. The benzene extract showed a maximum activity of (1.5cm) against *Pseudomonas aeruginosa*. The stem distilled water extract effective against *E.coli*, *Klebsiella pneumonia* and *Entrobacter aerogenes*.

ROOT: The effectiveness of the root powder extracts were showed in table 4. The petroleum ether extract was active against eight pathogens but it had a maximum inhibition of (1.0cm) against *Salmonella typhii*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The benzene extract was active against four of the selected pathogens but it had a maximum inhibition of (1.5cm) against *E.coli*.

The chloroform extract was not active against all pathogens. The methanol extract was active against *E.coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Proteus vulgaris* and *Bacillus subtilis*. Distilled water extract showed effective inhibition zone against *E.coli* (2.5cm), *Staphylococcus aureus*(1.0cm) and *Salmonella typhii*(0.bcm).

TABLE 1

Preliminary phytochemical analysis of powder extracts of *Cordia obliqua*

Reagents	Samples	Reducing sugar	Aminoacid	Protein	Phenol	Alkaloid	Steroid	Triterpenoid	Flavonoid	Catachin	Saponin	Tannin	Anthroquinones
Petroleum ether	Leaf	-	-	-	+	-	-	+	-	-	-	+	-
	Stem	-	-	+	+	+	-	-	-	-	-	+	-
	Root	-	-	-	-	+	+	-	-	+	-	-	-
Benzene	Leaf	-	-	-	+	+	+	+	-	-	-	-	-
	Stem	-	-	-	-	+	-	-	-	-	-	-	-
	Root	-	-	-	+	-	-	-	-	-	-	-	-

Choloroform	Leaf	-	-	-	-	+	-	+	-	-	-	-	-
	Stem	-	-	+	-	+	-	-	-	-	-	+	-
	Root	-	-	-	-	+	-	-	-	-	-	+	-
Methanol	Leaf	+	-	-	+	+	-	-	+	-	-	+	-
	Stem	+	-	-	+	+	+	-	-	+	-	+	+
	Root	+	-	-	+	+	-	+	+	-	-	+	+
Distilled water	Leaf	-	-	-	+	+	-	-	-	-	-	+	+
	Stem	-	-	-	+	+	-	-	-	-	+	-	-
	Root	+	-	-	-	+	-	-	-	-	-	-	-

TABLE 2

Antibacterial activity of *Cordia oblique* Leaf extract.

Microorganisms	Samples (Leaf)					
	Petroleum ether	Benzene	Chloroform	Methanol	Distilled water	Control
Diameter of inhibition zone (mm)						
<i>Eseheriachia coli</i>	-	-	-	0.8	-	1.8
<i>Pseudomonas aeruginosa</i>	-	-	1.1	1.1	-	2.8
<i>Staphylococcus aureus</i>	0.9	0.6	-	-	0.8	2.0
<i>Streptococcus pyogens</i>	-	0.7	1.0	1.2	1.0	2.8
<i>Salmonella typhii</i>	1.0	1.5	-	1.2	1.2	2.8
<i>Serratia marcescens</i>	-	0.9	-	-	-	2.8

Klebsiella pneumonia	1.4	1.2	-	1.3	1.1	2.0
Entrobacto areogenes	1.0	0.8	-	0.9	-	2.5
Proteus vulgaris	0.7	0.9	0.8	1.0	-	2.5
Bacillus subtilus	1.3	-	-	1.2	1.3	2.5

TABLE 3

Antibacterial activity of Cordia oblique Stem extract.

Microorganisms	Samples (Stem)					
	Petroleum ether	Benzene	Chloroform	Methanol	Distilled water	Control
Diameter of inhibition zone (mm)						
Eseheriachia coli	-	1.2	-	0.8	1.1	1.8
Pseudomonas aeruginosa	-	1.5	1.1	-	-	2.1
Staphylococcus aureus	1.4	0.8	0.9	-	-	2.8
Streptococcus pyogens	-	1.2	-	1.4	-	2.1
Salmonella typhii	-	1.2	-	1.4	-	1.8
Serratia marcescens	-	-	-	0.8	-	3.0
Klebsiella pneumonia	-	-	-	-	1.0	2.2
Entrobacto areogenes	-	-	-	-	1.3	2.5

Proteus vulgaris	-	0.8	-	0.9	-	2.0
Bacillus subtilis	-	1.0	0.8	0.8	-	2.7

TABLE 4

Antibacterial activity of Cordia oblique Root extract.

Microorganisms	Samples (Root)					
	Petroleum ether	Benzene	Chloroform	Methanol	Distilled water	Control
Diameter of inhibition zone (mm)						
Eseheriachia coli	0.8	1.5	-	0.6	2.5	3.5
Pseudomonas aeruginosa	1.0	0.6	-	1.8	-	2.5
Staphylococcus aureus	1.0	0.6	-	-	1.0	3.5
Streptococcus pyogens	0.7	-	-	-	-	2.5
Salmonella typhii	1.0	-	-	-	0.8	1.9
Serratia marcescens	0.6	-	-	-	-	2.0
Klebsiella pneumonia	-	-	-	0.7	-	2.0
Entrobacto areogenes	-	-	-	-	-	1.5
Proteus vulgaris	0.6	-	-	1.5	-	2.0
Bacillus subtilis	0.9	0.7	-	0.5	-	2.5

Conclusion

The antibacterial of five organic solvent extracts and distilled water extract were tested for the antibacterial activity against ten pathogenic bacteria has been studied. when *Cordia oblique* is adulterated with other plants of similar morphological characters the above mentioned phytochemical characters will help to distinguish the original drug.

References

1. Alma.M.H, Mavi. A, Yildirim.A, Digrak.M, Hirata.T, Screening chemical composition and in vitro antioxidant and antimicrobial activities of the essential oil from *Origanum syriacum*, *Bio pharm bull* 26 (12), 1725-9 (2003).
2. Aruna.V,Naidu, Sathyanarayana.T, Ganapathy.S, Phytochemical studies on the roots of *Mucunapruriens*. *Baker Indian drugs* , 35 (6), 356-358 (1998).
3. Jelani.S, Prabhar.M, Pharmacognostic studies of leaf of *Indigofera oblangifolia*, *Bioscience research Bulletin* 8(12) 65-72 (2001).
4. Narod.F.B, Gurib-Fakim A , Subratty. A.H, Phytochemical analysis of selected endemic and Indigenous medical plants of Mauritius and Rodrigues. *Research Journal of chemistry and Environment* 18(1) 47-55 (2004).
5. Pradeep Parihar, Bohra.A , Antimicrobial effect *Chelienthes albomarginata* against gastroenteritis. *Advances in plant sciences* 16(1) 47-51 (2003).
6. Sasikala.E, Usman ali.S, Kandub.A.B, On the pharmacognosy of *Clerodendron inerme* Gcerthar, leaves *Med and Aromatic plants abstract* 17(4) 415 (1995) .
7. Umarao singh, Wadhawan.A.M, Johri, *Dictionary of Economic Plants in India* 57(1996).