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Research Article

STUDIES ON ANTIMICROBIAL ACTIVITY OF *TEPHROSIACALOPHYLLA* AGAINST *XANTHOMONAS CITRI* AND *SALMONELLA TYPHIMURIUM*

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ABSTRACT: *Tephrosia calophylla* is an undershrub having very rich medicinal value. Preliminary photochemical screening revealed that the plant contains the secondary metabolites like flavonoids, terpenoids, cardiac glycosides in high amounts. *Tephrosia calophylla* plant showed very good anti microbial activity against the *Xanthomonas citri* and *Salmonella typhimurium* in different solvents ; ethanol ,methanol, chloroform, water and hexane.

Keywords: Antimicrobial, *Tephrosiacalophylla, Xanthomonas citri, Salmonella typhi*

INTRODUCTION

In the present world, medicinal plants are exclusively acknowledged when compared to synthetic drugs. It is being realized that quite a lot of diseases were found developing drug resistance to synthetic drugs and also accountable for many adverse effects. At present majority of the people are relying for their primary health care on traditional medicine. Increasing number of infectious diseases are incurable as many organisms are showing antibiotic resistance which requires the development of new medicaments to combat them. Natural products are playing an important role for this purpose.

Tephrosia calophylla is an under shrub with tuberous roots which belongs to the family fabaceae. Folklore of southern part of India claims its potentiality in treating various ailments like diabetes and jaundice with root tubers.

Leaf is used as medicine for antiseptic, ulcers, inflammations, anti-bacterial and antifungal diseases. Chemically the plant is found to be rich source of flavonoids. The constituents present in the plant play a significant role in the identification of the crude drug. Phytochemical screening is very important in identifying new sources of therapeutically an industrially important compounds like alkaloids, flavonoids, phenolic compounds, saponins, steroids are one of the tool to determine the quality and purity of the crude drug. The present study was undertaken to screen the secondary metabolites in Root, Leaf and Petiole of T. Calophylla to facilitate the research in drug discover process and also the present study was undertaken to determine the antimicrobial activity of plant extracts in different solvents against two bacterial pathogens, one is plant pathogen ,*Xanthomonas citri* and another is *Salmonella -typhimurium.*

MATERIALS AND METHODS

Collection of plant material:

Plant sample *T. Calophylla* was collected from Talakona forest region of Andhra Pradesh, Southern India. It was identified and confirmed with authenticated specimen housed at S.V. University and further confirmed by referring book "Flowering plants of Chittoor district" written by Dr. Madhava Chetty et al., S.V.University, Tirupati. The plant material was chopped off into small fragments separately as leaf, petiole and root and shade dried and grounded to fine powder separately as leaf, petiole and root.

Method of Phytochemical Screening :

The plant powder was subjected to phytochemical screening for the analysis of secondary metabolites. Each part of plant powder sample (60 gm) of *T Calophylla* was treated with solvents, ethanol, methanol, chloroform, water, ethylacetate, ethyl ether and hexane using soxhlet apparatus yielded secondary metrobolites. The preliminary phytochemical studies were conducted on the action extracts using standard procedures adopted by Harborne (1973) and Gibbs (1974).

Micro Organisms used:

For the present study micro organism samples were collected from S.V. Agricultural College, Tirupati. One is plant pathogen *Xanthomonas citri* and another pathogen is *Salmonella typhimurium.*

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Anti microbial eassay

The anti microbial activity of *T.calophylla* leaf, petiole and root extracts of different solvents (Ethanol, Methenol, Chloroform, Water and Hexane) studied against X-citri and *S. Typhimurium* by agar well method. Petridishes containing 18 ml of nutrient agar (at 40°) were with 8 mm *X. citri* and *S. typhinurium* innoculum disks at center of the petriplate, media was allowed to solidify and then individual petridishes were marked for the extract used. Wells of 6 mm diameter were cut into solidified agar media with the help of sterilized core border. Different volumes of each extract was poured in the respective well and the plates were incubated at 37° c for seven days. Organic solvents in which extracts were prepared were used as negative control. The experiment was performed in triplicate under strict aseptic conditions. The antibacterial activity for each of the diameter of inhibition (mm) produced by the respective extract at the end of the incubation period.

RESULTS AND DISCUSSION

Phytochemical Screening :

Preliminary phytochemical screening revealed the presence of Tannins, saponins, flavonoids, terpenoids, cardiac glycosides, reducing sugars, carbonyls, phlobatannins, steroids, alkaloids, phenols and ninhydrins. The root of *T.Calophylla* contains all the above said secondary metrobolites except steroids. .

Table 1: Phytochemical analysis with Root, Leaf and Petiole of *Tephrosia calophylla*

S.No.	Plant Compounds		E	M	C	H	E.A	E.E	W
1	Tannins	Root	+	+	-	-	-	-	+
		Leaf	+	+	-	-	-	-	+
		Petiole	+	+	-	-	-	-	+
2	Saponins	Root	+	+	+	+	-	-	+
		Leaf	-	+	+	+	-	-	+
		Petiole	+	+	+	+	-	-	+
3	Flavonoids	Root	+	+	+	-	+	+	+
		Leaf	-	-	-	-	-	-	-
		Petiole	+	+	+	-	-	-	+
4	Terpenoids	Root	+	+	+	+	+	+	+
		Leaf	+	+	+	+	+	+	+
		Petiole	+	+	+	+	+	+	-
5	Cardiac glycosides	Root	+	+	+	+	+	+	+
		Leaf	+	+	-	+	+	+	+
		Petiole	+	+	+	+	+	+	+
6	Reducing sugars	Root	+	+	+	-	-	-	+
		Leaf	+	+	+	+	-	-	+
		Petiole	+	+	-	-	-	-	+
7	Carbonyls	Root	-	-	-	+	-	-	+
		Leaf	-	-	-	+	-	-	+
		Petiole	-	-	-	+	-	-	+
8	Phlobatanins	Root	+	+	-	-	-	-	+
		Leaf	+	+	-	-	-	-	-
		Petiole	+	+	-	-	-	-	-
9	Steroids	Root	-	-	-	-	-	-	-
		Leaf	+	+	-	+	-	+	-
		Petiole	-	-	+	+	-	-	-
10	Ninhydrin test	Root	+	+	-	+	-	-	+
		Leaf	-	-	-	-	-	-	-
		Petiole	+	+	+	-	-	-	-
11	Alkaloids	Root	+	-	-	-	.	.	-
		Leaf	-	-	-	-	.	.	-
		Petiole	-	+	-	-	.	.	-
12	Phenols	Root	-	+	-	-	.	.	-
		Leaf	+	+	-	-	.	.	-
		Petiole	-	-	-	-	.	.	-

E=Ethanol,M=Methanol,C=Chloroform,H=Hexane,E.A=Ethylacetate,E.E=Ehyl ether,W=Water.

But it is rich in Terpenoids, cardiac glycosides and flavonoids. Leaf of *T. Calophylla* contains all the secondary metrobolites except Alkaloids, Ninhydrins, and Flavonoids. It is rich in Terpenoids and cardiac glycosides.Leaf is also having remarkable amounts of steroids, reducing sugars respectively. Petiole of leaf revealed the presence of all the above said secondary metrobolites except phenols. Petiole is rich in Terpenoids and Cardiac glycosides and saponins respectively. It is revealed that leaf blade contain no flavonoids but they are present in petiole

Antimicrobial activity

The extracts obtained through soxhlation using solvents : Ethanol, Methanol,. Chloroform, Water and hexane subjected to antimicrobial activity showed excellent result against *Xanthomonas citri* and *Salmonella typhimurium*. In the present study antimicrobial activity is tested separately as petiole, leaf blade and root extracts.

X. citri

Comparison among the petiole, root and leaf blade in all the extracts of different solvents, water extracts of petiole and root showed highest antimicrobial activity against *X. citri*. Among root extracts of all the solvents water extract showed highest inhibitory zone against *X.citri.* Among petiole extracts, water extract showed highest inhibitory zone. Coming to the leaf blade extracts of different solvents hexane extract showed highest inhibitory zone against *X. citri.*

Coming to the individual solvent extracts (eg: Ethanolic solvent extracts) of root, petiole and leaf blade, ethanolic extract of petiole, methanolic extract of root, chloroform extracts of root and leaf blade, water extract of petiole and root, hexane extract of root showed highest antimicrobial activity against *X. citri.*

S. Typhimurium

Comparison between root, petiole and leaf blade extracts of all the solvents, the water extract of *T. Calphylla* leaf blade showed the highest antimicrobial activity than the petiole and root against *S. typhimurium*.

Comparison between root extracts revealed that methanolic extract of root showed highest inhibitory zone, among leaf extracts, water extract and among petiole extracts methanolic extract showed highest inhibitory zone.

Comparison between individual solvent extracts (eg: ethanolic solvents, methanolic solvants), the ethanolic extract of leaf, methanolic extract of root, and chloroform extract of petiole and root, water extract of leaf hexane extract of leaf showed the highest zone of inhibition against *S.typhimurium*.

Finally it is revealed that the plant *T. calophylla* showed highest antimicrobial activity against *S. typhimurium* than *X. citri.*

Table 2 : Antimicrobial activity with petiole extracts of *T.calophylla* against *X.citri* and *S.typhimurium*

X.citri Zone of inhibition(mm)				Solvent	*S. typhimurium* Zone of inhibition(mm)			
40	60	80	100		40	60	80	100
8	10	12	13	Ethanol	-	-	-	-
7	8	10	12	Methanol	12	13	14	18
4	5	6	7	Chloroform	10	11	14	15
12	14	15	16	Water	7	8	10	10
-	-	-	-	Hexane	-	-	-	-

Table 3 : Antimicrobial activity with Leaf extracts of *T.calophylla* against *X.citri* and *S.typhimurium*

X.citri Zone of inhibition(mm)				Solvent	*S. typhimurium* Zone of inhibition(mm)			
40	60	80	100		40	60	80	100
7	8	10	11	Ethanol	10	12	13	14
6	7	8	10	Methanol	11	12	13	15
4	5	6	8	Chloroform	-	-	-	-
7	8	10	11	Water	15	15	16	20
7	8	10	12	Hexane	7	8	10	11

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Table 4 : Antimicrobial activity with root extracts of *T.calophylla* against *X.citri* and *S.typhimurium*

X.citri Zone of inhibition(mm)				Solvent	*S. typhimurium* Zone of inhibition(mm)			
40	60	80	100		40	60	80	100
5	8	10	11	Ethanol	8	9	10	11
8	10	12	14	Methanol	14	15	16	18
4	5	6	8	Chloroform	10	11	13	15
13	13	15	16	Water	-	-	-	-
9	10	11	12	Hexane	4	6	7	8

Earlier P. Harikrishna et al (2003) reported a new coumestan tephcalostan (I) in isolated from the whole plant. Seru Ganapathy et al (2009) reported a Benzil, Calophine A and three coumestan derivatives B, C and D isolated from roots of *T.calophylla*. primary phytochemical compounds and also antiprotozoal activity of *T.C.* are reported by S. Subhadra, V.R. Kancherapalli (2011).

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