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Antimicrobial Activity and Preliminary Phytochemical Analysis of *Tinospora cordifolia*

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In the present study, the methanolic and aqueous extracts of *T.cordifolia* were subjected to preliminary phytochemical analysis and anti microbial activities against certain pathogenic micro organisms.The phytochemical analysis revealed the presence of Alkaloids, Carbohydrates, Glycosides, Saponins, Sterols, Fats & Oils, Resins, Phenols, Proteins and Flavanoids. The antimicrobial activity of the methanolic extract was comparatively more for bacterial strains than that of the fungal strains. Further, antimicrobial activity was more in methanolic extract than the aqueous extract.

Key words: Antimicrobial activity, Phytochemical analysis, *Tinospora cordifolia*.

Tinospora cordifolia is popularly called Guduchi (Sanskrit), a glabrous,succulent,climbing shrub native to India. The branches bear smooth heart shaped leaves,unisexual greenish flowers (summer), and red berries (winter). Long thread like aerial roots arise from the branches as well. The viscous sap has a light yellow colour, odour and nauseating bitter taste (Kirtikar and Basu, 1995).

Although *T.corolifolia* is used clinically in the Indian system of medicine for the treatment of jaundice,diabetes and rheumatoid arthritis, it has also been found to possess adaptogenic, anti-inflammatory, antineoplastic, antioxidant, hepatoprotective, hypolipidemic, and immunologic properties (Kapil & Sharma ,1997).

In recent times the traditional indigenous medicines are considered as an alternative against antibiotics. The medicinal values of *T.cordifolia* is known from time immemorial (Chopra *et al.,* 1982). The objective of the present study is to investigate the effectiveness of the leaf extracts of *T. cordifolia* (aqueous and methanolic extracts) against few selected pathogens using appropriate standard methods.

MATERIAL AND METHODS

Plant material and Extracts preparation

The fresh leaves of *T.cordifolia* were collected from near by areas of Thanjavur,Tamilnadu, was brought to the laboratory and shade dried to crisp. They were then subjected to pulverization to get coarse powder. The coarse powder was subjected to soxhlet extraction separately and successively with

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methanol and water. These extracts were concentrated to dryness in flash evaporator under reduced pressure and controlled temperature(40^0-50^0C). Both extracts were put in separate air tight containers and stored in a refrigerator.

Qualitative phytochemical analysis

Qualitative phytochemical analysis were done by using the procedures of Kokate *et al.*, (1995). Alkaloids, Carbohydates, Tannins and Phenols, Flavanoids, Gums and Mucilages, Phytosterol, Proteins and Amino acids,Fixed oils, Fats, Volatile oil and saponins were qualitatively analyzed.

Microbial cultures

The microorganisms used in the present study were procured from National Chemical Laboratory (NCC), Pune.

Screening for Antimicrobial activity

The disk diffusion method was followed for antimicrobial susceptibility tests. The plates were prepared by pour plate technique using muller hinton agar for bacterial strains and potato dextrose agar for fungal strains with the proper concentrations of the inoculums. The filter paper discs impregnated with aqueous and methonolic extracts of *T.cordifolia* were placed at suitable distance on the plate.The plates were incubated at 37^0C for 24 h and were examined after 24 h. The diameter of the zone of inhibition was measured in mm and recorded.

RESULTS AND DISCUSSION

Traditionally *Tinospora cordifolia* is being used by hindu physicians to treat gonorrhoea, general weakness, fever, dyspepsia, dysentery, secondary syphilis, urinary diseases, impotency, gout, viral hepatitis, skin diseases and anemia (Chopra *et al.*, 1982). In compound formulations, guduchi is clinically used to treat jaundice, rheumatoid arthritis, and diabetes. The root is considered to be a powerful emetic and is used for bowel obstruction (Wadood *et al.*, 1992).

Table 1. Preliminary phytochemical analysis of aqueous and methanolic extracts of *T. cordifolia*

S.No	Test	Result
1	Alkaloids	+
2	Carbohydrates	+
3	Glycosides	+
4	Saponins	+
5	Sterols	+
6	Fats & oil	+
7	Resins	+
8	Phenols	+
9	Tannins	-
10	Flavanoids	+
11	Proteins	+
12	Diterpenes	-

+ = presence and - = absence of phytochemicals

Table 2. The antimicrobial activity of aqueous and methanolic extracts of *T.cordifolia*

S. No	Name of the organism	Zone of inhibition (mm)				
		Aqueous extract	Methanolic extract	Cephalosporin (50mg)	Amikacin (50mg)	Fluconazole (20mg)
Bacteria						
1.	*Staphylo coccus aureus*	12	20	24	20	-
2.	*Escherichia coli*	13	18	18	22	-
3.	Rhodo coccus	18	19	22	18	-
4.	*Bacillus subtilis*	12	18	17	21	-
Fungi						
1.	*Aspergillus niger*	12	12	-	-	22
2.	*Trichoderma reesei*	12	11	-	-	21
3.	*Saccharomyces cerevisiae*	13	15	-	-	20

- = No Activity.

The plant was also found to normalize the phagocytic function of peritoneal macrophages in CCl_4 intoxicated rats (Rege and Dahanukar, 1993). It was also well known for its immunomodulatory activities (Kapil and Sharma, 1997), anti diabetic activity (Stanley *et al.,* 2000), anti oxidant activity (Prince *et al.,* 1999; Mathew and Kuttan, 2001).

The preliminary phytochemical studies revealed the presence of alkaloids, carbohydrates, glycosides, saponins, sterols, fats and oils, resins, phenols, flavonoids and proteins (Table 1). Regarding the antimicrobial activity, it was more against bacterial strains than fungal strains. The maximum activity was observed against *Staphylococcus aureus.* (20mm) Among the two extracts, methanolic extract was more potent than aqueous extract. Further studies are required to establish the exact nature and mechanism of the active principles present in the extract.

REFERENCES

1. Kirtikar, K.R., Basu, B.D. editors, *Indian medicinal plants,* 1975; **1(2) :** 192-198.
2. Kapil, A., Sharma, S. Immuno potentiating compounds from *T. cordifolia*. *J. Ethnopharmacol.,* 1997; **58:** 89-95
3. Chopra, R.N., Chopra, I.C., Handa, K.L., Kapur, L.D. Indigenous drugs of India, second edition. Academic publishers, New Delhi, 1982; 426 – 428.
4. Kokate, C.K., PracticalPharmacognosy, Vallabh Prakashan, Pune. 4th ed. 1996; 107-109s
5. Wadood, N., Wadood, A., Shah, S.A. Effect of *T. cordifolia* on blood glucose and total lipid levels of normal and alloxan induced diabetic rabbits. *Planta Med.,* 1992; **58:** 131-136.
6. Rege, N.N., Dahanukar, S.A. Quantitation of microbicidal activity of mononuclear phagocytes: an invitro technique. *J. Postgrad. Med.,* 1993; **39(1)** : 22-25.
7. Stanley P., Prince, M., Menon, V.P. Hypoglycacmic and other related actions of *T. cordifolia* roots in alloxan indueed diabetic rats. *J. Ethnopharamacol.,* 2000; **70(1)** : 9-15.'
8. Prince, P.S., Padmanabhan, M., Menon, V.P., Antioxidant activity of *T. cordifolia* roots in experimental diabetes. *J. Ethnopharmacol.*, 1999; **65(3)** : 277-281.
9. Mathew, S., Kuttan, G. Antioxidant activity of *T. cordifolia* and its useflness in the amelioration of cyclophosphamide indueed toxicity. *J.Exp. Clin. Cancer Res.,* 2001; **20(4)** : 219-223.