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Screening for Phytochemicals and Antimicrobial Activity of Aqueous extract of *Tridax procumbens*

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ABSTRACT

The plants are producing different types of secondary metabolites and are employed either indirectly or directly in the pharmaceutical industries. The chemical constituents of secondary metabolites improve the primary health and physiological activity in human systems. *Tridax procumbens* is belonging to Asteraceae family. *T. procumbens* is classified as a weed. In traditional medicine, the leaves, root, and stem of *T. procumbens* were used to treatment of stomach pain, diarrhoea, colds, inflammations, hepatopathies, bacterial and skin infections. The main objectives of present study were to screen the phytochemicals and antimicrobial activity of aqueous extract of weed plant (*T. procumbens*). The phytochemical screening was carried out using the stranded methods. The evaluation of antimicrobial activity for aqueous extract of *T. procumbens* was done by agar well diffusion method using bacterial and fungal pathogens such as *Bacillus subtilis, Escherichia coli, Fusarium oxysporium* and *Trichoderma reesei*. All the phytochemicals such as carbohydrates, phenolic groups, glycosides, tannin, alkaloids, saponin, flavonoids and steroids were present in the extract of *T. procumbens* and were confirmed by phytochemical analysis. The aqueous extract has not shown antibacterial and antifungal activity against tested pathogens. Other evaluation process is to be done on isolation of phytochemicals and chemical structure determination of bioactive compounds.

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INTRODUCTION

Ayurveda, traditional Indian medicine (TIM) and Traditional Chinese medicine (TCM) are determined the most of the modern knowledge associated to medicinal plants (Patwardhan *et al.*, 2005). World Health Organization (WHO) reported that 80 percentage of population in developing countries depends on the traditional medicines for their primary health care needs and these treatments included the usages of plant extracts and their bioactive compounds (Joshi *et al.*, 2011). Medicinal plants and their extracts are used to treat and prevent the diseases. The secondary metabolites from medicinal plants are controlling the growth of microbes. Medicinal plants have rich amount of antimicro-

bial agents (Rajiv and Sivaraj, 2012) and they are play important role in development of new drug and drug formulation. The usage of medicinal plants has added advantage of minimize the more side effects often associated with chemically synthetic antimicrobial agents (Vu *et al.*, 2015). Several researchers have been investigated on evaluation of antimicrobial and pharmacological properties of herbal extract includes (stem, flower, root and leaves) (Moura-Costa *et al.*, 2012; Fomogne-Fodjo *et al.*, 2014). An investigation and screening of the phytochemicals from medicinal plants are very important steps in medicinal and pharmacy research (Banso and Adeyemo, 2007). Phytomolecules with biological activities are reported for treatment of various bacterial, fungal, viral and protozoan infections (Parekh and Chanda, 2007). At present, it is estimated that 28% of modern medicinal fields are used plant derived bioactive compounds by directly or indirectly. In past years, Number of novel bioactive compounds have authorized and subscribed as phyto-medicines (Fridlender *et al.*, 2015).

Tridax procumbens is commonly called as coat buttons. It is belonging to Asteraceae family. *T. procumbens* is classified as a noxious weed. In traditional medicine, it is used to treatment of stomach pain, anemia, diarrhea, colds, inflammations, hepatopathies, high blood pressure, mucosal inflammations, diabetes. protozoal infections and skin infections (Ravikumar *et al.*, 2005). Few of the researchers have been assessed the antibacterial, antifungal, antioxidant, antihyperuricemia and anticancer activity (Andriana *et al.*, 2019; Pandey *et al.*, 2016). In the present study aim is to investigate the screen and analysis of phytochemicals and antimicrobial activities using aqueous extract of weed (*T. procumbens*).

MATERIALS AND METHODS

Materials

T. procumbens were obtained from follow lands in and around of Karpagam Academy of Higher Education, Coimbatore, India and authenticated by Botanical Survey of India, Coimbatore.

Preparation of aqueous extract

Five gram of fresh and healthy *T. procumbens* was collected, washed with tap water and following with distilled water. The samples were ground into fine powder with help of mortar and pestle using aqueous solvent. A 50 mL of crude extract was kept in water bath under 80°C for 30 min. The samples were ground into fine powder with help of mortar and pestle using ethanol, hexane and chloroform. Then, the crude extract was filtered and filtrate was stored at 4°C for further analysis.

Analysis of phytochemicals

The aqueous extract of *T. procumbens* was employed for screen the primary and secondary metabolites. The preliminary phytochemicals screening was assessed using the standard protocols (Harborne *et al.*, 1999).

Assessment of antimicrobial properties

The antimicrobial activity was investigated by well diffusion method. The bacterial and fungal pathogens were obtained from Department of Microbiology, Karpagam Academy of Higher Education, Tamil Nadu. The selected pathogens were grown in nutrient broth. The Muller Hinton agar and Potato dextrose agar plates were prepared. The selected pathogens were swabbed on respective plates and wells were made. Various concentration of aqueous extract was poured in wells. The plates were incubated at 37°C for bacteria and room temperature for fungi. The standard antibiotics (Fluconazole for fungi and tetracycline for bacteria) were used as positive control. The assessment of antimicrobial properties was calculated by the zone of inhibition (in diameter mm).

RESULTS AND DISCUSSION

Analysis of phytochemicals

The phytochemical analysis of aqueous, hexane, chloroform and ethanol extract has been shown in Table 1. Carbohydrates, phenolic compounds and glycosides were present in all the extract. Saponin was observed in aqueous extract. Tannin and steroids were absent in ethanol extract. The alkaloids were occurred in chloroform extract. All the phytochemicals such as carbohydrates, phenolic groups, glycosides, tannin, alkaloids, saponin, flavonoids and steroids were occurred in *T. procumbens.* The similar results were reported by (Sawant and Godghate, 2013; Jhample *et al.*, 2015). They concluded that the all phytochemicals were present in methanol and acetone extract of *T. procumbens.*

Analysis of antimicrobial properties

Table 2 represents the antimicrobial activity for aqueous extract of *T. procumbens*. Plant extract (aqueous) was not shown the antifungal and antibacterial activity against fungal and bacterial pathogens. The similar study was conducted by (Jain *et al.*, 2015) and reported the aqueous extract (stem and leaves) of *T. procumbens* was not inhibit the growth of *Bacillus subtilis, E.coli,*

Table 1: Screening of phytochemicals for aqueous extract of *T. procumbens*

S.no	Phytochemicals	Aqueous	Ethanol	Hexane	Chloroform
1	Alkaloids	-	-	-	+
2	Flavonoids	-	+	+	+
3	Steroids	+	-	+	+
4	Phenolic compounds	+	+	+	+
5	Tannins	+	-	+	+
6	Carbohydrates	+	+	+	+
7	Glycosides	+	+	+	+
8	Saponins	+	-	-	-

"+" means present and "-" refers absent

Table 2: Analysis of antimicrobial properties for aqueous extract of *T. procumbens*

S.no	Name of the microbes	Zone of inhibition (in diameter mm)		
		25 μl	50 μl	Strand antibiotic
1	Escherichia coli	No activity	No activity	22.5 $\pm$1.2
2	Salmonella typhi	No activity	No activity	15.5 $\pm$ 0.5
3	Pseudomonas aeruginosa	No activity	No activity	22 $\pm$ 0.2
4	Klebsiella pneumoniae	No activity	No activity	20.5 $\pm$ 0.5
5	Sclerotinum rolfsii	No activity	No activity	16.5 $\pm$ 1.0
6	Fusarium oxysporum	No activity	No activity	18 $\pm$ 0.5

Fusarium oxysporium and *Trichoderma reesei.* Methanolic extract (stem and leaves) of *T. procumbens* was inhibiting the growth of *B. subtilis, E.coli, F. oxysporium* and *T. reesei* (Jain *et al.*, 2015). The zone was obtained in positive control (standard antibiotics). This analysis concluded that there is no antibacterial and antifungal property for aqueous of *T. procumbens*.

CONCLUSIONS

The present study confirms that presence of phytochemicals in weed plant (*T. procumbens*). Hexane, chloroform, ethanol and chloroform mediated *T. procumbens* extracts have rich amount of phytochemicals. The aqueous extract has not shown the antimicrobial activity. Hence the aqueous extract of *T. procumbens* may not employ for treatment of any microbial diseases. The necessary processes like Isolation, quantification of phytochemicals and assess the other biological activities using this plant are to be needed.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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