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Research Article

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Phytochemical and antimicrobial evaluation of leaves extracts of *Taebernaemountana coronaria*

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ABSTRACT

Phytochemical analysis of the dried leaves of Taebernaemontana coronaria (Apocynaceae) indicates the presence of a steroids, tannins, saponins, alkaloids and reducing sugars. The Phamacological interest of these compounds coupled with the use of this plant is traditional medicine promoted the authors to check for its possible antimicrobial activity. The extracts (pet ether, chloroform and ethanol) were found to possess maximum activity against infectious pathogens. The zone of inhibition was observed with four antimicrobes with some exceptions. The obtained results provide a support for the use of this plant in traditional medicine and its further investigation.

Keywords: Antimicrobial activity, Apocynaceae, phytochemical analysis, *Taebernaemountana coronaria*

INTRODUCTION

Some medicinal plants have been used for a wide variety of purposes such as food preservation, pharamaceutical, alternative medicine and natural therapies for many thousands of years. It is generally considered that compounds produced naturally rather than synthetically will be biodegraded more easily and therefore be more environmentally acceptable. Thus naturally antioxidants, antibacterian cytotoxic, antiviral, fungicidal agents and nutrients have gained popularity in recent years and their use and positive images among consumers are spreding. In recent years, multiple drug resistance in both human and plant pathogenic microorganisms have been developed due to the indiscriminate use of commercially antimicrobial drugs commonly used in the treatment of infectious diseases [1,2] . In order to find new therapeutic agents , plants that have antimicrobial activity have attracted attention[3-5].

Tabernaemontana coronaria, commonly known as Tagar belongs to the family Apocynaceae is a beautifully shaped evergreen shrub which blooms in spring but flowers may appear sporadically all year and distributed throughout Bangladesh and other parts of the South East Asia. The phytochemistry and a number of chemical constituents from the leaves, stems and roots have been reported previously. Constituents studied include alkaloids and non-alkaloid constituents such as terpenoids, steroids, flavonoids, phenyl propanoids, phenolic acids and enzymes[6-9]. In folklore practice it is used to treat fever and diarrhea. The plant is also used as tonic to the brain, liver and spleen [10]. It is reported that plant extract possesses antinociceptive[11] , antioxidant[12] , anti-inflammatory[13]and reversible acetylcholinesterase inhibition[14] activities. The present study was designed to investigate the antimicrobial activity of the plant *Taebernaemontana coronaria* in order to examine the pharmacological basis of the use of the plant in folk medicine for the treatment of infectious diseases.

Phytochemical investigation:
Preliminary phytochemical tests were performed in order to determine the presence or absence of phytoconstituents. The results for preliminary phytochemical evaluation are depicted in table-1.

EXPERIMENTAL SECTION

Plant material:
The leaves of *Tabernaemontana coronaria* were collected in the month of May-June from the fields around the area of Aagardhalli in Shimoga district, Karnataka. The plant was authenticated by Prof. M.S. Pushpalatha, Department of Botany, Sahyadri Science College, Shimoga.

Preparation of extracts:
Leaves were shade dried and coarsely powdered. The powdered plant material (1000g) was successfully extracted using soxhlet extractor by the solvents viz., pet ether(60-80^{0}C), chloroform and ethanol, according to their increasing polarity respectively. The extract obtained was filtered and evaporated to dryness under reduced pressure in rotary vacuum evaporator[15].

Antimicrobial activity
The cup-plate method was used for evaluating antimicrobial activity of the crude extracts

Micro organisms used:
The bacterial cultures viz., *E.coli* (NCIM 2945) *S.aureus* (NCIM2127) and the fungal cultures viz., *A.niger* (NCIM 798) and *C.albicans* (NCIM 3102). These cultures were procured from National Collection of Industrial Micro organism (NCIM), Pune, India.

Antibacterial activity:
The pet ether, chloroform & ethanolic extracts of *Tabernaemontana coronaria* were tested by the cup-plate method. Different concentrations of the extracts (5%, 10%, 15%, 20%) was prepared. The petriplates were poured with Nutrient agar medium and allowed for solidification. The test microorganisms (*E. coli* & S. *aureus*) were swabbed on the petriplate containing media. The four wells were prepared using cork borer. Different concentrations were filled in these wells. Then the plates were incubated at 37^{0}C for 24h along with the standard being Ciprofloxacin and control DMSO respectively. The diameter of the inhibition zones were measured in mm. The results were tabulated in table-2.

Antifungal activity:
The pet ether, chloroform & ethanolic extracts of *Taebernaemontana coronaria* were tested by the cup-plate method [16]. Different concentrations of the extracts (5%, 10%, 15%, 20%) was prepared. The petriplates were poured with Nutrient agar medium and allowed for solidification. The test microorganisms (*A. niger* & *C. albicans*) were swabbed on the petriplate containing media. The four wells were prepared using cork borer. Different concentrations were filled in these wells. Then the plates were incubated at 28^{0}C for 48h along with the standard and control Flucanazole and DMF . The diameter of the inhibition zones were measured in mm.Results were tabulated in table -3

RESULTS AND DISCUSSION

All the extracts have showed antibacterial and antifungal activity against the organisms. The results revealed that chloform and ethanolic extracts exhibited considerable zone of inhibition against *Escherichia coli* and *Staphylococcus aureus*. The ethanolic extract has showed moderate activity against both the organisms at 20% concentration. All the extract were compared with the standard drug Ciprofloxin. The different concentration of all the extracts also exhibited potent antibacterial activity. Antifungal activity was carried out against *Aspergillus niger* and *Candida albicans*. The ethanol extract showed maximum zone of inhibition at all the concentrations. The pet ether and chloroform extract showed potent antifungal activity. All the extracts were showed comparable activity with the standared drug Flucanazole.

This study has shown the scientific basis for the therapeutic uses of traditional plants. The obtained results provide a support for the use of this plant in traditional medicine and its further investigation.

Table- 1: Preliminary phytochemical screening:

Phytoconstituent	Pet ether extract	Chloform extact	Ethanol extract
Alkaloid	**-ve**	**+ve**	**+ve**
Flavanoids	**-ve**	**-ve**	**+ve**
Tannins/Phenols	**-ve**	**-ve**	**+ve**
Steroids/tritepenoids	**+ve**	**-ve**	**+ve**
Saponins	**-ve**	**-ve**	**+ve**

Table-2 : Antibacterial activity

Extract	Zone of inhibition (in mm)							
	Escherichia coli				*Staphylococcus aureus*			
	5%	**10%**	**15%**	**20%**	**5%**	**10%**	**15%**	**20%**
Petroleum ether extract	2.5	3.75	4.40	6.5	2.0	3.5	5.0	7.5
Chloroform extract	5.0	6.25	7.5	8.3	4.5	5.75	6.6	7.8
Ethanol extract	6.7	7.8	8.3	8.9	5.5	6.8	7.9	8.6
Ciprofloxacin	9.0				10.0			
Control (DMSO)	----				----			

Table-3 Antifungal activity

Extract	Zone of inhibition (in mm)							
	Aspergillus				*Candida albicans*			
	5%	**10%**	**15%**	**20%**	**5%**	**10%**	**15%**	**20%**
Petroleum ether extract	4.6	5.5	7.8	8.8	5.0	6.0	7.8	8.9
Chloroform extract	4.0	5.8	8.0	10.0	6.2	7.9	8.75	10.5
Ethanol extract	5.8	6.9	8.6	11.2	6.7	7.25	9.75	11.3
Fluconozole	13.0				12.0			
Control (DMF)	----				----			

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