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Preliminary phytochemical screening and antibacterial studies of the flowers of *Antigonon leptopus*

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ABSTRACT

The present study was carried out to evaluate the antibacterial properties of Antigonon leptopus against certain gram positive bacterial strains (Bacillus subtilis, Bacillus peritolis and Salmonella typhi) using disc diffusion method. The flower extracts of Antigonon leptopus were prepared using different solvents like ethanol and chloroform and are screened for its anti-bacterial activity. The best suitable extract was further optimized from the results of anti-bacterial studies. The phytochemical screening of the flower extracts was performed. The anti-bacterial activities of ethanol extract and chloroform extract of Antigonon leptopus flowers are checked by disc diffusion method. Both the flower extracts exhibited significant inhibition. Comparative study of the results obtained from the above methods indicates that the ethanol extract shows better antibacterial activity against these strains. All the extracts showed concentration dependent activity comparable with the reference Drug Streptomycin.

Key words: *- Antigonon leptopus, Anti-bacterial activity, Anti-bacterial agent.*

INTRODUCTION

The search for selective antibacterial agents has gained importance in recent era due to the growing cases of bacterial resistance to the time honored antibiotics [1-2]. So, this situation fetches the interest of scientist to develop newer broad spectrum antibacterial agents [3]. Plants contain numerous biologically active compounds, many of which have been shown to have antibacterial properties [4-6]. Plant-derived medicines have been part of traditional health care in most parts of the world [7]. The present study describes the evaluation and phytochemical screening of antibacterial potency plant species *Antigonon leptopus.*

Antigonon leptopus (family: polygonaceae) commonly known as “coral bells” or Mountain rose; is a known medicinal plant. The plant parts were utilized extensively by the Chinese and Indians.

As part of a search for antibacterial compounds from these plants we extracted and screened the flowers for antibacterial activity. It was found that the alcoholic extract showed the antibacterial activity.

MATERIALS AND METHODS

Plant material:

The flowers of plant material *Antigonon leptopus* was obtained from the local area in and around Narasaraopet, Guntur district (India). The plant was indentified based on its floral description given in the literature. The plant flowers were air dried under shade and made into fine powder by using hand homogenizer and sieved through sieve no. 40 and the fine powder was used for extraction procedure and other evaluation.

Chemicals

All the solvents used in this study were purchased from Merck Chemicals, India, of analytical grade.

Preparation of extract:

Antigonon leptopus flower powder (10 gm) was taken in 100 ml of ethanol and chloroform and macerated in stopper flask for 48 hours (hrs) ,shaking frequently during first six hrs at room temperature. Next day the mixture was filtered by using Whattmann no.1 filter paper and it was dried on water bath until the constant weight with dry mass was obtained for ethanol and chloroform extract was found to be 16 and 9.2 gm respectively (table 1)[8].

Preliminary Phytochemical Analysis

Phytochemical screening of plant extracts was done following the standard procedure by Santaram (1983), Chhabra et al (1984) and Harbone (1998). All the prepared plant flower extracts were subjected to preliminary phytochemical screening for the presence of alkaloids, quinines, resins, tannins, fixed oils, flavanoids, fats, saponins, phenolic compounds, Proteins and carboxylic acids [9-10]. The results were shown in table 2.

Disc Diffusion Method

a) Preparation of Discs

From the plant extracts, 50 mg and 100 mg of crude extracts were dissolved in 1 ml of 4 % dimethyl sulphoxide (DMSO) and 0.2 ml of the prepared extracts were loaded on to the filter paper discs (Sterilized Whatmann No. 1 filter paper discs of 6 mm diameter) to get 20 µg / disc concentration and allowed to dry at room temperature in laminar air flow chamber [11-14].

b) Micro organisms used

The screening of the anti-bacterial activity of *Antigonon leptopus* crude extracts were carried out individually on active cultures of *Bacillus subtilis, Bacillus peritolis and Salmonella typhi.*

c) Preparation of media

Muller Hinton Agar (MH, Hi media) was used. The formula (gm/litre) Beef extract 2g, casein acid hydrolysate 17.5g, starch 1.5 g and agar 17g; pH 7.4 ± 0.2.About 38g of MH agar was weighed and dissolved in 1000 ml of distilled water and adjusted to pH 7.4 ± 0.2, sterilized by autoclaving at 121 °C for 15 minutes at 15 psi pressure and was used for sensitivity tests [11-14].

d) Antimicrobial activity

The antimicrobial activity of the extracts was evaluated by disc diffusion method [15].Previously prepared paper discs containing different extracts were placed individually on the surface of the petriplates, containing 20 mL of respective media seeded with 0.1 ml of previously prepared microbial suspensions individually (10 CFU/mL). Standard antibiotic Streptomycin (20 µg/disc) obtained from Hi-media, Mumbai, was used as positive controls. The discs containing petroleum ether, chloroform and methanol served as negative controls. The assessment of antimicrobial activity was based on measurement of inhibition zones formed around the discs. The plates were incubated for 24 h at 37°C and the diameter of the inhibition zones was recorded.

RESULTS AND DISCUSSION

The ethanol and chloroform extracts of *Antigonon leptopus* flower having extractive value 16 and 9.2 (table 1) on phytochemical screening showed the presence of Volatile oils, carboxylic acids, terpenes, carbohydrates and glycosides as chemical constituents. The results are shown in table2. The anti-bacterial activity of various extracts like ethanol extract, chloroform extract are evaluated and compared using disc diffusion method. All the test extracts of *Antigonon leptopus* flower possess significant antibacterial activity against the gram positive pathogens. Among the two extracts, the ethanol extract showed a higher activity than other extracts (Table-3). This may be due to the solvent extract containing different constituents having antibacterial activity. Ethanol was proved as the most effective solvent for extracting broad spectrum of antibacterial compounds from plants.

Table 1 Extractive values of flower extract of *Antigonon leptopus*

S.No	Type of extract	Extractive Value(in grams)
1	Ethanol extract	16
2	Chloroform extract	9.2

Table 2 Phytochemical screening of flower extract of *Antigonon leptopus*

S.No	Plant constituents	Ethanol extract	Chloroform extract
1	Test for Alkaloids	-	-
2	Test for Volatile oils	+	+
3	Test for Carboxylic acids	+	+
4	Test for Fixed oils	-	-
5	Test forPhenols	-	-
6	Test forQuinones	-	-
7	Test forResins	-	-
8	Test forSaponins	-	-
9	Test forTannins	-	-
10	Test for Glycosides	+	-
11	Test forCoumarins	-	-
12	Test forCarbohydrates	+	+
13	Test for Emadins	-	-
14	Test for Fatty acids	-	-
15	Test forTerpenes	+	+
16	Test for Cardinolides	-	-

\+ *Indicates the presence of the constituents.; Indicates the absence of the constituents.*

Table 3 Antibacterial activity of flower extract of *Antigonon leptopus*

Gram positive pathogens	Flower Extracts of *Antigonon leptopus* (500 µg/ml)		
	Ethanol Extract (mm)	Chloroform Extract (mm)	Streptomycin (mm)
Bacillus subtilis	**20**	**18**	**24**
Bacillus peritolis	**18**	**17**	**20**
Salmonella typhi	**11**	**9**	**14**

CONCLUSION

The result of this work suggested that the flower extract of *Antigonon leptopus* has potent antibacterial activity against *Bacillus subtilis*, *Bacillus peritolis* ,*Salmonella typhi* which are gram positive and pathogenic. Therefore the results justify the use of the flower exrtract in treating these pathogenic strains and production of new antibiotics. It is essential that research should continue to isolate and purify the active components of this natural plant and use in experimental animals.

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