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### Studies on anti-microbial activity of flower extracts of *Antigonon leptopus* against common dental pathogens

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#### ABSTRACT

The present study was carried out to evaluate the anti-microbial properties of *Antigonon leptopus* against certain microbial strains causing dental carries (*Micrococcus albus*, *Staphylococcus aureus*, *Proteus vulgaris* and *Pseudomonas aerogenosa*.) using disc diffusion method. The flower extracts of *Antigonon leptopus* were prepared using solvents like ethanol and chloroform and are screened for its anti-microbial activity. The phytochemical screening of the flower extracts was performed. The anti-microbial activities of ethanol extract and chloroform extract of *Antigonon leptopus* flowers are checked by disc diffusion method. Both the flower extracts exhibited significant inhibition against these dental pathogens. Comparative study of the results obtained from the above methods indicates that the ethanol extract shows better anti-microbial activity against these strains. All the extracts showed concentration dependent activity comparable with the reference drug Streptomycin.

**Key words:** - *Antigonon leptopus*, Anti-microbial activity, Dental pathogens.

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#### INTRODUCTION

Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural resources. Plants contain numerous biologically active compounds, many of which have been shown to have anti-microbial activity [1]. Thus over 50% of these modern drugs are of natural origin and as such these natural compounds play an important role in drug development in pharma industry [2]. Diseases spread by microbes are the number one cause of death worldwide. This may be due to increasing incidence of multiple drug resistance. Microbial resistance to almost all anti-microbial agents has been reported [3]. This resistance is largely due to indiscriminate use of anti-microbial drugs commonly used in

treatment of these diseases. A part from resistance, some antibiotics has side effects which limit their usage. So there is a urgent need to discover new spectrum of anti-microbial agents with minimal side effects, and higher plants are potential source of novel anti-microbial prototypes [4].The present study describes the evaluation and phytochemical screening of anti-microbial potential plant species *Antigonon leptopus* against four common human dental pathogens.

*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 a part of search for anti-microbial compounds from these plants we extracted and screened the flowers for anti-microbial activity. It was found that the alcoholic extract showed the anti-microbial 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-microbial activity of crude extracted from the flowers of *Antigonon leptopus* were carried out individually on active cultures of, *Staphylococcus aureus*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Micrococcus albus*.

**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  $7.4 \pm 0.2$ . About 38g of MH agar was weighed and dissolved in 1000 ml of distilled water and adjusted to pH  $7.4 \pm 0.2$ , sterilized by autoclaving at 121 °C for 15 minutes at 15 psi pressure and was used for sensitivity tests [11-14].

**d) Anti-microbial activity**

The anti-microbial 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 anti-microbial activity was based on measurement of inhibition zones formed around the discs. The plates were incubated for 24 h at 37°C and the diameters of the inhibition zones were recorded.

## RESULTS AND DISCUSSION

The ethanol and chloroform extracts of *Antigonon leptopus* flower having extractive value 16 and 9.2gm (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 table 2. The anti-microbial activities 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 anti-microbial activity against these common human dental 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 anti-microbial activity. Ethanol was proved as the most effective solvent for extracting broad spectrum of anti-microbial 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 for Phenols	-	-
6	Test for Quinones	-	-
7	Test for Resins	-	-
8	Test for Saponins	-	-
9	Test for Tannins	-	-
10	Test for Glycosides	+	-
11	Test for Coumarins	-	-
12	Test for Carbohydrates	+	+
13	Test for Emadins	-	-
14	Test for Fatty acids	-	-
15	Test for Terpenes	+	+
16	Test for Cardinolid	-	-

+ Indicates the presence of the constituents.

- Indicates the absence of the constituents.

**Table 3 Anti-microbial activity of flower extract of *Antigonon leptopus***

Dental pathogens	Flower Extracts of <i>Antigonon leptopus</i> (500 µg/ml)		
	Ethanol Extract (mm)	Chloroform Extract (mm)	Streptomycin (mm)
<i>Staphylococcus Aureus</i>	11	9	23
<i>Proteus vulgaris</i>	14	12	28
<i>Pseudomonas aeruginosa</i>	10	7.5	12
<i>Micrococcus albus</i>	11	9.5	19

## CONCLUSION

The result of this work suggested that the flower extracts of *Antigonon leptopus* has potent anti-microbial activity against *Staphylococcus aureus*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Micrococcus albus* which are common human dental pathogens. Therefore the results justify the use of the flower extract 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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