ABSTRACT

Aim: The current study was aimed to investigate the antibacterial efficacy of C. punctatum Cass. Methods: Solvents such as ethanol and water were respectively used to evaluate the antimicrobial potential of the aerial parts of Centratherum punctatum against Staphylococcus aureus, Bacillus subtilis, E.coli and Proteus by well diffusion method. The maximum activity was observed in aqueous extract when compared with that of the ethanol extract. Results: The results of the study revealed that the whole plant extract possess good antimicrobial activity. Water extract of C. punctatum has more antimicrobial potential than ethanol extract. Conclusion: The major chemical constituents of plant may also contribute in the management of various diseases for which it is used as anti cancer, analgesic and wound healing agents.

KEYWORDS: Centratherum punctatum, aqueous and ethanol extraction, antimicrobial activity.

INTRODUCTION

According to World Health Organization medicinal plants with various life nourishing constituents would be the best starting place to obtain a variety of alarming, safe and novel drugs. Remedial efficacies of many home-grown plants, for various diseases have been described by traditional herbal medicine practitioners. At the commencement of nineteenth century active secondary metabolite principles of medicinal plants were purified and used as part of medicines, which has no side effects to the human being. These bioactive
compounds are exploited on a large scale because of their more systemic and no toxic effects. For human diseases and other organisms, medicinal plants have been used for centuries as remedies as they contain therapeutic components. Medicinal plants have become the focus of intense study in terms of validation of their traditional uses through the determination of their actual pharmacological effects. Synthetic drugs are not only expensive and inadequate for the treatment of diseases, but also often with adulterations and side effects. Therefore there is need to search new infection fighting strategies to control microbial infections. Hence in the present investigation an attempt was made to analyze the antibacterial activity of *Centratherum punctatum* against the bacterial infections. *Centratherum punctatum* a traditional drug belonging to the family Asteraceae. *Centratherum punctatum* Cass. is one among 33 species of the type genus *Centratherum* and is a perennial bushy plant of 45-60 cm height. It has a well branched stem with refreshing scented foliage and purple flower heads. Recently an essential oil containing nearly 59 different compounds has been isolated from the leaves of this plant, Centratherin, a sesquiterpene lactone, has been isolated from *C. punctatum* but its medicinal properties have not yet been established conclusively. A related species *C. anthelminticum* is known for antifilarial, and antihyperglycemic properties.

The present work deals with the antimicrobial efficacy of *Centratherum punctatum* Cass. It was noticed that, detailed study is lacking in this plant. The present paper attempts to analyze the antibacterial activity of *C. punctatum* against bacterial infections which could be useful in evaluating the therapeutic potentials of this ornamental plant.

**MATERIALS AND METHODS**

**Plant Materials**

Aerial parts of the selected plants were collected from in and around Trichy, identified using Flora of Presidency of Madras and authenticated by comparing with the specimen deposited at RAPINET Herbarium, St. Joseph’s College, Trichy, Tamil Nadu, India.

**Extract preparation**

Aerial portion of the selected plant drug was thoroughly washed to remove all the impurities and foreign organic matter and then shade dried in the beginning and further dried in an oven at 40 °C for 24 hr. The dried material was powdered to obtain a fine powder and then sieved. This is stored in plastic container at 40 °C until use. The powdered samples were subjected to aqueous and ethanol extraction. 100gms of powdered plant material was subjected to
soxhlet extraction for 8 hrs with 250ml of the solvents like ethanol, and water. The extracts obtained were later kept for evaporation to remove the excessive solvents. These extracts thus obtained were stored in a cool dry place and later used for antimicrobial efficacy. The stock solution of each extract was prepared in Dimethylesulfoxide (DMSO)

**Antimicrobial screening**

**Microorganism**
The strains such as *Staphylococcus aureus, Bacillus subtilis, E.coli and Proteus* were obtained from Department of Biotechnology, Srimad Andavan College of Arts & Science, Trichy and were preserved in the nutrient agar (High Media) at 40 °C. The strains were revived in nutrient broth and incubated at 37±1°C for overnight. The culture was placed on nutrient agar medium and spread throughout the plate using sterile glass ‘L’rod.

**Preparation of standard bacterial Suspensions**
Bacterial cultures were sub cultured in liquid medium (Nutrient broth) at 37°C for 8hrs and further used for the test (10^2-10^6CFU/ml). These suspensions were prepared immediately before the test was carried out. About (10^8–10^9CFU/ml) colony-forming units per ml were used. Each time, a fresh stock suspension was prepared; the experimental conditions were maintained constant so that suspensions with very close viable counts would be obtained.

**Preparation of standard fungal suspensions**
The fungal cultures *Aspergillus niger* and *Candida albicans* were maintained on Nutrient agar, incubated at 25°C for 4 days. The fungal growth was harvested and washed with sterile normal saline and finally suspended in (100ml) of sterile normal saline and the suspension was stored in refrigerator till used.

**Antibacterial susceptibility testing**
**Kirby Bauer Agar Well Diffusion Assay**
The nutrient agar medium was prepared and sterilized by autoclaving at 121°C 15 lbs pressure for 15 minutes then aseptically poured the medium into the sterile petriplates and allowed to solidify the Bacterial broth culture was swabbed on each petriplates using a sterile buds. Then wells were made by well cutter. The organic solvent extracts of leaves were added to each well aseptically. The process was repeated for each petri plates then the petriplates were incubated at 37°C for 24 hrs. After incubation the plates were observed for
the zone of inhibition. The experiment was repeated thrice and the average values were calculated for antibacterial activity.

**RESULTS AND DISCUSSION**

The plant crude extracts generally, inhibit gram-positive bacteria rather than the gram-negative bacteria.[12 & 13] But from the present study the extracts of *C.punctatum* were equally susceptible to both gram-negative bacteria and gram-positive bacteria. The antibacterial activities of *C.punctatum* extracts were tested against four bacterial strains and two fungal strains. The results showed promising antibacterial activity against the bacteria tested. The antimicrobial activity of *C.punctatum* was investigated by well diffusion method. The results were summarized in Tables. 1 & 2, Graph .1 & 2. As per result, ethanol extract showed a broad spectrum of very significant antibacterial activity against *Proteus*, *Staphylococcus aureus* and *E. coli* whereas, *Bacillus subtilis*, was found to be moderately sensitive. For the fungus the ethanol extract was found as more effective against *Candida albicans*. The zone of inhibition was more for aqueous extract when compared with the ethanol extract.

Table .1. Antibacterial Activity of Ethanolic Extract of *C.punctatum* Name of Organisms

<table>
<thead>
<tr>
<th>Name of Organisms</th>
<th>Zone of inhibition (diameter in mm/ml)</th>
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<tbody>
<tr>
<td></td>
<td>25 μl</td>
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<tr>
<td><em>Staphylococcus aureus</em></td>
<td>20</td>
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<tr>
<td><em>Bacillus subtilis</em></td>
<td>18</td>
</tr>
<tr>
<td><em>E.coli</em></td>
<td>18</td>
</tr>
<tr>
<td><em>Proteus</em></td>
<td>20</td>
</tr>
<tr>
<td><em>Candida albicans</em></td>
<td>20</td>
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<tr>
<td><em>A.niger</em></td>
<td>20</td>
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</tbody>
</table>

Graph .1. Antibacterial Activity of Ethanolic Extract of *C.punctatum*
Table 2. Antifungal Activity of Water Extract of *C.punctatum*

<table>
<thead>
<tr>
<th>Name of Organisms</th>
<th>Zone of inhibition (diameter in mm/ml)</th>
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<tr>
<td></td>
<td>25 μl</td>
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<td>30</td>
</tr>
<tr>
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<td><em>A.niger</em></td>
<td>13</td>
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</table>

CONCLUSION

The present study reveals the antibacterial and antifungal potential of aqueous and ethanol extract of *C.punctatum* leaves. Long term studies of *C.punctatum* and its isolated compounds are necessary to elucidate the exact mechanism of action so as to develop it as a potent antimicrobial drug.

REFERENCES


