TWO ETHNOMEDICINAL PLANTS USED BY THE TRIBAL PEOPLE OF CHHATARPUR DISTRICT WITH SPECIAL REFERENCE TO ANTI BACTERIAL ACTIVITY

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ABSTRACT

This district chhatarpur is known after the name of the great warrior of the region Maharaja Chhatrasal. It is a district of Madhya Pradesh, India. Gond, Saur, Kondar, Sansiya are the names of the tribes of the district. Saur and Kondar are the main tribes. Both are enlisted in the list of tribes, declared by ministry of tribal affairs, Government of Madhya Pradesh. Saur is mentioned at serial number 44 and kondar is mentioned at 22. The ethnomedicinal study of the tribes shows that there are some plants in local flora, which are being used in treatment of bacterial infection. As per the identification from Botanical survey of India, Allahabad, the two such plants are Enicostemma axillare and solanum virginianum. The ethanolic extracts of both plant have been evaluated against six bacterial strains. The results indicated that both plants exhibited antibacterial activity against six bacterial strains. All the bacterial strains were obtained from microbial type culture and collection, institute of microbial technology Chandigarh, India – The customer number is 8445.

KEYWORDS: Sour, Kondar, Chhatarpur, Antibacterial, Ethanolic extract.

INTRODUCTION

Indian subcontinent is being inhabited by over 54 million tribal people dwelling in about 5000 forest dominated villages spreading across the counting comprising 15% of the total geographical area, there knowledge of plants developed often of the cost of their life in their natural dwellings through centuries old experience could not be perfectly documented due to the lack of literacy and it had rather descended from one generation to another as a domestic
The plant based herbal therapy is widely explored in the traditional system of medicine and their curative potentials are well documented. The medicinal properties of plant are due to their antioxidant, antimicrobial, antipyretic, anti-inflammatory and anti-tumour activity of the phytochemicals present in them. Medicinal plants are one of the emerging and best sources for the discovery and development of novel bioactive compound for combating several bacterial diseases. The use of plant extracts for the treatment of several bacterial diseases have become popular because the effective life span of antibiotic is limited and over prescription as well as misuse of antibiotic is causing antimicrobial resistance. However, over the past two decades the health benefits are under threat as many commonly used antibiotics and their extensive use against bacterial diseases has led to emergence of multidrug resistance. The bacterial strains have developed the genetic potentiality to acquire and transmit resistance. In district of chhatarpur of Madhya Pradesh, many tribal and rural people of villages significantly rely on the local plant and resources for their primary health care need. Solanum virginianum and Enicostemma axillare are being used by the tribes of chhatarpur district to cure bacterial diseases. Enicostemma axillare is a potential antimicrobial agent and has antibacterial activity against some pathogenic bacteria. Solanum virginianum is also an effective plant against pathogenic microorganisms specially pathogenic bacteria.

This paper reports the survey that was done on the basis of folk use by traditional practitioners in tribal areas of chhatarpur district along with bioassay test for antibacterial activity.

**MATERIAL AND METHODS**

**Plants Parts Used for Extraction**
Mixture of roots, leaves, fruits, petals and stamens of Solanum virginianum – Roots leaves and flowers of Enicostemma axillare.

**Chemical Used for Extraction**
n-hexane, chloroform and ethanol.

**Bacterial Strains Used for Activity**
E.coli (MTCC no.739), B. subtilis (MTCC no.441), P.aeruginosa(MTCC no.741), C.perfrigens(MTCC no.450), S. pneumoniae (MTCC no. 655), S.typhimurium (MTCC no. 3224).
All bacterial strains were obtained from microbial type culture and collection (MTCC), institute of microbial technology, Chandigarh, India – The costomer no. is 8445.

**Ethnobotanical Survey**
For the survey standard method used and advised by Jain (1991) was followed. [11]

**Selection, Collection, and Identification of Plant Material**
Solanum virginianum and Enicostemma axillare both plants have been selected on the basis of local healers information for compilation of information the plants Used for infectious diseases in the tribes, a literature survey was also carried out. [12-14]

Plants were collected from local flora of district chhatarpur in the month of September – December. Identification and confirmation was done by taxonomists of botanical survey of india(B.S.I.) regional office, Allahabad(U.P.) India.

**Preparation of Plant Extracts**
Selected plants material was shade dried and coarsely powdered with electric blender and packed in air tight sealed envelopes for further studies. Material was extracted by cold percolation at room temperature for 7 days with regular stirring after every 2 hrs. in order of increasing polarity. Solanum virginianum (Root,leaves,fruit,petal,stamen) – 7 day in n-hexane → 7 days in chloroform → 7 days in ethanol. This ethanolic extract was collected and concentrated at 40°C under reduced pressure using rotary evaporator. Extract was stored at 4°C until further use. Enicostemma axillare (Roots, leaves, Flowers) – 7 days n-haxane → 7 days in chloroform → 7 days in ethanol. This ethanolic extract was collected and concentrated and stored as above.

**Inoculum**
The bacterial strains were inoculated in to SBCB and incubated at 35±2°C for 4 hrs . The turbidity of the resulting suspension was diluted with SBCB to match with 1 Mcfarland turbidity standard. This level of turbidity is equivalent to approximately 3×10⁸ CFU/ml.

**Agar Well Diffusion Method**
The modified agar well diffusion method was employed. Muller hinton agar plates were inoculated by streaking the swab over the entire sterile agar surface . This procedure was repeated by striking two more times, rotating the plates approximately 60 each time to ensure even distribution of the inoculums as a final step of the rim of the agar was also swabbed.
After allowing the inoculums to dry at room temperature, 6mm diameter wells were bored in the agar.

Each extract was used for antibacterial activity by introducing different concentrations in to wells. The plates were allowed to stand at room temperature for one hour for extract to diffuse in to the agar and then they were incubated at 35±2°C for 24 hrs.

RESULT AND DISCUSSION

Table 1: - Antibacterial activity of ethanolic extract of mixture of parts of solanum virginianum plant

<table>
<thead>
<tr>
<th>Strain</th>
<th>Zone of inhibition (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>400mg/ml</td>
</tr>
<tr>
<td>E.coli MTCC 739</td>
<td>35.4 ± 0.124</td>
</tr>
<tr>
<td>B.subtilis MTCC 441</td>
<td>32.6 ± 0.243</td>
</tr>
<tr>
<td>P.aeruginosa MTCC 741</td>
<td>33.2 ± 0.132</td>
</tr>
<tr>
<td>C.perfringens MTCC 450</td>
<td>30.7 ± 0.112</td>
</tr>
<tr>
<td>S.pneumoniae MTCC 655</td>
<td>34.8 ± 0.110</td>
</tr>
<tr>
<td>S.typhimurium MTCC 3224</td>
<td>26.4 ± 0.036</td>
</tr>
</tbody>
</table>

mm = millimeter, mg = milligram, ml = milliliter

Table 2: - Antibacterial activity of ethanolic extract of mixture of parts of Enicostemma axillare plant

<table>
<thead>
<tr>
<th>Strain</th>
<th>Zone of inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>400 mg/ml</td>
</tr>
<tr>
<td>E.coli MTCC 739</td>
<td>28.4 ± 0.112</td>
</tr>
<tr>
<td>B.subtilis MTCC 441</td>
<td>26.5 ± 0.113</td>
</tr>
<tr>
<td>P.aeruginosa MTCC 741</td>
<td>25.5 ± 0.114</td>
</tr>
<tr>
<td>C.perfringens MTCC 450</td>
<td>28.2 ± 0.114</td>
</tr>
<tr>
<td>S.pneumoniae MTCC 655</td>
<td>25.4 ± 0.034</td>
</tr>
<tr>
<td>S.typhimurium MTCC 3224</td>
<td>28.5 ± 0.114</td>
</tr>
</tbody>
</table>

mm = millimeter, mg = milligram, ml = milliliter, ± = standard error

The result are reported in table 1 and 2

Table first is showing the result of antibacterial activity of solanum virginianum. According to result, the ethanolic extract of mixture of certain parts is most effective against E. coli and S. pneumoniae table second is showing the result of antibacterial activity of Enicostemma axillare, according to result this plant extrat is most effective against S.typhimurium and E. coli. In this case, it is notice that antibacterial activity is increasing as the concentration is increased.
CONCLUSION

Solanum virginianum and Enicostemma axillare are non toxic and safe for human use and are regarded as valuable plants in both ayurvedic and modern drug development areas for its versatile medicinal use. So further investigation and phytochemical analysis is needed to isolate secondary metabolites and bioactive fractions responsible for antibacterial activity. A further investigation is necessary to characterize the bioactive compounds.

ACKNOWLEDGEMENT

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