ANTIBACTERIAL ACTIVITY OF TWO ETHNOMEDICINAL PLANTS USED BY SAUR AND KONDAR TRIBES OF CHHATARPUR DISTRICT M.P.(INDIA)

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ABSTRACT
Chhatarpur is a district of Madhya Pradesh state, located at the northern part of state. Saur and kondar are the main tribes of the district. Both tribes are enlisted in the list of tribes, declared by ministry of tribal affairs, Government of Madhya Pradesh. Saur is mentioned at 44 number and kondar is mentioned at 22 Number. Both the tribes have an excellent history of traditional use of medicinal plants. The ethnomedicinal study of both tribal communities clearly shows that there are several plant species in local area, which are being used by the tribal communities. Some plants are being used in treatment of bacterial infections. Sphaeranthus Indicus (L) and diplocyclos palmatus (L) Jeffery. Are the plants, which are being used in bacterial infections by both tribal communities. The chloroform extract of a mixture of head and Root of sphaeranthus indicus and the aqueous extract of mature fruits of diplocyclos palmatus have been evaluated against six bacterial strains (Escherichia coli, Bacillus subtilis, Pseudomonas aeruginosa, salmonella typhimurium, clostridium perfringens, streptococcus pneumoniae) 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 costomer number- 8445).

Keywords:- Saur, Kondar, Antibacterial, Mixture to head and root, chhatapur.

INTRODUCTION
The medicinal value of plants lies in some chemical substances that produce a definite
physiological action on human body. The most important of these bioactive compounds of plants are alkaloids, flavanoids tannins and phenolic compounds\(^1\). Traditional healers claim that their medicine is cheaper and more effective than modern medicine. In developing countries, low income people such as farmers, people of small isolatic villagers and native communities use folk medicine for the treatment of common infection\(^2\). The phytochemical research based on ethno pharmacological information is generally considered an effective Approach in the discovery of new anti-infective agents from higher plants\(^3\). There are several reports on antimicrobial activity of different herbal extracts in different regions of the world\(^4\)-\(^7\). Sphaeranthus indicus is an ethnomedicinal plant, it is being used by saur and kondar tribes of chhatarpur district. Sphaeranthus Indicus is a comman annul Spreading herb found in rice field throughout India. Its whole plant exhibited the antimicrobial activity\(^8\). Diplocyclos palmatus is a lesser heard medicinal plant of Ayurveda with the fruit having important use in the area of reproductive medicine (female infertility, aphrodisiac, tonic, leucorrhoa). The plant specially the fruits have immense folklore used even today\(^9\). In district chhatarpur of Madhya Pradesh, many tribal and rural people of villages significantly rely on the local plant resources for their primary health care needs\(^10\).

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

**MATERIALS AND METHODS**

Chemicals used in extraction :- n- hexane, chloroform, ethanol, distilled water Plant parts used for extraction:- Head and roots of sphaeranthus indicus, mature fruits of diplocyclos palmatus

Bacterial strains for activity:- E.coli (MTCC no. 739), B.subtilis(MTCC no 441), Pseudomonas aeruginosa(MTCC no 741), clostridium perfringens(MTCC no 450) streptococcus pneumoniae (MTCC no 655) salmonella typhimurium(MTCC no 3224)

All bacterial strains strains were obtained from microbial type culture and collection (MTCC), institute of microbial technology, chandigarh, India. The costomer no is 8445.

**Ethno botanical survey :-** For the survey, standard method used and advised by Jain(1991) was followed\(^11\).

**Selection, Collection and identification of plant material:** Sphaeranthus indicus and diplocyclos palmatus both plants have been selected on the basis of local healer’s
information for compilation of information the plants used for infectious diseases in the tribes, a literature survey was also carried out\textsuperscript{12-14}.

Mature fruits (with seed) Diplocyclos palmatus was collected form local forest area of chhatarpur district in the month of September - October. Sphaeranthus indicus was collected from the banks of fields, peripheral area of water sources in the math of December – January.

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 strring after every 2hrs. in the order of increasing polarity.

Sphaerathus indicus (Head and roots) n hexane(7 days) – chloroform (7 days)

This chloroform extract was collected and concentrated at 40\degree c under reduced pressure using rotary evaporator. The extract was stored at 4\degree c until further use.

Diplocyclos palmatus (mature fruits with seed) – n- hexane(7days) – chloroform(7days) – Ethanol(7days) – distilled water (7days).

This aqueous extract was collected and concentrated and stored as above.

Inoculum :- The bacterial strains were inoculated into SBCB and incubated at 35\pm2\degree 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 $3.\times10^8$ CFU/ml.

**Agarwell diffusion method:** The modified agar well diffusion method was employed\textsuperscript{15}. Muller hinton agar plates were inoculated by streaking the swab over the entire sterile agar surface. This procedure was repeated by streaking two more times, rotating the plates approximately 60 each time to ensure even distribution of the inoculum. As a final step the rim of the agar was also swabbed. After allowing the inoculum to dry at room temperature, 6 mm – diameter wells were bored in the agar.

Each extract was check for antibacterial activity by introducing different concentrations into wells. Simultaneously ofloxacin was used as positive control at a concentration of 1 mg/ml.
The plates were allowed to stand at room temperature for one hour for extract to diffuse into the agar and then they were incubated at 35±2°C for 24 hrs.

RESULT AND DISCUSSION

Table -1: Antibacterial activity Of chloroform Extract of a mixture of heads and roots sphaeranthus indicus indicus

<table>
<thead>
<tr>
<th>Strain</th>
<th>Zone of inhibition (mm)</th>
<th>Standard ofloxacin mg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>400mg/ml</td>
<td>200mg/ml</td>
</tr>
<tr>
<td>E.coli MTCC 739</td>
<td>40.7±0.025</td>
<td>37.4±0.124</td>
</tr>
<tr>
<td>B.subtilis MTCC 441</td>
<td>38.4±0.038</td>
<td>32.6±0.168</td>
</tr>
<tr>
<td>p.aeruginosa MTCC 741</td>
<td>26.±0.64</td>
<td>22.5±0.147</td>
</tr>
<tr>
<td>C. perfringens MTCC 450</td>
<td>37.0±0.336</td>
<td>31.6±0.110</td>
</tr>
<tr>
<td>S. pneumoniae MTCC 655</td>
<td>41.8±0.085</td>
<td>38.6±0.137</td>
</tr>
<tr>
<td>S. typhimurium MTCC 3224</td>
<td>30.5±0.147</td>
<td>27.2±0.104</td>
</tr>
</tbody>
</table>

mm= millimeter, mg = milligram, ml = milliliter

Table -2: Antibacterial activity Of aqueous extract of mature fruit (withseed) diplocyclos palmatus(L.) jeffrey.

<table>
<thead>
<tr>
<th>Strain</th>
<th>Zone of inhibition (mm)</th>
<th>Standard ofloxacin mg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>400mg/ml</td>
<td>200mg/ml</td>
</tr>
<tr>
<td>E.coli MTCC 739</td>
<td>27.6±1.250</td>
<td>24.2±1.425</td>
</tr>
<tr>
<td>B.subtilis MTCC 441</td>
<td>26.4±1.410</td>
<td>22.3±1.112</td>
</tr>
<tr>
<td>p.aeruginosa MTCC 741</td>
<td>23.2±1.113</td>
<td>21.4±1.612</td>
</tr>
<tr>
<td>C. perfringens MTCC 450</td>
<td>20.4±1.110</td>
<td>19.2±1.154</td>
</tr>
<tr>
<td>S. pneumoniae MTCC 655</td>
<td>24.3±1.125</td>
<td>22.6±1.134</td>
</tr>
<tr>
<td>S. typhimurium MTCC 3224</td>
<td>25.8±1.114</td>
<td>23.7±1.117</td>
</tr>
</tbody>
</table>

mm=millimeter mg=milligram ml=milliliter ± showing standard error
The result are reported in table 1 and 2
Table 1 is indicating the result of antibacterial activity of head and roots of sphaeranthus. According to result that this extract is most effective against S. pheumonice, after that it shows the effectiveness against E.coli.

Table 2 is indicating the results of antibacterial activity of Aqueous extract of mature fruits (with seed) of diplocyclos palmatus According to results this extract is most effective against E.-coli and then against B. subtilis.

In both case it should be noted that as the concentration of extract increases the activity is also increase.

CONCLUSION
Both the plants which are being used by the tribes, these specific plant parts are showing antibacterial activity it means both plants have a potential to kill the bacteria. 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.

ACKNOWLEDGMENT
The authors are thankful to MTCC- institute of microbial technology chandigarh, Botanical survey of India. Allahabad, for providing their support.

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