Comparative Study on Antibacterial Activities of Clerodendron infortunatum Linn and Clerodendron paniculatum linn Root Extract

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ABSTRACT
The root portions of the Clerodendron infortunatum Linn and Clerodendron paniculatum linn roots extracted with ethanol by cold maceration process. The extracts were vacuum dried and subjected to antibacterial (Staphylococcus aureus, Bacillus subtilis, Escherichia coli and Klebsiella pneumoniae) screening by Agar disc diffusion method. Minimum Inhibitory Concentration of microbial growth was also evaluated. The phytochemical screening as performed and different phytoconstituents present in the extracts were identified. The extract exhibited potent activity against Staphylococcus aureus, Bacillus subtilis, Escherichia coli and Klebsiella pneumoniae. The study reveals that Clerodendron paniculatum possess better antibacterial activity than the other species.

Keywords: Clerodendron infortunatum Linn & Clerodendron paniculatum linn roots, Antibacterial activity.

INTRODUCTION
Clerodendron infortunatum Linn, Clerodendron paniculatum Linn (Family : Verbenaceae)1 was a species found in India. In this reported as folk remedy for tumours, leprosy, fever, infection, inflammation. The roots have been reported to possess laxative, diuretic, analgesic, anti-inflammatory, anti-tumour and antibacterial activities2. To our knowledge there were no scientific reports on the antibacterial activities of Clerodendron infortunatum Linn, Clerodendron paniculatum Linn root. In the present study the root portions of Clerodendron infortunatum Linn, Clerodendron paniculatum Linn was extracted with ethanol, by cold extraction. The vacuum dried extracts (25, 50 and 100mcg/mL) were screened for antibacterial activities3,4. Minimum Inhibitory Concentration was also determined5.

EXPERIMENTAL METHODS
Plant material and Extraction
The plants C.infortunatum C.paniculatum was collected from Pathanamthitta district of Kerala and identified by Thomas Mathew, HOD of Botany, Marthoma College Tiruvalla, Kerala. Voucher no. VSCI-13, VSCP14 were deposited in the Pharmacognosy department, Pushpagiri College of pharmacy, Tiruvalla. The root portion of the plants were washed with running water to remove soil and other matter and dried in shade for 20 days, powdered, extracted 500gm with ethanol (EECI) by cold extraction to yield the respective extracts. The extracts were reduced to molten mass by rotary vaccum evaporator and the yield was 18%, 21% respectively.

Preliminary phytochemical screening was performed as per standard procedure and various phytochemical constituents were identified6,7.

Antibacterial activity
The extracts (EECLECP) were subjected to antibacterial (Staphylococcus aureus, Bacillus subtilis, Escherichia coli and Klebsiella pneumoniae) screening. The antibacterial screening was done by Agar diffusion method using a paper disc3,4.
Nutrient agar and Saubraud dextrose agar media were used for antibacterial screening. The sterilized (autoclaved at 120˚ for 30 mins) medium (40˚- 45˚) was inoculated (1mL /100mL of medium ) with suspension of the micro organism (match with McFarland barium sulphate standard). The paper impregnated with the extracts (25,50,100mcg/Ml in dimethyl sulphoxide) was placed on the solidified medium .The plates were pre inoculated for 1 h at room temperature and incubated at 37˚C for 24 and 48h for antibacterial activity determination. Ciprofloxacin (5mcg/disc) was used as standard for antibacterial activity. The observed zones of inhibition are presented in table 1 and fig no 1.The MIC for the above organism was found by Agar streak dilution method³. About 20ml of the media containing concentrations of the extracts was poured into each sterile petridish and allowed to solidify Microorganisms were then streaked one by one on the agar plate aseptically. After streaking all the plates were incubated at 37˚C for 24 h .Then the plates were observed for the growth of micro organisms. The lowest concentration of the plant extracts required for inhibiting the growth was considered as the MIC of the extracts against bacterial strains. The MIC values of each extract against the tested micro organism were vide Table1.

Table 1: Zone of Inhibition (in mm) and Minimum Inhibitory Concentration (MIC) of Clerodendron infortunatum Linn, Clerodendron paniculatum Linn root extract

<table>
<thead>
<tr>
<th>ORGANISM</th>
<th>EXTRACT</th>
<th>STANDARD (Ciprofloxacin) (5mcg/disc) in mm</th>
<th>25mcg</th>
<th>50mcg</th>
<th>100mcg</th>
<th>MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacillus subtilis Strain no. NCIM-2067</td>
<td>EECI</td>
<td>24</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>EECP</td>
<td>28</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>Staphylococcus aureus Strain no. NCIM-2079</td>
<td>EECI</td>
<td>46</td>
<td>16</td>
<td>21</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>EECP</td>
<td>46</td>
<td>16</td>
<td>20</td>
<td>26</td>
<td>21</td>
</tr>
<tr>
<td>Escherichia coli Strain no. NCIM-2065</td>
<td>EECI</td>
<td>33</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>EECP</td>
<td>33</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Klebsiella pneumoniae Strain no. NCIM-2070</td>
<td>EECI</td>
<td>36</td>
<td>16</td>
<td>18</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>EECP</td>
<td>36</td>
<td>17</td>
<td>19</td>
<td>23</td>
<td>21</td>
</tr>
</tbody>
</table>

EECI: Ethanol extract of Clerodendron infortunatum Linn root,
EECP Ethanol extract of Clerodendron paniculatum Linn root.

Zone of inhibition measured in mm
RESULT AND DISCUSSION
The preliminary phytochemical screening carried out on Clerodendron infortunatum Linn, Clerodendron paniculatum Linn root indicated the presence of carbohydrates, starch, mucilage, saponins, flavanoids, tannins, phenolic compounds in the ethanol extract. The antibacterial activities of the extracts were determined by measuring the zone of inhibition produced by the extracts against various tested organisms at different concentration. All the extracts exhibited marked activities against the tested organisms. E.coli and K.pneumonia, Staphylococcus aureus were more sensitive towards the extract at 100mcg indicated by a greater degree of inhibition on comparison with standard. All the organisms exhibited moderate activity against the extract as evident from Table1. From the above it is evident that the drug Clerodendron paniculatum Linn possess a better antibacterial drug with a minimum of adverse effects.

CONCLUSION
The preliminary phytochemical screening carried out on Clerodendron infortunatum Linn, Clerodendron paniculatum Linn root indicated the presence of carbohydrates, starch, mucilage, saponins, flavanoids, tannins, phenolic compounds in the ethanol extract. The antibacterial activities of the extracts were determined by measuring the zone of inhibition produced by the extracts against various tested organisms at different concentration. All the extracts exhibited marked activities against the tested organisms. E.coli and K.pneumonia, Staphylococcus aureus were more sensitive towards the extract at 100mcg indicated by a greater degree of inhibition on comparison with standard. All the organisms exhibited moderate activity against the extract as evident from Table1. From the above it is evident that the drug Clerodendron paniculatum Linn possess a better antibacterial drug with a minimum of adverse effects.

ACKNOWLEDGEMENT
Management and all staffs of Karpagam University for providing the all informations. Management of Pushpagiri group of institutions, Tiruvalla for providing the necessary facilities needed for the research.

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