SCREENING FOR ANTIMICROBIAL ACTIVITY OF METHANOL EXTRACT OF ROOTS OF Tephrosia purpurea AGAINST Staphylococcus aureus

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Received March 15, 2012 Accepted June 20, 2012

ABSTRACT

Plants have been a valuable source of natural products for maintaining human health. Plants used in traditional medicinal systems have proved to be reliable sources of antimicrobial compounds. Medicinal plants have been considered interesting since they are frequently used in medicine as remedies for many infectious diseases. Tephrosia purpurea belongs to family Papilionaceae/Fabaceae. The whole plant and its roots are used for medicinal purposes. The herb is useful both, internally as well as externally. In this study methanolic root extract of Tephrosia purpurea were investigated for in vitro antimicrobial property by agar disc diffusion method. The crude methanolic extract inhibited the growth of Gram positive bacteria Staphylococcus aureus. The active extracts were subjected to the Minimum Inhibitory Concentration (MIC) agar dilution method, to determine the minimum inhibitory concentration of extract.

Key Words: Antimicrobial activity, Staphylococcus aureus, Tephrosia purpurea, Minimum Inhibitory Concentration (MIC), Methanolic extract

INTRODUCTION

Plant posses several secondary metabolites as the chemicals for defense. Saponins having various pharmacological effects are widely distributed in plants. It is reported that saponins are used for their antibacterial, antifungal, antiviral, cytotoxic, and antihistaminic in activites. The essential oils of several plants of family leguminaceae, limaceace and asteraceae have been reported by various workers to possess antimicrobial activity. The various solvent extracts of Ricinus communis leaves against five species of bacteria was studied and showed positive antibacterial effect. The antimicrobial activity of isoflavone glyoside has been also reported. Looking to the pertaining literature and in view of the necessity to search the suitable antibacterial drugs from plants, the present investigation was proposed to be investigated against Staphylococcus aureus, a causative agent of skin diseases. Tephrosia purpurea family Papilionaceae/Fabaceae commonly known as surpunkha was collected from the local surrounding of Vidisha (M.P). After proper identification in the Botany department a voucher specimen was procured in the herbarium record of Pest control and Ayurvedic Drug Research laboratory of Vidisha (M.P). India at s.no. 104.

AIMS AND OBJECTIVES

To determine the fractions of crude extract by thin layer chromatography.
To determine the Minimum Inhibitory Concentrations using the MIC agar dilution method.

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MATERIAL AND METHODS

Preparation of Extract

The dried plant root powder material was extracted over night with 70% methanol by cold percolation method as well as soxhlet apparatus. There after the material was repeatedly extracted with hot extracted methanol for three times. The soluble part was concentrated which gave 3.25% yield. The methanolic and water extracts were used for the present study as shown in the Table 1

Table 1

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Solvent</th>
<th>Weight of powdered plant materials</th>
<th>Volume of Solvent</th>
<th>Weight of extract</th>
<th>% of yield of extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tephrosia purpurea</td>
<td>Methanol 90%</td>
<td>500 gm</td>
<td>1000 ml</td>
<td>18.0 gm</td>
<td>36.0%</td>
</tr>
<tr>
<td>Tephrosia purpurea</td>
<td>Water</td>
<td>500 gm</td>
<td>1000 ml</td>
<td>20.5 gm</td>
<td>41.0%</td>
</tr>
</tbody>
</table>

Thin Layer Chromatography of crude extracts of roots of *Tephrosia purpurea* was done by using different solvents system (n.butanol: NH₄OH). The results of the TLC obtained is mentioned in Table 2

Table 2

<table>
<thead>
<tr>
<th>Crude extract of plant material</th>
<th>Solvent</th>
<th>Spot</th>
<th>RF Value</th>
<th>Visual Light</th>
<th>Iodine chamber</th>
<th>UV Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tephrosia purpurea n. butanol: NH₄OH (1:1)</td>
<td>Tf₁</td>
<td>0.78</td>
<td>Dark Green</td>
<td>Green</td>
<td>Yellow with Green</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tf₂</td>
<td>0.61</td>
<td>Yellow Green</td>
<td>Yellow with Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tf₃</td>
<td>0.47</td>
<td>Light green</td>
<td>Light green</td>
<td>Green</td>
<td></td>
</tr>
</tbody>
</table>

Antimicrobial activity

The preliminary testing of the antimicrobial activity of water and methanolic extracts of *Tephrosia purpurea* roots was tested by agar diffusion bioassay. The antimicrobial activity of extract was tested using the well method on bacterial isolate (*Staphylococcus aureus*) seeded in Agar. The extract was tested for their Minimum Inhibitory Concentrations using the MIC agar dilution method. The Minimum Inhibitory Concentration (MIC) values of the extract are shown in Table 3 which shows dose dependent inhibition of bacterial growth.

RESULTS AND DISCUSSION

Table 1 reports the percentage yield of crude drug in soxhlet in 90% methanol and water. Maximum yield was noticed in water extract. This shows that *Tephrosia purpurea* content is more polar compounds than non polar. Table 2 shows the TLC fraction of the crude drug obtained from the plant along with their RF value when compared with the RF value of authentic marker compounds (Sigma Aldrich co.pvt Ltd.USA) shows the presence of saponins. The different concentration of the purified fraction were applied on the

Table 3

<table>
<thead>
<tr>
<th>Saponin Fraction</th>
<th>Minimum Inhibitory Concentration (MIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraction 1</td>
<td>0.63</td>
</tr>
<tr>
<td>Fraction 2</td>
<td>0.31</td>
</tr>
<tr>
<td>Fraction 3</td>
<td>0.15</td>
</tr>
</tbody>
</table>
petridish containing bacterial culture after 24 hours, inhibition of growth was measured and minimum inhibitory concentration was worked out. The minimum inhibitory activity in alcoholic extract of Commiphora caudata leaves against eight bacterial species and antibacterial activity of Punica granatum in different solvents is quite contrast against the view expressed in the present study.

CONCLUSION

T. purpurea extracts have considerable promise to be used as antimicrobial agents. It can be concluded that the methanolic root extract of T. purpurea shows significant activity against Staphylococcus aureus. The MIC, extract exhibiting antimicrobial activity showed variation in the three fractions. This value was obtained for crude extracts. For the determination of the MIC, the active compounds can be isolated.

REFERENCES