INTRODUCTION

The plant A. bidentatum Hochst belongs to the Malvaceae family. The genus Abutilon comprises mainly of shrubs and small trees. About 10 species are found in India, some of which are found to be medicinally useful. A. indicum have several applications in the medicinal world [1-4]. A. bidentatum is a shrub growing throughout the hotter parts of India. A perusal of literature revealed that this plant remained unexplored by the pharmacologists but their sister species have been found to possess the promising activity of one type or another.

MATERIALS AND METHODS

The plant material (aerial parts) of A. bidentatum Hochst was collected from the campus university of Rajasthan, Jaipur and was identified for authenticity in the department of botany, University of Rajasthan, Jaipur (Herbarium sheet No. RUBL 824).

Preparation of extract

Air-dried and finely powdered plant material (3.5 Kg) was extracted exhaustively with 95% ethanol on a steam bath for 8 h thrice. The extract was filtered and concentrated under reduced pressure, whereupon a dark greenish semi-solid (6.05 g) was obtained. The concentrated ethanolic extract was suspended in a minimum amount of water and then fractionated with petroleum ether, diethyl ether and ethyl acetate respectively. In each case, the extract was concentrated under reduced pressure.

Phytochemical studies

The dark green semi-solid pet. ether extract (39.09 g) was chromatographed over a column of silica gel, which afforded various compounds whose identity was confirmed by comparison with authentic samples (co-TLC), mixed m. p. and spectral (IR, 'H NMR, 13C NMR and Mass) studies. Elution of with solvents of increasing polarity afforded tetracosane5 (150 mg) white crystal, m. p. 54-55 °C; cetyl stearate (175 mg) white crystal, m. p. 57-58 °C; tetracosyl alcohol [5] (352 mg) white crystal, m. p. 75 °C; cycloartenone [5] (125 mg) white crystal, m. p. 106-107 °C; β-amyrin [5] (160 mg) white crystal, m. p. 197-198 °C; β-sitisterol [5] (250 mg) white needles, m. p. 135-136°C and a new cholestane derivative [6, 7] (123 mg) white granules, m. p. 225-226 °C. In the case of reddish brown solid (8.5 gm) only two compounds alantolactone [5] (98 mg) grey flakes, m. p. 80-82 °C and isoalantolactone [5] (82 mg) colorless crystals, m. p. 110-112 °C were separated out with the help of column chromatography. Elution was carried out with solvents of increasing polarity, starting from pet ether.

Pharmacological studies

The ethanolic extract of aerial parts of A. bidentatum was screened for antibacterial activity against test bacteria Escherichia coli, Staphylococcus aureus, Klebsiella aerogenes, Proctus vulgaris and Salmonella paratyphi B. antifungal activity against Aspergillus flavus, Aspergillus niger, Fusarium moniliforme and Rhizoctonia bataticola by using Disc diffusion method [8] antiviral activity against poliomyelitis, measles, herpes simplex coxsackie, semliki forest and vesicular stomatitis viruses by Plaque inhibition method[9] and antitumor activity using Sarcoma 180 A as the test system[10].

RESULTS AND DISCUSSION

The extract exhibited significant fungicidal activity only, the maximum activity was seen against Fusarium moniliforme (activity index 0.74 at 1000 g/disc and 0.61 at 500 g/disc).

Table 1: Bactericidal and fungicidal efficacy of aerial parts of abutilon bidentatum

<table>
<thead>
<tr>
<th>Dose</th>
<th>Test bacteria</th>
<th>Test fungi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E. coli</td>
<td>K. aerogenus</td>
</tr>
<tr>
<td>1000µg/disc</td>
<td>IZ</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>AI</td>
<td>-</td>
</tr>
<tr>
<td>500µg/disc</td>
<td>IZ</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>AI</td>
<td>-</td>
</tr>
</tbody>
</table>

IZ inhibition zone (in mm) including the diameter of disc (6 mm), AI* activity index=Inhibition zone of sample/Inhibition zone of standard, Standard: Amikacin = 10 µg/ml (bacteria); Mycostatin = 100 units/disc (fungi), (+) Trace activity; (-) No activity.
Table 2: Virucidal efficacy of aerial parts of abutilon bidentatum

<table>
<thead>
<tr>
<th>Dose</th>
<th>Poliomyelitis</th>
<th>Coxsackie</th>
<th>Semliki forest</th>
<th>Herpes simplex</th>
<th>Measles</th>
<th>Vesicular stomatitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>500µg/ml</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>NT</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>250µg/ml</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25µg/ml</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Antiviral activity expressed as the reduction factor of viral titer (R), in presence and absence of extract. NT = non-toxic; T = toxic

In case of bactericidal activity, extract showed trace activity against *Staphylococcus aureus* only at 1000 g/disc, similarly, it exhibited weak virucidal activity only against Semliki forest (R=10, 500 g/disc) virus. The plant extract failed to exhibit antitumor activity.

Table 3: Antitumor activity

<table>
<thead>
<tr>
<th>Part used</th>
<th>Dose (mg/kg/day)</th>
<th>Toxic death</th>
<th>BWCa</th>
<th>PCVb</th>
<th>GRc</th>
<th>Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerial part</td>
<td>100</td>
<td>0</td>
<td>-2.3</td>
<td>0.29</td>
<td>83.2</td>
<td>-</td>
</tr>
</tbody>
</table>

aBody weight change, bPacked cell volume, cGrowth ratio =0-10%++; 11-40%++; 41-65%++; 66% onwards

ACKNOWLEDGEMENT

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CONFLICT OF INTERESTS

Declare none

REFERENCES


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