ANTHELMINTIC ACTIVITIES OF ANTIGONON LEPTOPUS HOOK AND MUSSAENDA ERYTHROPHYLLA LAM

N. JAYA RAJU*, B. GANGA RAO

Dept. of Pharmacy, College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, (A.P) India Email: raju8859@rediffmail.com

Received: 14 Sep 2010, Revised and Accepted: 15 Oct 2010

ABSTRACT

Extracts from Antigonon leptopus Hook (Polygonaceae) roots & rhizomes are well known in India as garden creeper, commonly called as Picchibatani (Telugu), Mexican creeper (English), and roots of Mussaenda erythrophylla Lam (Rubiaceae) commonly known as mussenda (telugu), nagavalli (Sanskrit) and red flag bush (English) when tested in vitro anthelmintic activity on the earthworms (Pheretima posthua) for both plants separately, showed potent. The results indicated that the ethyl acetate and methanol extracts of Antigonon leptopus significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug. The ethyl acetate and methanol extracts of Mussaenda erythrophylla significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug (piperazine hydrate). Methanol extract of Antigonon leptopus was more active than its ethyl acetate extract \(p<0.001\), while ethyl acetate extract of Mussaenda erythrophylla was also more potent than the methanol extract. Further studies are in process to isolate the active principles responsible for the activity.

Keywords: Antigonon leptopus, Mussaenda erythrophylla, Anthelmintic activity.

INTRODUCTION

Helminthic infections are now being recognized as cause of much chronic ill health and sluggishness amongst the tropical people. More than half of the population in the world suffers from worm infection of one or the other.

Antigonon leptopus Hook (Polygonaceae) are well known in India as garden creeper, picchibatani in Telugu. A. leptopus is a tender perennial vine can easily grow to 30‐40 ft. in length. The coral vine has attractive green heart shaped leaves\(^3\). The coral vine is found in Indian ocean and coastal areas. Previously isolated compounds 2-anthocyanins, Pelargonin, Malvin quercetin, rhamnetin and quercetin-3-o-β-D-glucopyranoside\(^5\).

Mussaenda erythrophylla (Rubiaceae) is native to western tropical Africa, occasionally seen in gardens and parks as ornamental plant in India and is commonly known as mussenda (telugu), nagavalli (Sanskrit) and red flag bush (English)\(^4\). It is a perennial, evergreen shrub. A number of triterpenoids and glycosides were reported, mussaendosides A-C, M and N with cyclolanostene type aglycone\(^5,6\) and aureusidin\(^7\), iridoid glycosides\(^8\).

Very recently the methanol extract of A. leptopus was found to possess Antithrombin activity\(^3\), Antidiabetic\(^10\) and Consumed as food\(^11\) reported. The M. erythrophylla roots are useful for cough, jaundice and when chewed acts as an appetizer. The pharmacological activities reported from Mussaenda species were diuretic, antiophlogistic, antipyretic and effective in laryngopharyngitis, acute gastroenteritis and dysentery and also anti-fertility activity\(^12\).

MATERIALS AND METHODS

Plant material collection

Antigonon leptopus roots & rhizomes were collected from the Andhra University campus area, Visakhapatnam in the month of November 2006 and authenticated by the taxonomist, Dept of Botany Andhra University and the specimen voucher no. AUCP/BGR/2006/A52 was preserved in the Department.

The roots of Mussaenda erythrophylla was collected from Lawsons Bay colony, Visakhapatnam, in the month of November 2007, specimen voucher no. AUCP/BGR/2007/M64 was preserved in the Department. The authentication of both the plants was done by prof. M. Venkiah, Dept. of Botany, Andhra University, Visakhapatnam, Andhra Pradesh, India.

Tested material

Ethyl acetate (2.75%) and methanol (3.90%) extract from A. leptopus roots & rhizomes, ethyl acetate (3.50%) and methanol (4.25%) extract from roots M. erythrophylla.

Studied activity

Anthelmintic activity was evaluated for both A. leptopus and M. erythrophylla separately. The activity was tested according to method discussed in detail by Kailasagar & Kurupa\(^13\), Pheretima posthua (Earthworm obtained from Horticulture Department) of nearly equal size (9+1cm) were selected for present study due to its anatomical and physiological resemblance with round worm parasites of human beings\(^14,15\).

Table 1: Effects of A. leptopus roots & rhizomes extracts on earthworm

<table>
<thead>
<tr>
<th>Concentration (mg/ml)</th>
<th>Paralysis time (min)</th>
<th>Death time (min)</th>
<th>Paralysis time (min)</th>
<th>Death time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl acetate extract</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>24±1.08</td>
<td>358±6.04</td>
<td>190±1.90</td>
<td>2.38±4.62</td>
</tr>
<tr>
<td>20</td>
<td>178±2.55</td>
<td>230±3.02</td>
<td>133±5.56</td>
<td>186±3.20</td>
</tr>
<tr>
<td>40</td>
<td>115±6.05</td>
<td>196±4.11</td>
<td>95±8.32</td>
<td>120±1.44</td>
</tr>
<tr>
<td>80</td>
<td>54±2.92</td>
<td>118±11.00</td>
<td>48±7.03</td>
<td>90±1.65</td>
</tr>
<tr>
<td>Methanol extract</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>22±2.00</td>
<td></td>
<td></td>
<td>80±8.24</td>
</tr>
</tbody>
</table>

Each value represents mean ±SEM (N=3).

\(p<0.001\) significantly different compared with reference compound, piperazine hydrate, student’s t-test.
Six earthworms of nearly equal size were placed in each Petri dish at room temperature. The time taken to complete paralysis and death were recorded. The mean paralysis time and mean lethal time for each sample were recorded.

Statistical analysis

The results were analyzed for statistical significance using one-way ANOVA followed by student t-test. Difference at P<0.001 was considered significant.

RESULTS AND CONCLUSION

Ethyl acetate and methanolic extracts of A. leptopus roots & rhizomes (Table 1) and the ethyl acetate and methanolic extracts from roots of M. erythrophylla (Table 2) showed concentration-dependent anthelmintic activity against earthworms. A. leptopus showed significant effects (p<0.001) at the tested concentrations (10-20mg/ml) as determined by the paralysis time and death time (Table 1). The methanol extract was more effective in causing death of worms, especially at higher concentration of 80mg/ml as compared to standard drug. The ethyl acetate and methanol extracts of Mussaenda erythrophylla significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug (piperazine hydrate). Methanolic extract of Antigonon leptopus was more active than its ethyl acetate extract (p<0.001), while ethyl acetate extract of Mussaenda erythrophylla was also more potent than the methanol extract. Further studies are in process to isolate the active principles responsible for the activity.

**Table 2: Effects of M. erythrophylla root extracts on earthworm**

<table>
<thead>
<tr>
<th>Concentrations (mg/ml)</th>
<th>Paralysis time (min)</th>
<th>Death time (min)</th>
<th>Paralysis time (min)</th>
<th>Death time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl acetate</td>
<td>MeOH extract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>14±4.16</td>
<td>23±5.29</td>
<td>20±5.17</td>
<td>31±2.40</td>
</tr>
<tr>
<td>20</td>
<td>12±4.00</td>
<td>18±9.32</td>
<td>15±2.96</td>
<td>27±8.11</td>
</tr>
<tr>
<td>40</td>
<td>9±2.98</td>
<td>12±1.00</td>
<td>11±5.83</td>
<td>200±6.35</td>
</tr>
<tr>
<td>80</td>
<td>4±7.87</td>
<td>9±8.40</td>
<td>70±6.16</td>
<td>128±5.22</td>
</tr>
<tr>
<td>Pipercarvone hydrate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paralysis time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>2±2.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each value represents mean ±SEM (N=3).

P<0.001 significantly different compared with reference compound, piperazine hydrate, student’s t-test.

Nevertheless, activities of extracts of the two plants investigated on the earthworms were lower than that of the reference compound, piperazine hydrate. This report is the first documentation on the anthelmintic activity of A. leptopus and M. erythrophylla. It may be worthwhile to test the compounds previously isolated from these two plants for anthelmintic activity.

REFERENCES

1. Ram P. Rastogi and Mehrotra, BN, Compendium of Indian Medicinal Plants, CDRI and NISIC, New Delhi, 1998; p. 52.