EVALUATION OF ANTHELMINTIC ACTIVITY OF GYROCARPUS ASIATICUS WILLD AND LACTUCA RUNCINATA DC ON THE PERHITIMA POSTHUMA MODEL

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ABSTRACT

Objective: The present study was designed to evaluate the anthelmintic activity of methanolic extracts of Gyrocarpus asiaticus Willd and Lactuca runcinata DC.

Methods: The crude methanolic extracts of Gyrocarpus asiaticus Willd aerial parts and Lactuca runcinata DC whole plant were taken for in vitro comparative studies on the anthelmintic activity against Pheritima posthuma. Different concentrations (25, 50, 100 mg/ml) of both the extracts were used for the activity. Varying albendazole concentrations (25, 50, 100 mg/ml) were used as a reference standard and normal saline (0.9% NaCl) was used for the control treatment.

Results: The results were expressed in terms of time in minutes to report the paralysis and time of death of the earthworms. The results obtained from the study indicate significant anthelmintic activity, supporting folk use of both the plants when compared with the standard. The results also established that Lactuca runcinata DC was a more potent candidature as compared with Gyrocarpus asiaticus Willd.

Conclusion: The present study concluded that the methanolic extracts of Gyrocarpus asiaticus and Lactuca runcinata possess potent anthelmintic activity.

Keywords: Methanolic extract, Albendazole, Anthelmintic activity, Gyrocarpus asiaticus Willd, Lactuca runcinata DC.

INTRODUCTION

From the ancient times, indigenous drugs have been used in the Indian medicinal system to treat different ailments and to provide therapeutic benefits. During the recent years, medicinal chemistry has made great strides, especially in synthetic chemistry but, for the sake of therapeutic effect up to the level and nontoxic treatment for helminthiasis, the research of plant derived drug therapy is mostly needed. [1] Anthelmintic or anthelminthic are drugs that expel parasitic worms (helminths) from the body, by either stunning or killing them. [2]

Gyrocarpus asiaticus Willd commonly known as Taniki or Nalla poliki [3] is a tree belonging to the family Hernandiaceae. Gyrocarpus asiaticus is one of the species in the genus Gyrocarpus with the class Magnoliopsida. Lactuca runcinata DC [L.runcinata, Synonym-Lactuca haeanea DC] commonly known as Undirachakam [4] or Atheli is an annual erect herb belonging to the family Compositae (Asteraceae). Traditionally this plant finds its wide applicability as diuretic and in chronic obstruction of liver and bowel. [4]

A detailed literature review on the plant in investigation has shown that till date there are no published reports worldwide, related to the possible anthelmintic activity of Gyrocarpus asiaticus Willd and Lactuca runcinata DC on Pheritima posthuma. So, the present study was aimed to investigate the anthelmintic activity of Gyrocarpus asiaticus Willd and Lactuca runcinata DC on Pheritima posthuma model.

MATERIALS AND METHODS

Collection of plants

The Gyrocarpus asiaticus Willd plant was collected from the nearby area of Tirunelveli District fields (Tamil Nadu) and Lactuca runcinata DC Plant was collected from the nearby area of Thoothukudi District fields (Tamil Nadu) in December 2011, identified and authenticated by Dr. V. Chelladurai (Retired Research Officer-Botany, Central Council for Research in Ayurveda and Siddha, Govt. of India), Tirunelveli, Tamil Nadu, India. Herbarium of the plants were prepared and preserved in the Department of Pharmacognosy, Korginga College of Pharmacy, Korangi, East Godavari District, Andhra Pradesh, India.

Collection of earthworms

The earthworms are collected from water logged soils near Korangi, East Godavari district, Andhra Pradesh. They are washed with normal saline solution and stored in tyrode solution.

Preparation of the extracts

Shade-dried small pieces of Gyrocarpus asiaticus Willd and shade-dried powder of the Lactuca runcinata DC were subjected to hot percolation with the Soxhlet apparatus using methanol as a solvent.

Preliminary phytochemical screening


Experimental Procedure

The anthelmintic activity was performed according to the method of Ghosh et al. (2005) on the adult Indian earthworm Pheritima posthuma. [9,10] Albendazole, the standard drug, was diluted with normal saline to obtain 25, 50 and 100 mg/ml concentrations and was poured into Petri dishes. Methanolic extracts of both plants were diluted with normal saline to obtain 25, 50 and 100 mg/ml concentrations. Normal saline (0.9% NaCl) alone served as the negative control. All these dilutions were poured into the Petri dishes accordingly. Ten petridishes of equal size were taken & numbered. Six earthworms (n=6) of similar sizes (about 8 cm) were placed in each petridish at room temperature. Time for paralysis was noted down when no movement of any sort could be observed, except when the worms were shaken vigorously. Time of death for worms was recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water (50 °C). The paralysis time and lethal time were recorded in terms of minutes.

RESULTS AND DISCUSSION

Preliminary phytochemical evaluation

The methanolic extract of Gyrocarpus asiaticus showed positive results for alkaloids, cardiac glycosides, flavonoids, phenols,
saponins, steroids, tannins and terpenoids but methanolic extract of Lactuca runcinata showed positive results for alkaloids, cardiac glycosides, flavonoids, phenols, phlobatannin, reducing sugars, saponins, steroids, tannins and terpenoids.

**Anthelmintic activity**

In vitro anthelmintic activity was performed and the paralysis time and lethal time were recorded. Statistical evaluation of the data was performed by one-way ANOVA. The results were expressed as mean ± SD.

The results show that for the 25 mg/ml concentration, albendazole showed the best activity for death time (104.83±6.99 min) and the methanolic extract of Gyrocarpus asiaticus and Lactuca runcinata showed a death time of 126±2.82 min and 105.83±5.23 min, respectively. Also, for the 50 mg/ml concentration, albendazole showed the highest activity against the worms (85.5±4.84 min) and the methanolic extract of Gyrocarpus asiaticus and Lactuca runcinata showed a death time of 117±9.75 min and 92.3±5.87 min, respectively. For the 100 mg/ml concentration, albendazole showed the least death time of 63.83±4.16 min, and the methanolic extract of Gyrocarpus asiaticus and Lactuca runcinata showed a death time of 76.6±3.26 min and 66.2±1.75 min, respectively. The paralysis and death times of both the plants along with the standard is given in (Table 1). The study revealed that both the plants’ methanolic extracts had significant activity at the higher concentration (100 mg/ml). Lactuca runcinata has shown better activity than Gyrocarpus asiaticus at a higher concentration (100 mg/ml) compared with the standard, albendazole (100 mg/ml). The comparison of the death time of both the plants in different concentrations with respect to the standard is given in (Figure 1).

**Table 1: In vitro anthelmintic effect of Gyrocarpus asiaticus and Lactuca runcinata against Pheretima posthuma**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Concentration (mg/ml)</th>
<th>Paralysis Time (min)</th>
<th>Death Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albendazole (Std)</td>
<td>25</td>
<td>53.66±2.59</td>
<td>104.83±6.99</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>42.33±1.32</td>
<td>85.5±4.84</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>31.66±0.88</td>
<td>63.83±4.16</td>
</tr>
<tr>
<td>GA extract</td>
<td>25</td>
<td>68.16±3.65</td>
<td>126±2.82</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>52.33±4.13</td>
<td>117±9.75</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>38±4.38</td>
<td>76.6±3.26</td>
</tr>
<tr>
<td>LR extract</td>
<td>25</td>
<td>64.35±2.80</td>
<td>105.83±5.23</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>49.34±1.24</td>
<td>92.3±5.87</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>34.86±3.03</td>
<td>66.2±1.75</td>
</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

±SD value, n=6, P <0.01.

**CONCLUSION**

In conclusion, the anthelmintic activity was screened by taking Pheretima Posthuma as experimental model. The methanolic extracts are having good anthelmintic activity. The phytochemical study shows the presence of tannins and saponins which are may be responsible for the anthelmintic activity. The crude extracts of Gyrocarpus asiaticus and Lactuca runcinata have to be further studied to isolate the active compounds present and to establish the mechanism of action.

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**REFERENCES**


