Evaluation of in vitro anthelmintic activity of extracts of Jasminum sessiliflorum

Ruby Philip¹, Kathiresan Krishnasamy², Elessy Abraham¹

¹Nazareth College of Pharmacy, Othera P.O, Thiruvalla, Kerala, India
²Department of Pharmacy, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu, India

ABSTRACT

Plant preparations are most popular from ancient times for the treatment of various diseases. The ancient people had an appreciable on the application and usage of plant preparations for the common ailments. Based on the investigation, it has been found that various species of this plant has been used as an anthelmintic. The extracts of Jasminum sessiliflorum was investigated for anthelmintic potential using earthworms, Phere titima posthuma. Different concentration of plant extracts were used for the evaluation. Albendazole (10 mg/ml) was used as reference standard drug. The method employs the determination of paralysis time and death time of the worms and these results were recorded. Extracts showed significant activity. The ethanolic extract was found to be most efficient.

INTRODUCTION

Helminths cause infections which are very popular infections in human beings. It is a threat to the human population, and they cause enormous health hazards, resulting in malnutrition, anaemia, eosinophilia and pneumonia. These parasites mainly live in the intestinal tract of the human body. The development of resistance to common drugs used for the treatment is a serious problem in the use of conventional medicines. This marks the importance of natural anthelmintics.

The WHO has put forward an estimate which states a large population is harbouring the parasitic infection. The parasitic worm also has a severe economic impact as it also infects the livestock and crops, thereby affecting the production and supply of food. The research on anthelmintics has not shown much progress despite all this adverse situations. Helminth infections sensitize humans to other infections, and so is a major concern in the developing and underdeveloped countries.

The plant, Jasminum sessiliflorum (Family: Oleaceae), is a climbing shrub with a smooth stem and minutely pubescent branchlets. The aim of the present study is to evaluate the anthelmintic potential of Jasminum sessiliflorum extracts.

MATERIALS AND METHODS

Collection of plant materials

The plant J. sessiliflorum (Family: Oleaceae) were collected from Tirunelveli district, which is located at Tamil Nadu, India. The plant was identified and authenticated by Mr Chelladurai, Research officer-Botany, Central council for research in Ayurveda and Sidha, Government of India. After authentication, the fresh, healthy plants of Jasminum sessiliflorum was dried properly for three weeks in the shade and then segregated and powdered with the aid of a mechanical grinder. The powdered material was stored in containers that were airtight.
Table 1: Anthelmintic activity of *Jasminum sessiflorum*

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Concentration (mg/ml)</th>
<th>Paralysis time (min)</th>
<th>Death Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Control (0.1% CMC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Albendazole 10mg/ml</td>
<td>19.18 ± 0.5</td>
<td>38.15 ± 0.7</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Petroleum ether extract 25mg/ml</td>
<td>48.16 ± 0.9</td>
<td>75.23 ± 0.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Petroleum ether extract 50mg/ml</td>
<td>38.14 ± 0.3</td>
<td>68.60 ± 1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Petroleum ether extract 100mg/ml</td>
<td>34.54 ± 0.8</td>
<td>55.65 ± 1.2</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Chloroform Extract 25mg/ml</td>
<td>44.52 ± 1.1</td>
<td>71.10 ± 1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chloroform Extract 50mg/ml</td>
<td>37.13 ± 0.7</td>
<td>63.23 ± 1.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chloroform Extract 100mg/ml</td>
<td>31.82 ± 0.5</td>
<td>48.40 ± 1.1</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Ethyl acetate Extract 25mg/ml</td>
<td>39.32 ± 1.1</td>
<td>65.10 ± 1.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethyl acetate Extract 50mg/ml</td>
<td>33.43 ± 1.2</td>
<td>59.30 ± 1.5</td>
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<tr>
<td></td>
<td>Ethyl acetate Extract 100mg/ml</td>
<td>28.30 ± 1.6</td>
<td>43.20 ± 1.0</td>
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</tr>
<tr>
<td>6.</td>
<td>Ethanol Extract 25mg/ml</td>
<td>36.50 ± 1.5</td>
<td>55.40 ± 1.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethanol Extract 50mg/ml</td>
<td>25.34 ± 1.9</td>
<td>47.24 ± 1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethanol Extract 100mg/ml</td>
<td>20.85 ± 1.2</td>
<td>40.18 ± 1.1</td>
<td></td>
</tr>
</tbody>
</table>

Preparation of extracts

The plant *Jasminium sessiflorum* was successively extracted using a soxhlet assembly, by using various solvents such as petroleum ether, chloroform, ethyl acetate and ethanol (order of increasing polarity). Hot percolation method was employed to obtain the aqueous extract. The concentration of the extracts was done with the aid of rotary vacuum evaporator. The dried weight of the material was used to calculate the percentage yield, after the weighing of the extract produced with each solvent.

Anthelmintic activity

The anthelmintic potential evaluation was done on adult Indian earthworms, *Pheretima postuma* as per (Ajaiyeoba et al., 2001) with minor modifications. The dose suspensions were prepared using Carboxy methyl cellulose (0.1% CMC), which is non-toxic and non-irritant used in oral and other formulations. All extracts and standard drugs suspensions were freshly prepared before starting the experiment. Eight groups of approximately equal size earthworms consisting of six earthworms in each group were used for the present study.

**Group-1:** Control

**Group-2:** Standard (Albendazole- 10mg/ml)

**Group-3:** Petroleum ether extracts of *Jasminum sessiflorum* in differing concentrations (25mg/ml, 50mg/ml, 100mg/ml).

**Group-4:** Chloroform extracts of *Jasminum sessiflorum* in differing concentrations (25mg/ml, 50mg/ml, 100mg/ml).

**Group-5:** Ethyl acetate extracts of *Jasminum sessiflorum* in differing concentrations (25mg/ml, 50mg/ml, 100mg/ml).

**Group-6:** Ethanolic extracts of *Jasminum sessiflorum* in differing concentrations (25mg/ml, 50mg/ml, 100mg/ml).

The parameters noted were the time taken for paralysis as well as the death of the individual worms. The time at which the earthworms exhibited no movement of any sort except when they were shaken vigorously was noted as the time for paralysis. Time for the death of worms were recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water at 50°C followed with fading of their body colour (Dwivedi et al., 2009). Three sets of experiments were done for statistical significance.

RESULTS AND DISCUSSION

**Figure 1: Graphical Representation of Anthelmintic Activity**

PE: Petroleum ether extract, CE: Chloroform extract, EA- Ethyl acetate extract, EE- Ethanolic extract

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The anthelmintic activity was carried out on adult earthworms, *Pheretima postuma due to the advantage that it resembles the intestinal roundworm parasites found in human beings both anatomically and physiologically*. The screening of different extracts of *Jasminium sessiliflorum* revealed the presence of many phytoconstituents such as alkaloids, flavonoids, tannins and saponins. It is believed that the anthelmintic action is due to the presence of tannins and polyphenolic compounds in the extracts. It was observed that a certain degree of positive response was exhibited by all the extracts. The evaluation of the anthelmintic activity in comparison with the reference standard Albendazole is shown in Table 1 and Figure 1. The ethanolic extract was found to produce the highest degree of positive response.

The low cost involved and the rapid turnover makes the in vitro assays for the screening of anti-parasitic potential more popular (*Al-Shaibani et al.,* 2008). Ciliary movement helps in the movement of earthworms. Damage to the mucopolysaccharide outer layer by any agent will result in paralysis and thereby restricts the motion of earthworms (*Latha et al.,* 2008). The anthelmintics act by starving the earthworms, thereby ultimately causing their paralysis and death. Parasites will also die if they become paralyzed and temporarily lose their ability to maintain their position in the gut. Anthelmintics can act by also binding to gastrointestinal tract free proteins of the worms, thereby ultimately causing death (*Patel et al.,* 2010).

**CONCLUSIONS**

We could conclude that the extracts of *Jasminum sessiliflorum* have exhibited a remarkable potential as anthelmintics, with ethanolic extract exhibiting the maximum activity. The identification of the correct mechanism of action and the phytoconstituents responsible for the activity requires further in vivo analysis. It is clear that further studies will prove the plant versatile to be used as a potent anthelmintic.

**REFERENCES**


