IN VITRO ANTHELMINTIC ACTIVITY OF BAUHINIA VARIEGATA BARK (LEGUMINOSAE)

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ABSTRACT

Aqueous and Chloroform extract of bark of Bauhinia Variegata were investigated for their anthelmintic activity against Pheretima posthuma and Ascardia galli. All extracts exhibited a dose dependent (25, 50 and 100 mg/ml) inhibition of spontaneous motility (paralysis) and time of death of the worms. Extract obtained from bark not only killed the Pheretima posthuma but also killed the Ascardia galli. The observations were comparable with standard drug Piperazine citrate at a concentration of 20 mg/ml and distilled water as control. Maximum vermicide activity was shown by both extract at the concentration of 100mg/ml. From the experiment performed, it can be said that the aqueous and chloroform extract of bark of Bauhinia variegata bearing a potential anthelmintic activity.

Keywords: Anthelmintic activity, Ascardia galli, Bauhinia Variegata, Pheretima posthuma, Piperazine citrate.

INTRODUCTION

Helminthes are the most common infections in man, affecting a large proportion of the world’s population. Parasitic diseases may cause severe morbidities including lymphatic filariasis (cause of elephantiasis), onchocerciasis and schistosomiasis. Development of resistance to most of commercially available anthelmintic became a severe problem worldwide.  

Bauhinia variegata Linn. (Leguminosae), commonly known as “Kachnar” is an herbaceous plant, reaching up to 6-12 meters. The leaves are shaped a little like cow’s hoof and white to pinkish flowers. The flowers are hermaphrodite (have both male and female organs). Petals pale purple or rose or white or yellow, obovate 4 -6 cm long, 2-3 cm broad. The plant prefers light (sandy), medium (loamy) and heavy (clay) soils. The plant prefers acid, neutral and no shade. It requires moist soil.

MATERIALS AND METHOD

Plant materials

The fresh bark of Bauhinia Variegata were collected from local area of sonai, Maharashtra, India and identified and authenticated from Botanical survey of India, Pune the bark was air dried and powdered with a mechanical grinder, filtered and fine powder was stored in a non-toxic polyethylene bag.

Drug and chemicals

The following drugs and chemicals were used:

Piperazine citrate (Panka) Medicos, India), Tween-80 (Acme chemicals, India), Chloroform (Research Lab Fine chem. Industries, India)

Preparation of the extract

Aqueous Extract (Maceration method)

Air-dried fine bark powdered material (200 gm) of Bauhinia Variegata was kept for maceration with 1000 ml of distilled water for 12 hr. The extract was double filtered by using muslin cloth and Whatman no.1 filter paper and concentrated by evaporation on water bath. The extract was dried and used as a powder. The percentage yield of extract was found to be 3.65 percent.

Chloroform Extract (Continuous Soxhlet extraction method)

The powder was first defatted with petroleum ether and then soxhlet-extracted with Chloroform which is further evaporated to dryness to obtain chloroform extract.

Preliminary Phytochemical screening

The extract was subjected to phytochemical screening and the preliminary chemical examination of Chloroform extract revealed the presence of steroids, flavonoids, tannins, coumarins, carbohydrates and reducing sugars. Flavonoids exhibit varied biological activities that include analgesic, anti-inflammatory, antioxidant, hepatoprotective and antiulcer activities. Tannins are protectants. Based on this, it was contemplated to carry out the screening of chloroform extract for analgesic, anti-inflammatory activities.

Anthelmintic Bioassay

The aqueous and chloroform extracts of bark of Bauhinia Variegata were investigated for their anthelmintic activity against Pheretima posthuma and Ascardia galli. Different concentrations of the extract were tested in the bioassay, which involved determination of the time of paralysis and the time of death of the worms. Piperazine citrate was included as standard reference and distilled water as control.

Preparation of the extract

The anthelmintic assay was performed on healthy adult Indian earthworm, Pheretima posthuma due to its anatomical resemblance with the intestinal roundworm parasite of human beings.

Activity against earthworms

The anthelmintic assay was carried as per the method of Ajaiyeoba et al. with minor modifications. Suspension of aqueous extract and chloroform extract of Bauhinia Variegata at different concentration...
Six worms about the same size were released in 50 ml of sample with desired concentration. They were observed for their spontaneous motility and evoked responses. The paralytic score was recorded at different time intervals. Immediately after inhibition of response to external stimuli, the worms were placed in fresh water and observed for recovery. Duration required for final recovery/death was noted; mean paralytic score was plotted against time. The death and/or total paralysis time was recorded at room temperature. The death of the worm was ascertained by transferring it into a beaker containing hot water (50°C), which stimulated and induced movements if the worm was alive. Same experiment was done for Ascardia galli worms.

<table>
<thead>
<tr>
<th>Plant Extract</th>
<th>Concentration (mg/ml)</th>
<th>Pheretima posthuma</th>
<th>Paralysis (min)</th>
<th>Death (min)</th>
<th>Ascardia galli</th>
<th>Paralysis (min)</th>
<th>Death (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>25</td>
<td>74.4 ± 0.43</td>
<td>85.3 ± 0.93</td>
<td>75.8 ± 0.42</td>
<td>84.1 ± 1.00</td>
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<tr>
<td></td>
<td>50</td>
<td>51.5 ± 0.55</td>
<td>66.1 ± 1.05</td>
<td>53.1 ± 0.77</td>
<td>65.2 ± 0.61</td>
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<tr>
<td></td>
<td>100</td>
<td>36.6 ± 0.65</td>
<td>49.8 ± 0.57</td>
<td>36.9 ± 0.43</td>
<td>50.3 ± 1.24</td>
<td></td>
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</tr>
<tr>
<td>CE</td>
<td>25</td>
<td>70.5 ± 0.83</td>
<td>75.4 ± 0.38</td>
<td>73.6 ± 1.71</td>
<td>79.0 ± 1.93</td>
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</tr>
<tr>
<td></td>
<td>50</td>
<td>36.4 ± 0.53</td>
<td>40.4 ± 0.47</td>
<td>50.9 ± 2.11</td>
<td>63.1 ± 1.51</td>
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</tr>
<tr>
<td></td>
<td>100</td>
<td>24.8 ± 0.51</td>
<td>27.1 ± 0.28</td>
<td>29.6 ± 1.93</td>
<td>31.6 ± 2.10</td>
<td></td>
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<tr>
<td>PC</td>
<td>20</td>
<td>21.9 ± 1.71</td>
<td>24.0 ± 0.91</td>
<td>23.7 ± 1.32</td>
<td>27.0 ± 0.48</td>
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</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

AE-Aqueous extract, CE-Chloroform Extract. All the values expressed Mean ± SD; n=6 in each group.

RESULT AND DISCUSSION

Preliminary phytochemical screening of chloroform extract revealed the presence of steroids, flavonoids, tannins, coumarins, carbohydrates and reducing sugars like phytoconstituents (Table 1) may be responsible to show a potent anthelmintic activity. From the observation made the extracts of plant of Bauhinia variegata was found to show a potent anthelmintic activity when compared to standard drug.

Aqueous extract of Bauhinia variegata (25 mg/ml) showed the time of paralysis and death 74.4 min and 85.31 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 75.8 min and 84.1 min time for paralysis and death respectively. For 50 mg/ml of concentration the time of paralysis and death was found to be 51.53 min and 66.13 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 53.1 min and 65.2 min for paralysis and death respectively. For 100 mg/ml of concentration the time of paralysis and death was found to be 36.6 min and 49.8 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 36.9 min and 50.3 min respectively.

For the chloroform extract of Bauhinia variegata (25 mg/ml) showed the time of paralysis and death 70.5 min and 75.4 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 73.6 min and 79 min time for paralysis and death respectively. For 50 mg/ml of concentration the time of paralysis and death was found to be 36.4 min and 40.5 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 50.4 min and 63.1 min for paralysis and death respectively. For 100 mg/ml of concentration the time of paralysis and death was found to be 24.8 min and 27.1 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 29.6 min and 34.6 min respectively.

The observation with Piperazine citrate showed the time of paralysis and death 21.9 min and 24 min respectively against the Pheretima posthuma, whereas against the Ascardia galli it showed 23.7 min and 27 min respectively. For 20 mg/ml concentration, it observed that both the extract showed a remarkable anthelmintic potential against the Pheretima posthuma and Ascardia galli. The anthelmintic activity of Bauhinia variegata extract due to the presence of active constituents i.e. steroid, flavonoids, tannins etc. Further, there is scope to evaluate the active principals of Bauhinia variegata for their anthelmintic activity to open the new era for natural anthelmintic.

REFERENCES