In-vitro anthelmintic activity of *Caesalpinia bonducella* (Linn). Flem. leaves.

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**ABSTRACT**

Helminth infections remain a major constraint to livestock productivity across all agro-ecological Zones. Today, the principal mode for control of gastrointestinal parasites is based on the commercial anthelmintic. However, widespread increase of anthelmintic resistance, scarcity and high cost especially to farmers of low income in developing countries led to the need of other alternative helminth control methods. Among other alternative methods, there is considerable and expanding interest in traditional herbal dewormers. In present communication methanolic and aqueous extracts of leaves of *Caesalpinia bonducella* Linn. Flem were investigated for their anthelmintic activity against *Pheretima posthuma* and *Ascardia galli*. Various concentrations were used in the bioassay, which involved paralysis and death time of the worms. Both the extracts showed significant anthelmintic activity.

**KEY WORDS:** Anthelmintic, Ascardia galli, Caesalpinia bonducella, Pheretima posthuma, Piperazine citrate.

**INTRODUCTION**

*Caesalpinia bonducella* (L.) Flem. Fever nut; bonduc nut (Family: Caesalpiniaeaceae) commonly known as Nata Karanja (Hindi), is a prickly shrub found throughout the hotter regions of India, Myanmar and Sri Lanka. The leaves of *Caesalpinia bonducella* are traditionally used for the treatment of inflammation and toothache. The topical anti-inflammatory activity of *Caesalpinia bonducella* leaves has been reported. It has also been found to possess multiple therapeutic properties like antipyretic, antidiuretic, anthelmintic and antibacterial, anticonvulsant, anti-anaphylactic and anti-diarrheal, antiviral, anti-asthmatic, anti-microbial and anti-oestrogenic. Currently we have reported the hepatoprotective and antioxidant properties of this plant. Phytochemical screening of the extracts revealed the presence of alkaloids, saponins, flavonoids, triterpenes, tannins and steroids. Purpose of the study is to evaluate anthelmintic potential of plant *Caesalpinia bonducella*.

**MATERIALS AND METHODS**

**Plant material:**

The leaves of the plant *Caesalpinia bonducella* were collected from Jath in Sangli district of Maharashtra in June 2008 and authenticated by Indian Council Medical Research, Belgaum.

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**Preparation of extracts:**

The leaves were shade dried, powdered and subjected to successive solvent extraction petroleum ether (60-80%) chloroform, methanol in soxhlet extractor and cold maceration of the successive marc in water. Extracts were vacuum dried.

**Animals**

Indian adult earthworms (*Pheretima posthuma*) were collected from water logged areas and *Ascardia galli* (nematode) worm were obtained from freshly slaughtered fowls (Gallus gallus). Both worm types were identified at the Department of Zoology, RLS College, Belgaum.

**Evaluation of anthelmintic activity:**

The anthelmintic assay was carried as per method of Ajaiyeoba et al with minor modifications. The anthelmintic activity was evaluated on adult Indian earthworm *Pheretima posthuma* worm due to its anatomical and physiological resemblance with the intestinal round worms parasites of human beings. *Ascardia galli* (nematode) worms are easily available in slaughtered fowls and it can be used as a screening model for anthelmintic drugs as advocated earlier. Fifty millilitre of formulation containing three different concentrations, each of crude alcoholic and aqueous extract (10, 50, 100mg/ml in distilled water) was and six worms (same type) were placed in it. This was done for both type of worms Observation were made for the time taken to cause paralysis and death of the individual worms. mean time for the paralysis (P) in min was noted when no movement of any sort could be observed, except when the worm was shaken vigorously, time of death (D) in min was recorded after ascer-
Table 1: Anthelmintic activity of methanolic and aqueous extracts of *Caesalpinia bonducella* leaves

<table>
<thead>
<tr>
<th>Test subs</th>
<th>Concentrations (mg/ml)</th>
<th>Time taken for paralysis (P) and death of worms in min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>D</td>
</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alcohol extract</td>
<td>10</td>
<td>26.5 ± 0.56</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>17.0 ± 0.56</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>9.66 ± 0.49</td>
</tr>
<tr>
<td>Aqueous extract</td>
<td>10</td>
<td>28.17 ± 0.47</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>19.67 ± 0.71</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>8.66 ± 0.33</td>
</tr>
<tr>
<td>Piperazine citrate</td>
<td>10</td>
<td>18.83 ± 0.60</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

Preliminary phytochemical screening of leaves of *Caesalpinia bonducella* showed the presence of diterpenoids and flavonoids. Tannins, resins. As shown in table 1, methanolic and aqueous extract exhibited anthelmintic activity in dose-dependent manner giving shortest time of paralysis (P) and death (D) with 100 mg/ml concentration. The alcoholic extract of *Caesalpinia bonducella* caused paralysis of 9.66 min. and time of death of 30.5 min. while aqueous revealed paralysis of 8.66 and 33.33 min. respectively against the earthworm Phereutima posthuma. The reference drug Piperazine citrate showed the same at 18.83 and 60.33 minutes, respectively. *Ascardia galli* worms also showed sensitivity to the methanolic and aqueous extract of *Caesalpinia bonducella*. The methanolic extract caused paralysis in 10.42 min, death in 31.75 min and the aqueous extract displayed P and D in 9.10 and 30.22 min respectively, at higher concentration of 100 mg/ml. Piperazine citrate did the same at 15.17 and 41.67 min. Piperazine citrate by increasing chloride ion conductance of worm muscle membrane produces hyper polarization and reduced excitability that leads to muscle relaxation and flaccid paralysis. The leaf extract of *Caesalpinia bonducella* not only demonstrated paralysis, but also caused death of worms especially at higher concentration of 100 mg/ml in shorter time as compared to reference drug Piperazine citrate. Phytochemical screening of the extracts revealed the presence of alkaloids, saponins, flavonoids, triterpenes, tannins and steroids. Tannins were shown to produce anthelmintic activities chemically tannins are polyphenolic compounds. It is possible that tannins contained in the extracts of *Caesalpinia bonducella* produced similar effects. Reported anthelmintic effect of tannins is that they can bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and may cause death. Further studies are in process to identify the possible phytoconstituents responsible for anthelmintic activity.

**REFERENCES**


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