DETERMINATION OF ANTHELMINTIC ACTIVITY OF TERMINALIA CATAPPA EXTRACT (RED LEAVES)

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ABSTRACT

Terminalia catappa (red leaves) were used to check anthelmintic activity of methanolic extract of Terminalia catappa. The paralysis time and death time was checked by this study. The anthelmintic activity of red leaves was checked by preparing its methanolic extract in a concentration of 20mg/ml, 40mg/ml, and 60mg/ml. The standard drug Albendazole was used to check the anthelmintic activity of methanolic extract. The observations and results suggest that methanolic extract of Terminalia catappa leaves found to possess concentration dependent anthelmintic activity on worms (shows better activity with increasing concentration of extract). The methanolic extract 20mg/ml shows significant activity as compare to the standard drug. The study involves the determination of paralysis time and death time of the worms in different doses of the methanolic extracts.

KEYWORDS: Terminalia catappa red leaves, Albendazole, Time for Paralysis, Time for Death, Anthelmintic Activity.

INTRODUCTION

Helminthiasis also known as helminth infection or intestinal worm infection in which humans beings or other animal were infected with parasitic worms known as helminths. The parasitic worms were classified as tapeworms, flukes, and roundworms. Typically, the worms reside in the gastrointestinal tract of their host but may also burrow into the liver and other organs. Infected people excrete helminth eggs in their faeces, which then contaminate the soil in areas with inadequate sanitation.¹ Some other people may be infected by ingesting eggs or larvae in contaminated food or through penetration of the skin by infective larvae in the soil.
(hookworms). Helminthiasis spread worldwide and is one of the common diseases of all ages. The parasitic diseases cause severe morbidity by affecting population in endemic areas with major economic and social consequences. [2] Helminth infections are among the most common infections in man, affecting a large proportion of the world’s population. In developing countries, they pose a large threat to public health and contribute to the prevalence of malnutrition, anaemia, eosinophilia, and pneumonia. The most severe cause of parasitic diseases is morbidity including filariasis, onchocerciasis (river blindness), and schistosomiasis. [3] Although the majority of the infections due to worms were generally limited to tropical regions, they can occur to travellers who have visited those areas. [4] As per WHO only synthetic drugs are frequently used for treatment of helminth infestations in human beings but these synthetic drugs are out of reach of millions of people and have a lot of side effect. In view of this, an attempt has been made to study the anthelmintic activity by use of herbal drug.

**Figure. 1 Image of Parasitic Hookworm causing Helminth infections.**

*Terminalia catappa* is large tropical tree belonging to family Combretaceae which grows mainly in the tropical regions of Asia, Africa, and Australia. It is known by the common names Bengal almond, Indian almond, Malabar almond etc. The trees have been spread widely by humans in the native range is uncertain. The tree grows to 35meters (110ft) tall with an upright symmetrical crown and horizontal branches. The *Terminalia catappa* have corky light fruit that are dispersed by water. The nuts within the fruit are edible when fully ripen; taste is most likely to almond. As the tree gets older, its crown becomes more flattened to form a spreading, vase-shape. Its branches are distinctively arranged in tiers. The leaves are large (15-25cm) long and (10-14cm) broad, ovoid, glossy dark green, and leathery. *Terminalia catappa* is the dry-season deciduous. At the end of the period of growth they start falling and turn to pinkish reddish or yellow brown due to the pigments such as violaxanthin,
lutein and zeaxanthin. The flowers are monoecious with distinct male and female flowers on the same tree both are (1cm) in diameter with white greenish, inconspicuous and without petals. They are produced on auxiliary or terminal spikes. The fruit are drupe (5-7cm) long and (3-5.5cm) broad, green at first then yellow and finally red when ripe, containing a single seed.

Figure 2 A- T. catappa red leaves, B- Single red leave, C- Green leaves of T. catappa, D- Fruits of T. catappa.

*Terminalia catappa* were also known to be ornamental tree, grown for the deep shade (provided by its large leaves). The fruit is edible, tastings is lightly acidic. The woods are red, solid, and have high water resistance. It has been utilized in Polynesia for making canoes. The leaves contain several flavonoids (such as kamferol or quercetin), several tannins (such as punicalin, punicalagin, or tercatin), saponines, and phytosterols. *Terminalia catappa* leaves and also the bark were used in different traditional medicines for various purposes due to their chemical richness. In Taiwan fallen leaves were used as herbs for the treatment of liver diseases. A tea made from the leaves is prescribed against dysentery and diarrhea. It is also thought that the leaves contain agents for prevention of cancers and antioxidant as well as anti-clastogenic characteristics.
MATERIALS AND METHODS

Materials

The drug Albendazole was gift sample from Micro Labs Pvt. Ltd. (Goa, India). All other chemicals petroleum ether, methanol, distilled water etc. were used of analytical grade.

Collection of Earthworms

The earthworms of lengths (6-12cm) were obtained from the damp, cool, and covered area of the Vishnupuri, Nanded (Maharashtra, India). The worms were transferred into a glass bottle with some quantity of the soil from which they were taken. The worms were identified and authenticated by approved zoologist.

Plant materials Collection

Terminalia catappa plant red leaves was collected from near S.R.T.M. University (Campus area Nanded, Maharashtra) in the month of May and authenticated by botanist NES Science College (Nanded, Maharashtra). After authentication the fresh leaves were collected cleaned and shade dried.

Extract Preparation

Terminalia catappa plant red leaves were pulverized by mechanical grinder and passed through a 20# mesh sieve. The powdered leaves (500gm) were extracted successively with petroleum ether and methanol extract by using a soxhlet apparatus and water extracted by a cold maceration. The extracts were filtered through a cotton plug, followed by whatmann filter paper (no.1). The extracts were evaporated under reduced pressure using a rotovac evaporator at a low temperature at 40°C - 50°C until all the solvent get removed to give extract sample. Then weights of each residue were noted. [9]

Anthelmintic Activity

Test samples of extracts were prepared at the concentrations, 20, 40 and 60 mg/ml in 25 ml of distilled water containing 2% Tween 80. Six earthworms of approximately same size were placed in petridish [diameter 9cm each] containing above solution of extracts. Albendazole [20 mg/ml] was used as standard drug and distilled water containing 2% Tween 80 was used as control. Anthelmintic activity of Albendazole mediates through hyper-polarization that leads to muscle relaxation and flaccid paralysis. [10] Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously.
Time for death of worms was noted when the earthworms neither moved when shaken vigorously or when dipped in warm water [50°C]. [11,12]

RESULTS AND DISCUSSION
The ultimate aim of present research work is to evaluate anthelmintic activity of methanolic extract *Terminalia Catappa* (Red leaves) against Indian earthworm *Phertima posthma*. In this study the paralysis time and death time of the earthworms in different doses of the extracts (20mg/ml, 40mg/ml, and 60 mg/ml) were determined. Albendazole drug at concentration (20mg/ml) were used as standard/reference drug to compare anthelmintic activity of the methanolic extract *Terminalia Catappa* (Red leaves) against Indian earthworm *Phertima posthma*. The result suggests that Methanolic extract of *Terminalia Catappa* (Red leaves) possess concentration dependent anthelmintic activity.

Table 1. Anthelmintic Activity of *Terminalia Catappa* Methanolic Extract of (Red Leaves)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concentration (mg/ml)</th>
<th>Time For Paralysis (min)</th>
<th>Time For Death (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control (normal saline)</td>
<td>…………</td>
<td>…………</td>
</tr>
<tr>
<td>2</td>
<td>Albendazole (20mg/ml)</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>Methanolic extract 20mg/ml</td>
<td>30</td>
<td>49</td>
</tr>
<tr>
<td>4</td>
<td>Methanolic extract 40mg/ml</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>5</td>
<td>Methanolic extract 60mg/ml</td>
<td>15</td>
<td>22</td>
</tr>
</tbody>
</table>

The figure 3 depicts the Anthelmintic activity of Albendazole (Std. Dose) and Extract of *Terminalia Catappa* (Leaves) with Control (Normal saline) against Indian earthworm *Phertima posthma*. The study involves the determination of paralysis time and death time of...
the worms in different doses of the extracts (20mg/ml, 40mg/ml and 60 mg/ml). Each Petri-dish contains six number of Indian earthworm *Phertima posthuma*. Anthelmintic activity study of methanolic extract were performed by comparing with Anthelmintic drug Albendazole as standard dose. The paralysis time and death time of the worms in different doses of the extracts were noted shown in Table no.1. The control there is no death and paralysis of Indian earthworm *Phertima posthuma*.

**Figure 4. Anthelmintic activity of Albendazole (Std. Dose) and *Terminalia Catappa* red leaves Extract.**

The standard dose of Albendazole drug at concentration 20 mg/ml show paralysis time and death time at 16 and 23 min. respectively were used as reference. The Methanolic extract of *Terminalia Catappa* (Leaves) concentrations at 60 mg/ml show paralysis time and death time at 15 and 22 min. From the result it concluded that, Methanolic extract of *Terminalia Catappa* (Leaves) were show concentration dependent anthelmintic activity.
CONCLUSION

The Anthelmintic activity of *Terminalia catappa* red leaves (extract) shows better activity on helminth causing worms with increasing concentration of the extract. From this research work, it found that Methanolic extract of *Terminalia Catappa* leaves were show concentration dependent anthelmintic activity. Further studies need to isolate and reveal the active compound in the crude extracts of *Terminalia catappa* and establish the mechanism of action are required.

REFERENCES

3. Lukhob CW, Simmonds MSJ, Paton AJ. Insecticidal molluscidal, Ethnopharmacol, 2006; 103: 123-124.
11. Eddy NO, Ekop AS. Comparative studies of the level of toxicant in the seeds of *Terminalia catappa* (Indian almond) and coulaedulis (African walnut). Chem. Class J., 2005; 2: 14-76.