RESEARCH ARTICLE

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Evaluation of Anthelmintic Activity of Methanolic Extract of *Croton Bonplandianum* Baill

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ABSTRACT

The aim of the present study was to evaluate the phytochemical constituent and anthelmintic activity of methanolic extract of whole parts of *Croton bonplandianum* Baill. The various concentration i.e. 100%, 50%, and 25% of methanolic extract of the whole part of *Croton bonplandianum* Baill were tested for bioassay which determined the time of paralysis (P) the time of death (D) of *Pheretima posthuma*. Albendazole was used as a standard drug and the normal saline solution was used as controlled. The three different concentrations of plant extract i.e. 25 mg/ml, 50 mg/ml, and 100 mg/ml showed paralysis time 21±1 min, 17±1 min, and 13±2min respectively, and showed death time 51±2 min, 47±1 min, and 41±1 min respectively. Albendazole as a standard drug, in three different concentrations i.e. 25 mg/ml, 50 mg/ml, and 100 mg/ml showed paralysis times 16±1 min, 10±2 min, and 7±2 min respectively, and showed death times 31±2 min, 22±2 min, and 18±3 min respectively. From the result, it is concluded that the methanolic extract of *Croton bonplandianum* Baill has significant Anthelmintic activity.

Keywords: Albendazole, Anthelmintic Activity, *Croton Bonplandianum* Baill, *Pheretima Posthuma*.

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I. Introduction

Helminthiasis can be defined as a disease in which a part of the body is infested with worms such as pinworms, roundworms, tapeworms, etc. Basically, the worms stay in the gastrointestinal tract but may also present in the liver or other organs [6]. The worms can produce harmful effects by do out of their food, causing loss of blood, and by secreting toxins. The World Health Organization (WHO) has estimated that About 2 billion people are suffering from parasitic worm infections [7]. Domestic animals and crops are also affected by parasitic worms, which leads to the destruction of food production and economic impact. Nowadays anthelmintic drug discovery is the poor relation of the pharmaceutical industry due to the prevalence of parasitic worms. The farmers are dependent on traditional, ancestral, low cost and approachable treatments for helminths. However, whole nations are suffering from these tropical diseases because of little money to invest in drug discovery processes or treatment. Therefore, a small number of chemotherapeutic agents are available for the treatment of Helminthiasis. Anthelmintic drugs are those drugs that act locally or systemically in the GIT by killing parasites (Vermicide), or by expelling the parasites (Vermifuge) from the living organisms [6].

In India, Ayurvedic or herbal systems of medicine are very popular. people are using plants for the treatment of their own ailments and also for their domestic animals. *Croton bonplandianum* Baill also known as Churchuri, Reil poondu, Bantulsi respectively have various biologically active compounds [15]. The plant *Croton bonplandianum* Baill is a small perdurable herb, 30-40 cm in height, leaves of the plant are simple, petiolate, alternately arranged, 3-5 cm long, and lance-shaped with a toothed margin. This plant

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is used traditionally for curing different types of health-related problems such as gastrointestinal disorders, respiratory diseases, hepatic problems, analgesics, malaria, chicken pox, rheumatism, etc. The current study justifies the use of *Croton bonplandianum* Baill as an anthelmintic by using standard parasitological procedures.

II. Materials And Methods

A. Worms Collection

Pheretima posthuma (Indian earthworm) was collected from the water-doused area of Haldia (East Medinipur), West Bengal. They were washed with normal saline solution to remove all the muddy or dirt material. Indian earthworms are 150 mm in length and 3-5 mm in width. They were used for experimental purposes [6].

B. Collection of Plant Material

The plant *Croton bonplandianum* Baill was collected from the surrounding of the Haldia Institute of Pharmacy college campus, Haldia, Purba Medinipur, West Bengal.

C. Preparation of Plant Extract

The whole plant of *Croton bonplandianum* Baill was collected and powdered by grinder after a shade dry process. After that 250 gm of plant material was mixed with 500 ml of methanol & kept for 3 days as per the maceration process [2]. After three days, the macerated solution was filtered, and the filtrate was kept in a glass bottle. Then the methanol solvent was evaporated from the extract by using a water bath at 40°C temperature. The dried extract was stored in a closed container for further use.

D. Preparation of Test Drug and Reference Drug

The samples for in vitro study were prepared to have different concentrations like 25 mg/ ml, 50 mg/ml, and 100 mg/ml respectively (Jeeva *et al.*, 2006).

The three different concentrations of *Croton bonplandianum* Baill methanolic extract were prepared i.e. 25 mg/ml (250 mg extract in 10 ml Saline Solution), 50 mg/ml (500 mg extract in 10 ml Saline Solution) and 100 mg/ml (1000 mg extract in 10 ml Saline Solution) for anthelmintic activity as test drug. Samples of aqueous extracts of standard Albendazole were prepared by dissolving 250 mg 500 mg, and 1000 mg of each in 10ml of normal saline (0.9 gm NaCl in 100 ml distilled water) to get samples of concentration 25 mg/ml, 50 mg/ml, and 100 mg/ml respectively. All samples were labeled for identification.

E. Anthelmintic Activity

The Evaluation of the anthelmintic activity was performed according to the standard method. All earthworms were washed with a normal saline solution before performing the experiment. The earthworms were divided into seven groups and each group consists of five earthworms. The control group was placed in a petridish containing 10 ml of normal saline solution (0.9% NaCl). Earthworms were placed in petridish containing three different concentrations (25, 50, 100 mg/ml) each of plant extract [6]. Time for paralysis was noticed when no movement happens except when the worms were shaken strenuously. The time death of *Pheretima posthuma* (min) was recorded after discovering that earthworms neither moved when shaken nor when any external stimuli were given. In the same manner, albendazole was taken as a standard compound. The test results were compared with standard compound albendazole (25, 50, 100 mg/ml) treated samples [7].

III. Result And Discussion

The methanolic extract of the whole part of *Croton bonplandianum* Baill showed anthelmintic activity against *Pheretima prosthuma* at three different concentrations and the time for paralysis and time of death was noted in Table I. The effects were comparable with that the effects produced by the standard drug albendazole.

The methanolic extract of the whole part of *Croton bonplandianum* Baill in three different concentrations i.e. 25 mg/ml, 50 mg/ml, and 100 mg/ml showed the time for paralysis 21.62±0.21 min, 17.55±0.25 min, and 12.77±0.27 min respectively and showed the time of death 50.99±0.40 min, 47.48±0.27 min, and 41.45±0.33 min respectively. Albendazole as a standard drug, in three concentrations i.e. 25 mg/ml, 50 mg/ml, and 100 mg/ml showed the time for paralysis 16.08±0.30 min, 9.46±0.55 min, and 7.57±0.26 min respectively and showed the time of death 31.44±0.35 min, 21.58±0.44 min, and 18.26±0.26 min respectively.

TABLE I: ANTHELMINTIC ACTIVITY OF METHANOLIC EXTRACT OF CROTON BONPLANDIANUM AGAINST *PHERETIMA POSTHUMA*

Sl. No.	Group	Concentration(mg/ml)	Time for paralysis (min)	Time for death (min)
1.	Control	10 ml normal saline solution	No paralysis	No death
2.	Std-A	25 mg/ml	16.08±0.30*	31.44±0.35*
3.	Std-B	50 mg/ml	9.46±0.55*	21.58±0.44*
4.	Std-C	100 mg/ml	7.57±0.26*	18.26±0.26*
5.	Test-A	25mg/ml	21.62±0.21*	50.99±0.40*
6.	Test-B	50 mg/ml	17.55±0.25*	47.48±0.27*
7.	Test-C	100 mg/ml	12.77±0.27*	41.45±0.33*

All values represent Mean ± SEM; n=5. One-way ANOVA was followed by Bonferroni Test in each group. Values are significantly different from the reference standard (Albendazole), *P<0.001 vs Test.

The time for paralysis and time of death of *Pheretima prosthuma* was very significant when compared with the standard drug albendazole (Fig. 1 and Fig. 2). Fig. 3 represents the anthelmintic activity of methanolic extract of *Croton bonplandianum* Baill.

The activity of the extract was found to be inversely proportional to the time taken for paralysis/ death of the worms.

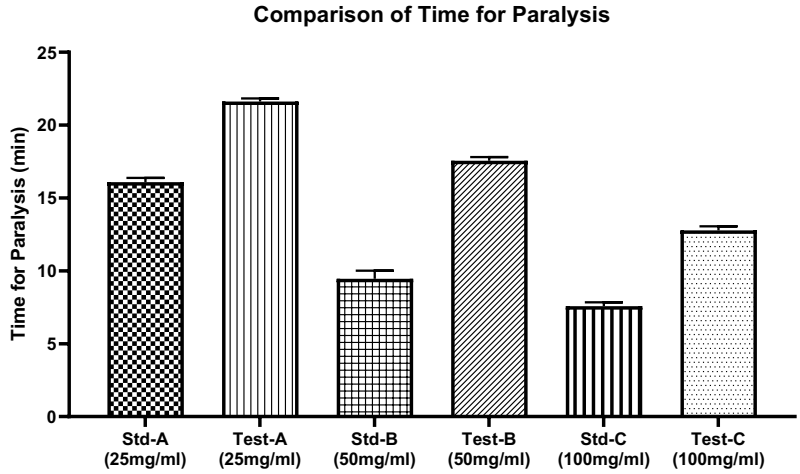

Fig. 1. Comparison of time for paralysis of earthworms treated with test drug and standard drug albendazole.

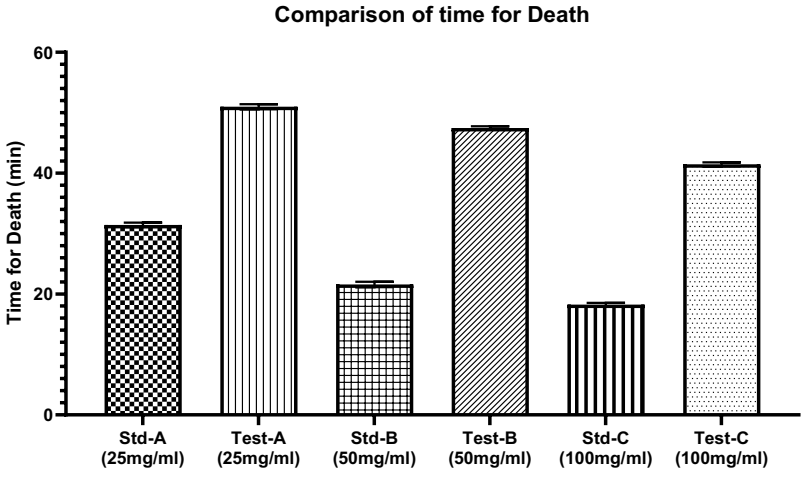

Fig. 2. Comparison of time for death of earthworms treated with test drug and standard drug albendazole.

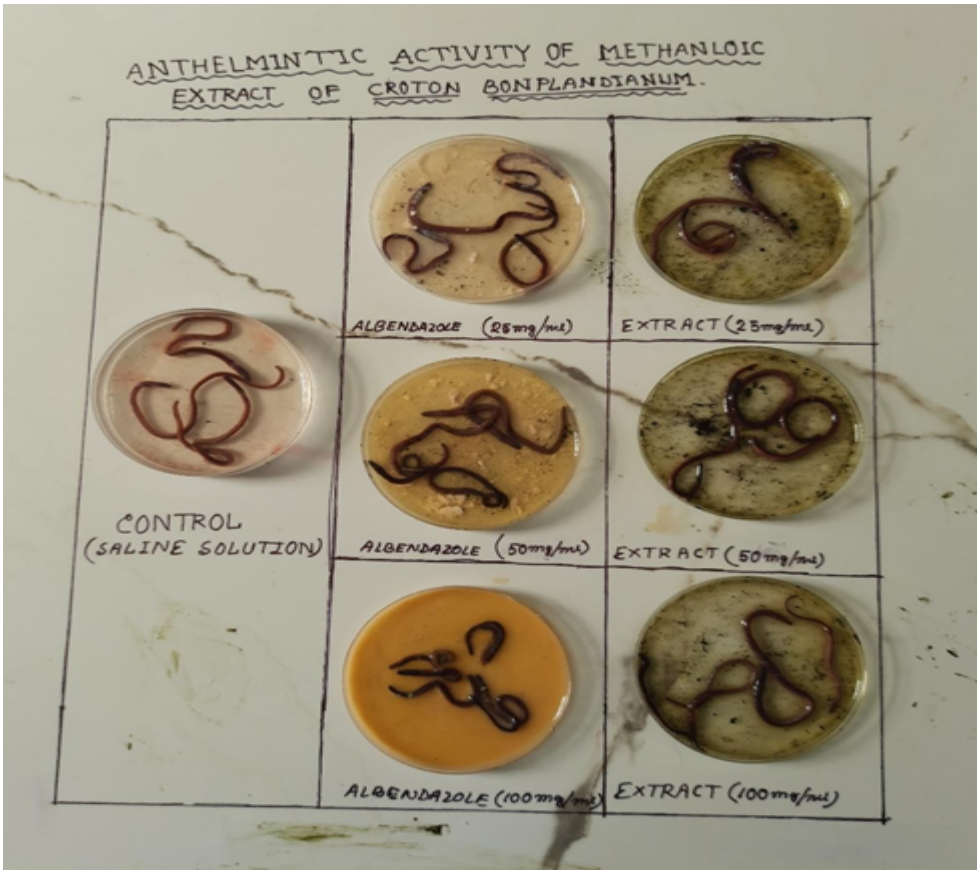

Fig. 3. Anthelmintic activity of methanolic extract of Croton bonplandianum Baill.

IV. Conclusion

The present research work can be concluded that the methanolic extract of *Croton bonplandianum* Baill showed a significant effect as compared to the standard drug albendazole. The highest anthelmintic activity was observed in the methanolic extract of *Croton bonplandianum* Baill at 100 mg/ml. Hence this study proved that the extract of *Croton bonplandianum* Baill is having anthelmintic activity and it can be useful for the treatment of helminthiasis.

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Conflict of Interest

The authors have no conflicts of interest regarding this research.

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