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Assessment of Anthelmintic Potential of Hydroalcoholic fruit flesh extract of *Terminalia catappa* Linn.

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ABSTRACT

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

Keywords: Anthelmintic, Hydroalcoholic extract, Albendazole, Time of paralysis, Time of death.

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INTRODUCTION

Parasitic helminthes are of major global importance, especially in developing countries where over billions of people are estimated to be infected with soil transmitted helminthes, causing significant economic losses and threatening food security[1]. The most severe cause of parasitic diseases is morbidity including filariasis, onchocerciasis (river blindness), and schistosomiasis[2]. Control of helminthes relies almost exclusively on a limited number of synthetic anthelmintic drugs. The foremost problem in the treatment of helminthes disease is the resistance of the helminthes to the currently available drugs[3]. The use of natural plant extracts as de-wormers for humans has long been practiced, however scientific validation of these practices and identification of active compounds has been lacking. Anthelmintic effects of plants are normally ascribed to secondary metabolites such as alkaloids, terpenoids or polyphenols such as proanthocyanidins, also known as condensed tannins (CT). Some secondary metabolites were found in *Terminalia catappa* extract. Ethanol extract, petroleum ether, chloroform and ethyl acetate contain steroids. Alkaloids in ethanol extract only. The distribution of tannins and reducing sugars were detected in ethanol and aqueous methanol extracts, while petroleum ether fraction showed presence of saponins. All the fractions shows presence of resins[4].

Tropical almond, botanically equated as *Teminalia catappa* Linn., is a tall deciduous erect tree reaching 25-40 m. with an upright symmetrical crown and horizontal branches. It has a vast natural distribution throughout India, also called as Indian Almonds. The *Terminalia catappa* have corky light fruit having nuts within the fruit and are edible when fully ripen; taste is most likely to almond. Typically, on the basal part of the flower spike one to five fruits develop. The fruit is sessile, laterally compressed and avoid to ovate, smooth skinned. At maturity its color changes from green through yellow to bright red or dark purplish-red at full maturity[5]. Polar extract from different parts (leaves, fruit, and bark) of *Terminalia catappa* shown antimicrobial, antifungal, antioxidant, anti-metastatic, anti-inflammatory, mutagenic, aphrodisiac and antidiabetic[6]. Also anti-oxidant potential of *Terminalia catappa* usually have active ingredients which are used to cure ailments or diseases[7].

The present study was therefore undertaken to evaluate *in-vitro* anthelmintic potential of hydroalcoholic extract of fruit flesh extract of *Terminalia catappa*. The anthelmintic potential of extract was evaluated using the adult Indian earthworm *Pheretima posthuma,* and reference compound for comparison[8]. It was used due to its anatomical and

physiological resemblance with the intestinal roundworm parasite of human being[9].

MATERIALS & METHODS

Plant material: The fruits of *Terminalia catappa* were collected from college campus Butibori Nagpur, (M.S.) and identified from Department of Botany, R.T.M.U. Nagpur University, Nagpur (M.S.) Matured fruits were collected in bulk, washed under running tap water to remove adhering dust, removed fruit flesh and allowed for maceration.

Collection of Earthworms:

The earthworms of lengths (6-10cm) were obtained from the damp, cool, and covered area of the medicinal garden area of college campus, Butibori. 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.

Preparation of hydroalcoholic extract: A weighed quantity of fruit flesh of plant (100 gm) subjected to maceration using ethanol (95%), at a temperature range of 30^{0}C to 32^{0}C. The filtrate was evaporated to dryness at 40^{0}C under reduced pressure in a rotary vacuum evaporator. The percentage yield of ethanolic extract was 5% w/w. The extract thus obtained was used directly for the assessment of anthelmintic potential through *in vitro* method.

Anthelmintic potential

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 potential 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^{0}C].

Table 1: Anthelmintic potential of hydroalcoholic fruit flesh extract of *Terminalia catappa*

Sr. No	Extract	Conc (mg/ml)	Time taken for paralysis (P) and for death of *Pheretima posthuma* worms (D) in min.	
			Paralysis (P)	Death (D)
1)	Control	----	----	----
2)	Hydroalcoholic Extract	20	47	90
		40	35	45
		60	20	28
3)	Albendazole	20	15	21

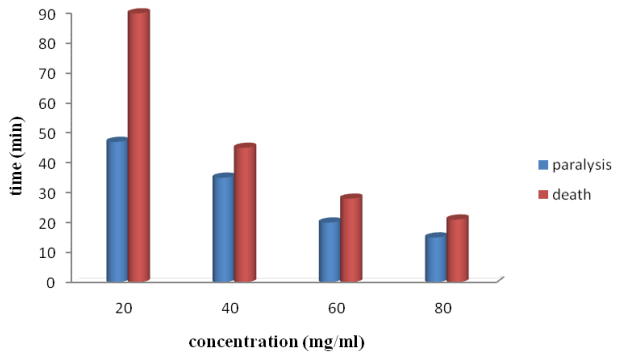

Figure 1: Graphical representation showing time taken for paralysis and for death of *Pheretima posthuma* worms in minute against concentration of extract

RESULTS AND DISCUSSION

The ultimate aim of present research work is to evaluate anthelmintic potential of hydroalcoholic fruit flesh extract of *Terminalia Catappa* against Indian earthworm *Pheretima posthuma.* 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) was used as standard/reference drug to compare anthelmintic potential of the hydroalcoholic fruit flesh extract of *Terminalia Catappa* against Indian earthworm *Pheretima posthuma.* The result suggests that hydroalcoholic fruit flesh extract of *Terminalia Catappa* possess concentration dependent anthelmintic activity.

CONCLUSION

The anthelmintic potential of hydroalcoholic fruit flesh extract of *Terminalia catappa* shows better activity on helminthes with increasing concentration of the extract. From this research work, it was found that hydroalcoholic extract of fruit flesh of *Terminalia Catappa* showed 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. The present study justifies the folklore claims of its anthelmintic potential.

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