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REGULAR ARTICLE

COMPARATIVE IN-VITRO ANTHELMINTIC ACTIVITY OF THE LATEX OF *FICUS RELIGINOSA*, *FICUS ELASTICA* AND *FICUS BENGALENSIS*

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SUMMARY

The World Health Organization estimates that a staggering two billion people harbor parasitic worm infections. Parasitic worms also infect livestock and crops, affecting food production with a resultant economic impact. The three plants present in the study are *Ficus religinosa, Ficus elastica* and *Ficus bengalensis*. They belong to the family Moraceae and are traditionally used for various diseases. Our aim was to investigate the anthelmintic activity of the latex of three plants. The latex of the plants was taken for anthelmintic activity against Indian earthworm *Pheritima posthuma*. Various species of the ficus latex was tested and results were expressed in terms of time for paralysis and time for death of worms. Metronidazole (10mg/ml) was used as a reference standard and distilled water as a control group. From the results of this study found that the three plants possess anthelmintic activity but *Ficus religinosa* shows more activities compared to others.

Key words: *F.religinosa*, *F.el*astica, *F.bengalensis*, Metronidazole, Anthelmintic activity, latex

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1. Introduction

Among the most widespread of all chronic infection are those caused by various species of parasitic helminthes (worms). Inhabitants of tropical or subtropical, low income countries are most at risk; children often become infected with one or more species almost as soon as they are born and may remain infected throughout their lives. In some cases these infection results mainly in discomforts and does not causes substantial ill health, but others such as schistosomiasis and hookworm disease, can produce very serious morbidity. Worm infestations are also a major cause for concern in veterinary medicine, affecting domestic pets form animals [1].

Many *Ficus* species are commonly used in traditional medicine to cure various diseases. They have long been used in folk medicine as astrigents, carminatives, stomachics, vermonicides, hypotensives, antihelmintics and anti-dysentery drugs[2]. Previous phytochemical studies on the genus showed the presence of flavonoids[3], alkaloids[4], organic acids[5] and triterpenes [6].

Ficus elastica (*Moraceae*) is a widely-spread evergreen tree up to 30 m tall. The leaves are 7-20 cm long, with smooth edges and blunt pointed tips. The leaves are about a foot long and are thick with deep green colour. The plant is known locally as "India-rubber tree" [7].

Ficus religiosa, belonging to family *Moraceae*, is commonly known as peepal in India. The plant is used in gout, stomatitis, leucorrhea, ulcers, inflammation and glandular swelling of the neck[8]. *Ficus religiosa* has been reported for its wound healing[9], antibacterial [10] and acetylcholinesterase inhibitory activity[11]. *Ficus religiosa* has been used in the traditional system of ayurveda to Manage diabetes[12]. The leaves of *Ficus religiosa* have been studied for anti-hyperglycaemic activity[13].

Ficus bengalensis Linn. Family: (*Moraceae*) is a very large tree distributed throughout

India. It is commonly known as 'Bargad' in Hindi or 'Indian Banyan tree' and considered as holy tree of India. Information based on ethno medicinal survey reveals that the herbal preparations of different parts of *Ficus bengalensis* had been considered as effective economical and safe treatments for curing various diseases in Indian traditional system of medicine. The hanging roots of *Ficus bengalensis* have been reported as anti-diarrhoeal agents[14]. The plant is used in folk medicine for respiratory disorders and certain skin diseases[15]. Bark of *Ficus bengalensis* has been traditionally used for the management of diabetes mellitus. Oral administration of bark extract showed lowering of blood glucose level in STZ diabetic animals and enhancement of serum insulin levels in normoglycemic as well as diabetic rats[16].

Development of anthelmintic resistance in helminthes reported in a number of countries gives a clear indication that control programs based exclusively on their use are not sustainable[17, 18, 19, 20, 21]. The development of integrated programs to control helminths is vital, but such control programs require viable alternatives to the use of anthelmintics[22]. Medicinal plants have served through ages, as a constant source of medicaments for the exposure of a variety of diseases. The history of herbal medicine is almost as old as human civilization. The plants are known to provide a rich source of botanical anthelmintics, anti-bacterials and insecticides[23, 24]. A number of medicinal plants have been used to treat parasitic infections in man and animals[25,26,27,28].

2. Materials and Methods

Materials

Latex of *F.religinosa, F.elastica, F. bengalensis*, Metronidazole, Normal saline, distilled water.

Plant collection and identification

Latex of the plants *F.religinosa, F.elastica, F. bengalensis* was collected in SASTRA University, Thanjavur, India. This collection was authenticated by Dr. N. Ravichandran, CARISM, SASTRA University, Thanjavur-613 401.

Worm Collection and Authentication

Healthy adult Indian earthworms *Pheritima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings were used in the present study. All the earth worms were of approximately equal size (6 cm). They were collected from local moist place, washed and kept in water and authenticated.

Method

Anthelmintic activity of latex was evaluated by exposing the adult *pheritima posthuma* to different concentration and species of Ficus latexes (Table 1). The activity was performed according to the method of Ghosh *et al*.[29] with slight modification on adult Indian earth worm *pheritima posthuma* as it has anatomical and physiological resemblance with the intestinal earthworm parasites of human beings. All the earthworms were washed in normal saline solution before they were released into respective formulation. For each latex triplets were used, in each Petri dish three equal size worms were placed. In these three Petri dish two for crude latex and other for normal as control, reference i.e Metronidazole (10mg/ml) were used. Observation was made for the time taken for paralyze and death of individual worms (Table 2).

Table 1: Plant material (latex) evaluated for their Anthelmintic activity

S.No	Botanical name	Family	parts
1.	*Ficus religinosa,*	Moraceae	Latex
2.	*Ficus elastica*	Moraceae	Latex
3.	*Ficus bengalensis*	Moraceae	Latex

Table 2: Anthelmintic activity of *F.religinosa, F.elastica, F.bengalensis*

S.No	Plant latex	Quantity of latex (µl)	Time taken for paralysis(min)	Time taken for death (min)
1.	*F.religinosa*	250	6.2	15.2
		500	7.3	17.3
2.	*F.elastica*	250	6.4	15.5
		500	7.4	18.4
3.	*F. bengalensis*	250	10.2	26.3
		500	13.4	30.1
4.	Metronidazole	10(mg/ml)	5	13.2
5.	Control	-	-	-

3. Results and Discussion

These three plant latex was active against the earth worms. It is evident from (Table 2) that latex of *F. religinosa* demonstrated paralysis as well as death of worms in a less time compared to *F. elastica* and *F. bengalensis*. These three plant latex has considerable amount of tannins. The anthelmintic effects of tannins may be attributed to its capacity to bind free protein available in the tubes for larval nutrition and thus reduced nutrient availability could have resulted in larval starvation or decrease in gastrointestinal metabolism directly through inhibition of oxidative phosphorylation causing larval death [30, 31]. It is close to the standard drug metronidazole (10mg/ml) activity. The activities of the crude extract increase with increasing the amount of latexes. *F. religinosa* has shown paralysis within 6.2, 7.3 minutes, and death within 15.2, 17.3 minutes, at 250 µl, 500µl of crude latex respectively. *F. elastica* and *F. bengalensis* paralysis within 6.4, 7.4 minutes, and 10.2, 13.4 minutes, and death within 15.5, 18.4 minutes, and 26.3, 30.1 minutes, at 250 µl, 500µl respectively (Figure 1 & 2). Death and paralysis of worm was comparable with that metronidazole which shows the paralysis within 5 minutes, death within 13.2 minutes, .

Figure 1: Anthelmintic activity of *F.religinosa, F.elastica* and *F.bengalensis*

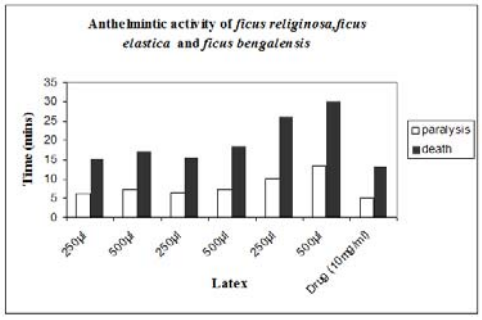

Figure: 2 Anthelmintic activity of *F.religinosa*

Figure: 3 Anthelmintic activity of *F.elastica*

4. Conclusion

The anthelmintic activity of *F.religinosa, F.elastica, F. bengalensis* latexes have been tested against the Indian earth worm pheritima posthuma. It is concluded based on the findings of the present study that the *F.religinosa, F.elastica, F. bengalensis* all possesses varying degree of anthelmintic activity. It has been seen from the (Table 2) anthelmintic activity of *F.religinosa* was closely related to the metronidazole as standard drug for anthelmintic activity.

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