

Phytochemical Screening and Anthelmintic Activity of *Ficus religiosa* Linn.

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Abstract:

The present study was designed to evaluate the anthelmintic potential of bark extract of *Ficus religiosa* Linn. The methanolic extract of *Ficus religiosa* & its aqueous extract at different concentrations (25, 50, 100 mg /ml) were tested on Indian adult earthworm (*Pheretima posthuma*) by in vitro standard procedure. Time of paralysis and time of death of the worms were considered as parameters to assess the anthelmintic action. Albendazole and 2% gum acacia in distilled water were used as the standard and control, respectively. The methanolic fraction of the extract exhibited potent anthelmintic activity compared to the aqueous extracts, as evidenced by a significant decrease in time of paralysis & death. Evaluation of anthelmintic activity by aqueous extract at 100mg/ml concentration showed time of paralysis & time of death as 7.01 & 13.20 min. Whereas for the methanolic extract fraction, it was 5.4 & 8.16 min. The reference standard Albendazole showed the time of paralysis & time of death as 1.22 & 2.30 min. The observed activity could be due to the presence of phenolic compounds, particularly tannins, in the test extract. These in-vitro studies indicated that *Ficus religiosa* Linn. is a significant source of natural anthelmintic, which might be helpful in preventing the progression of various parasitic disorders.

Key words: *Ficus religiosa* Linn, Methanolic extract, Aqueous extract, Albendazole, Paralysis time, Death time, Anthelmintic activity.

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1. INTRODUCTION

Intestinal parasitic infections are one of the main health problems, especially in developing countries, and particularly in children. Inadequate sanitation and poor hygiene may be the reason behind it ^[1]. Anthelmintic are drugs that either kill or expel infesting helminthes and the gastrointestinal tract is the abode of many helminths, although some also live in tissues, or their

larvae migrate into tissues. They harm the host depriving him of food, causing blood loss, injury to organs, intestinal or lymphatic obstruction and by secreting toxins. Helminthiasis is rarely fatal, but is a major cause of morbidity [2]. The world health organization (WHO) has estimated that approximately 80% of the world's population depends on traditional medicines for meeting their primary health care needs [3]. Numbers of synthetic drugs like mebendazole, albendazole, piperazine, pyrantel, are used to control and prevent from the infection, used as broad spectrum anthelmintic drug. Long term use of this synthetic medicine associated with various adverse effects like tolerance, resistance, nausea, vomiting, drowsiness, dizziness, and abdominal pain. Therefore, search for new drugs is essential from natural source [4]. Today, gastrointestinal anthelmintic. However, wide-spread increase in anthelmintic resistance, scarcity and high costs, particularly for low-income farmers in developing among other alternative methods [5]. The aim of the study is to evaluate anthelmintic potential of bark extracts of *Ficus religiosa*.

Ficus religiosa is known to be a native Indian tree and thought to be originating mainly in Northern and Eastern India. It is called peepal tree. It is a familiar site in Hindu temples, Buddhist monasteries and shrines, villages and at roadsides [6]. All parts of this tree contains various phytochemical and are used in food and medicinal preparations for living organism [7]. The literature survey revealed that leaves of *Ficus religiosa* show sufficient anthelmintic activity. [8], [9] Therefore objective of this work was to assess the anthelmintic activity of *Ficus religiosa* barks.



Fig.1 *Ficusr eligiosa* Plant



Fig.2 *Ficus religiosa* Bark

2. MATERIALS AND METHODS

2.1 Plant material

The bark and plant of *Ficus religiosa* Linn were collected from Bhilai in the month of November and it was authenticated by Prof. Dr. Ranajana Shrivastava Head, Dept of Botany, Govt. T.V.Y PG College, Durg, India. The fresh barks were thoroughly cleaned under running water from the tap and allowed to dry for 15 days in the shade.

2.2 Experimental Animal

Anthelmintic activity was studied using adult Indian earthworms (*Pheretima posthuma*). To get rid of all the waste, the earthworms were collected from the damp soil behind the College area and cleaned with regular saline. For all experimental procedures, earthworms that are 7 -10 cm long were used because they are anatomically and physiologically similar to intestinal roundworm parasites in humans.

2.3 Preparation of extracts

The dried barks of *Ficus religiosa* Linn, was coarsely powdered with the help of mechanical grinder and powdered material was kept in airtight containers with the appropriate labels and then extracted with methanol and water separately in soxhlet apparatus for 12 hrs. The extract were filtered and concentrated under vacuum-sounding apparatus for 30 min and then stored for further use.^[10]

2.4 Chemicals

Saline solution, Tween- 80, Methanol and gum acacia were taken from institute laboratory. Albendazole (CADILA Pharmaceuticals) was procured from the medical stores. All these chemicals were used during the experiment.

2.5 Preliminary Phytochemical analysis

The preliminary phytochemical analysis was carried out to confirm presence of Phenol & benzoic acid etc^[11].

2.6 Anthelmintic activity

Pheretima posthuma are easily available and it has anatomical and physiological resemblance with the intestinal roundworms parasites of human being^[12]. The anthelmintic activity was carried as per method described by Panda et al with minor modifications. Both the test extracts solution was prepared in 2% gum acacia in distilled water to obtain dose of test drug at 25, 50,100 mg/ml.

Albendazole suspension was also prepared in the same concentration using 2% gum acacia in distilled water. The worms were divided into four groups each containing 4 worms^[13].

Grouping was done as follows:

Group I - Control (only the vehicle is used i.e. 2%w/v gum acacia)

Group II- Aqueous extract treated

Group III- Methanolic extract treated

Group IV - Standard drug (Albendazole) treated.

Four worms were observed for their spontaneous motility and evoked responses. Time of paralysis is noted at different time intervals when no movement was observed except the worms were ascertaining that they neither moved even when shaken vigorously nor they revive even in normal saline. Time of death is noted when worms showed zero response to the stimuli, even

after performing the prick test and when dropped in warm water (50°C) followed with fading away of their body colour. ^[14] All results were expressed as a mean $\pm$ SEM of four animals in each group. The observation of test extracts & standard drug is shown in the table no. 1.

3. RESULTS & DISCUSSIONS

From the observations made, a dose dependent paralytic effect much earlier and the time of death was observed (Table no. 1). Although both the test extracts showed significant anthelmintic activity in a dose dependent manner but the methanolic extract appeared to be more effective. Evaluation of anthelmintic activity by aqueous extract at 100mg/ml concentration showed time of paralysis & time of death as 7.01 & 13.20 min. Whereas for methanolic extract fraction, it was 5.4 & 8.16 min.

The reference standard Albendazole showed the time of paralysis & time of death as 1.22 & 2.30 min. respectively. Preliminary phytochemical analysis of test extracts revealed the presence of tannins & Phenols. Phenol have antibacterial properties and Tannins have been reported to produce anthelmintic activities as they can bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and thereby cause deaths. ^[15] The pharmacological

Studies have accepted that anthelmintic activity is due to a proteolytic fraction called ficin. It is evident from above that methanolic extracts of *Ficus religiosa* possibly exerted anthelmintic effect because of ficin. ^[16] The potent wormicidal activity of methanolic fraction against earthworms suggests that it is effective against parasitic infection of humans.

Fig.3: Anthelmintic activity of test extracts of *Ficus religiosa* Linn.



Fig.3 Control group

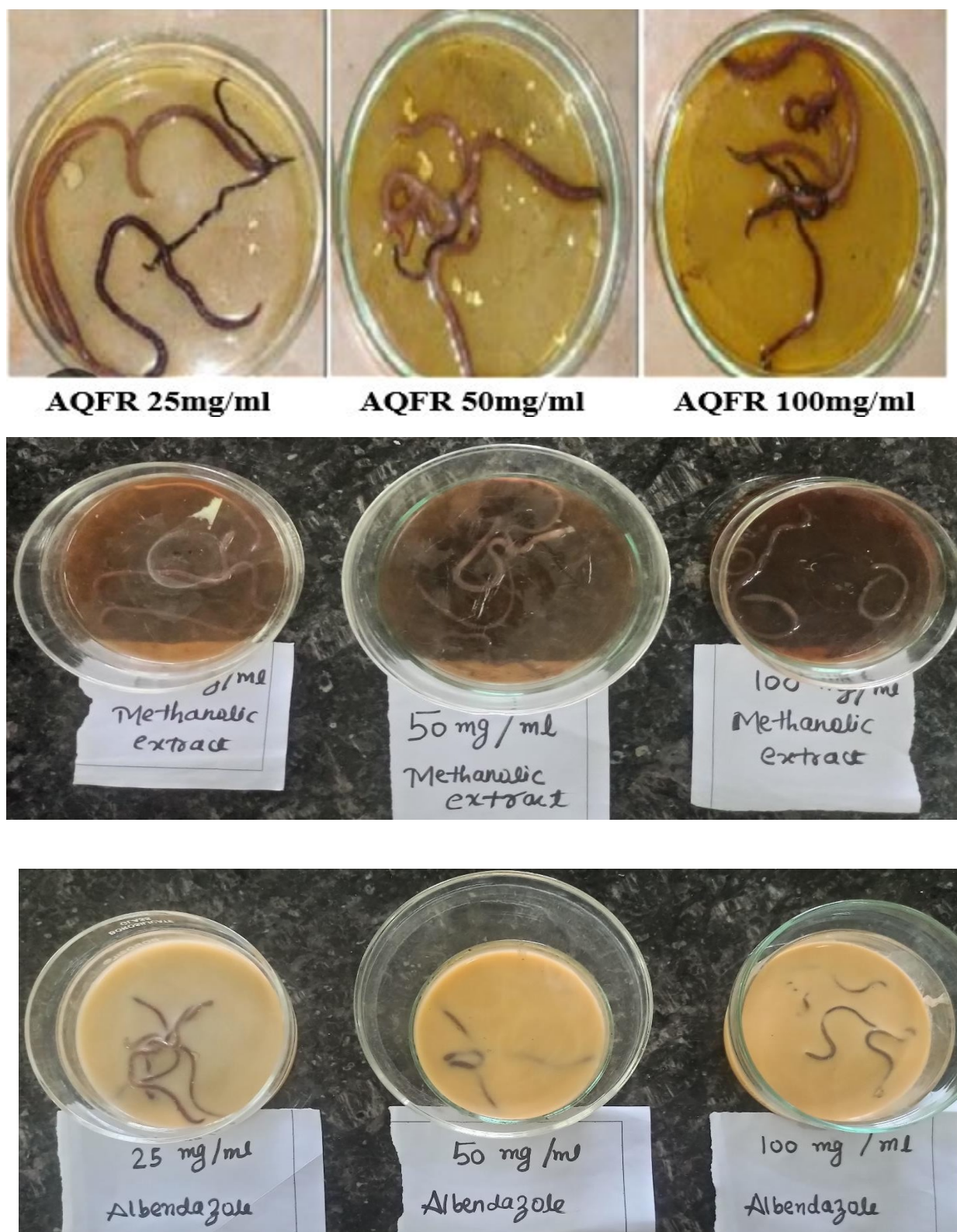
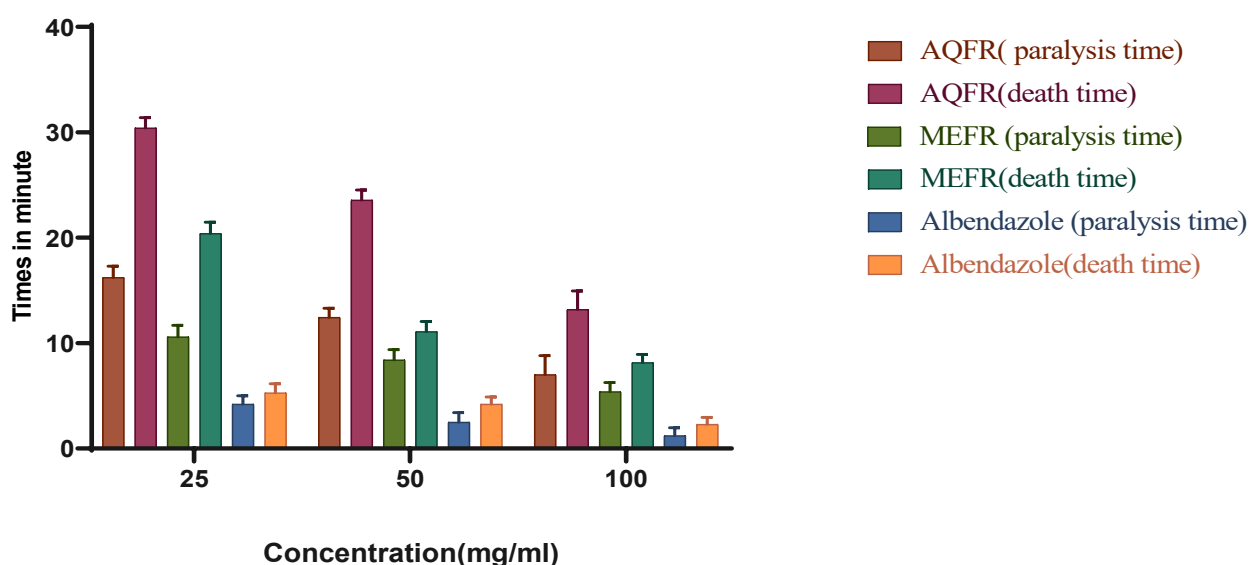


Fig.4 Different extracts of *ficus religiosa* at different concentration

Table.1: Anthelmintic activity of bark extracts of *Ficus religiosa* Linn.

Test Sample	Conc. (mg/ml)	Paralysis Time (min.)	Death Time (min.)
Aqueous Extract	25	16.22±1.08	30.4±1.00
	50	12.43±0.88	23.58±0.95
	100	7.01±1.81	13.20±1.75
Methanolic Extract	25	10.6±1.08	20.4±1.07
	50	8.4± 0.99	11.1. ±0.95
	100	5.4±0.85	8.16±0.76
Albendazole (Standard drug)	25	4.2±0.81	5.27±0.87
	50	2.5±0.91	4.20±0.70
	100	1.22±0.76	2.30±0.66

Anthelmintic activity of *Ficus religiosa*Fig.5: Anthelmintic activity of test extracts of *Ficus religiosa* Linn.

4. CONCLUSION

The methanolic extracts of barks of *Ficus religiosa* Linn. exhibited significant anthelmintic activity against earthworms in dose dependent manner. The observed activity may be due to their phenolic content (tannins) which is worth for further investigations on isolation of the specific constituents.

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