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COMPARATIVE IN-VITRO ANTHELMINTIC ACTIVITY OF THE LATEX OF *FICUS CARICA, FICUS RACEMOSA AND FICUS RELOGIOSA.*

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Abstract

Among the most common infections of digestive system in human beings are helminth infections. In developing countries they pose a large threat to the society. Such parasitic diseases cause severe morbidity, including lymphatic filariasis, onchoserciasis and schistosomiasis. Present study is an attempt to evaluate anthelmintic activity of different extracts of Ficus carica, Ficus racemosa, Ficus religiosa latex. 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), vidangasav was used as a reference standard and distilled water as a control group.

INTRODUCTION

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. Despite this prevalence of parasitic infections, the research on the anthelmintic drug is sparse. According to the WHO, only a few drugs are used in treatment of helminthes in humans. Anthelmintics from natural sources could play a key role in the treatment of these parasite infections. In view of this, attempts have been made to study the anthelmintic activity of traditional medicinal plants.

Most of the phytochemical, secondary metabolites of plants are physiologically active. The plants are known to provide a rich source of botanical, anthelmintic, antibacterials, and insecticides. Helminthes are recognized as a major problem to livestock production throughout topics. Most of the diseases caused by helminthes are of a chronic and debilitating in nature; they probably cause more morbidity and greater economic and social deprivation among humans and sanimals than any singal group of parasites.

Ficus carica (*Moraceae*) is a widelyspread evergreen tree up to 8-10 m tall. Preliminary phytochemical investigation of roots of F. *carica* showed the presence of carbohydrates, flavonoids, amino acids, proteins, steroids, saponins and tannins. The leaves are 10-25 cm long, with smooth edges and blunt pointed tips. The leaves are about a foot long and are thick with deep green colour.[3] Leaves contain crude protein, crude fibers, and phosphorus. The latex of fig fruit (**Ficus carica** (Moraceae)) has been used in several traditional herbal medicine remedies, most of them aimed to treat skin viral infections such as **warts** (HPV) and other similar ones having viral origins as **herpes simplex type 1 (HSV-1)**, **echovirus type 11** (ECV-11) and adenovirus (ADV), having also a significant toxic effect against early fourth-stage larvae of Aedes aegypti. It also shows anti-cancer, anti-inflammatory, anthelmintic, anti-oxidant activity. Plant parts of carica species used as anthelmintic activity include leaves, bark, steam, latex.[7]

Ficus racemosa, belonging to family *Moraceae*, is commonly known as umber in India. The tree is medium tall, growing 10-16 meters in height. The rich green foliage provides a good shade. The bark is reddish grey and often cracked. The fruit receptacles 2-5 cm in diameter, pyriform, in large clusters, arising from main trunk or large branches. The fruits resemble the figs and are green when raw, turning orange, dull reddish or dark crimson on ripening. The seeds tiny, innumerable, grain-like, the outer surface of the bark consists of easily removable translucent flakes grayish to rusty brown, uniformly hard and non-brittle. . The leaves are dark green, 7.5-10 cm long, ovate or elliptic. Chemical constituents of the plants of the Ficus racemosa contains leucopelargonidin - 3-0-x-L rhamnoside and leuco cynidin. 3-0-x-D galactosyl cellobioside, glucoside beta glucoside, 20-tetratria conthene-2- one, 6-hepatatria contene-10-one, pentatricentan -5-one, beta sitosterol- alpha –D- glucose and mesoinositel. The plant is used in cure of cancer and as demulcent, digestive, emollient, laxative and stomachic, tonic. It is also reported for its wound healing, antibacterial and acetylcholinesterase inhibitory activity. *Ficus racemosa* has been used in the traditional system of ayurveda to manage diabetes. The leaves of *Ficus racemosa* have been studied for antihyperglycaemic activity.[4] . Plant part used in anthelmintic activity leaves, bark, steam, latex, root.

Ficus religiosa, belonging to family *Moraceae*, is commonly known as peepal in India. *Ficus religiosa* is a large dry season-deciduous or semi-evergreen tree up to 30 metres (98 ft) tall and with a trunk diameter of up to 3 metres (9.8 ft). . The fruit is a small fig 1-1.5 cm diameter, green ripening to purple.) The leaves are cordate in shape with a distinctive extended tip; they are 10–17 cm long and 8–12 cm broad, with a 6–10 cm petiole.The preliminary phytochemical analysis of the methanol extract of Ficus religiosa bark studied by , showed the presence of flavonoids, saponins and tannins. F. recemosa bark contain phytochemical constituents namely alkaloids, carbohydrates, flavonoids, glycosides, saponins, steroids, tannins, phenols and triberpenoids The plant is used in gout, stomatitis, leucorrhea, ulcers, inflammation and glandular swelling of the neck. *Ficus religiosa* has been reported for

its wound healing, antibacterial and acetylcholinesterase inhibitory activity. *Ficus religiosa* has been used in the traditional system of ayurveda to Manage diabetes. The leaves of *Ficus religiosa* have been studied for antihyperglycaemic activity. [5] The plant parts are used as leaves,bark ,steam,seeds ,latex.

Materials and Methods

Materials

Latex of *F. carica, F. racemosa, F. religiosa*, Vidangasav, Mendazole, Normal saline, distilled water.

Plant collection and identification

Latex of the plants *F. carica, F. racemosa, F. religiosa*, was collected in Pune University, Maharashtra, India. This collection was authenticated Botanical survey of India Pune University, Maharashtra. 411001.

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. The activity was performed according to the method of Ghosh *et al*.29 with slight modification on adult Indian earth worm *pheritima posthum a* 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. Vidangasav (250µ, 500µ) were used. Observation was made for the time taken for paralyze and death of individual worms. [6]

Phytochemical screening[4]

Following chemical tests were performed for testing different chemical groups present in both extracts:

Alkaloids

Mayer's test: To 2-3 ml of the extract, few drops of the Mayer's reagent

(1.36gm of Mercuric chloride and 5gm of potassium iodide in 100ml distilled water)were added. Formation of a cream colour precipitate indicated the presence of alkaloids.

Glycosides

Borntrager's test: The test extract was boiled with 1ml of sulphuric acid in a test tube for 5minutes. While hot it was filtered, then it was cooled. Shaking of the mixture was done with equal volume of chloroform. Two layers of solution were formed. The lower layer of chloroform was separated. Then that layer was shaken with half of its volume of dilute ammonia. Production of a rose pink to red colour suggested the presence of glycoside.

Tannins

Lead acetate test: Aqueous extract and lead acetate solution gives white precipitate indicated the presence of tannins.

Ferric chloride test: 2-3ml aqueous extract and 5% Ferric chloride solution gives deep blue-black colour indicated the presence of tannins.

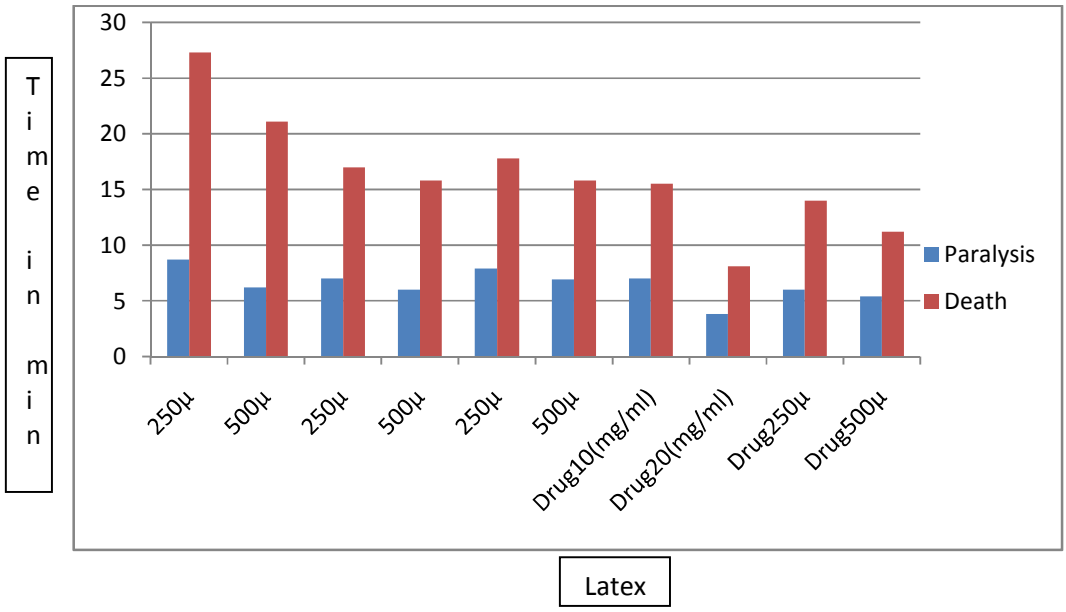
RESULT AND DISCUSSION

These three plant latex was active against the earth worms. It is evident from (Table 1) that latex of *F. racemosa latex* showed paralysis as well as death of worms in a less time compared to

F. religiosa and *F. carica*. These three plant latex has considerable amount of tannins. Chemically tannins are polyphenolic compounds. Some synthetic phenolic anthelmintics e.g.,niclosamide, oxyclosamide and bithinol are shown to interfere with the energy generation in helminths by uncoupling oxidative phosphorylation. It is possible that tannins contained in the extracts produced similar results. Another possible anthelmintic effect of tannins is that they can bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and cause death. 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. racemosa* has shown paralysis within 7, 6 minutes, and death within 17.0,

15.8 minutes, at 250 µl, 500µl of crude latex respectively. *F. religiosa* and *F. carica paralysis* within 7.9, 6.9 minutes, and 8.7, 6.2 minutes, and death within 17.9, 15.8 minutes, and 27.3, 21.1 minutes, at 250 µl, 500µl respectively (Figure 2 & 3). Death and paralysis time of worm was compared with standard metronidazole which shows the paralysis within 7 & 3.8 minutes at 10(mg/ml) & 20(mg/ml) minutes, death within 15.5 & 8.1 minutes, respectively. It was also compared with Vidangasave which showed paralysis within 6 &5.4 minutes, death within 14 & 11.2 minutes.

Figure 1: Anthelmintic activity of *F. carica, F. racemosa, F. religiosa*



Standard Drug-

Metronidazole 10 & 20 (mg/ml),

Vidangasav 250 & 500 µl

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Figure 2 Anthelmintic activity of F. racemosa

Figure 3 Anthelmintic activity F. religiosa

Sr.No.	*Plant latex*	*Quantity of latex (µl,)*	*Plant latex*	*Time taken for death (min)*
1.	*Ficus carica*	*250* *500*	*8.7* *6.2*	*27.3* *21.1*
2.	*Ficus racemosa*	*250* *500*	*7* *6*	*17.0* *15.8*
3.	*Ficus religiosa*	*250* *500*	*7.9* *6.9*	*17.9* *15.8*
4.	*Metronidazole*	*10(mg/ml)* *20(mg/ml)*	*7* *3.8*	*15.5* *8.1*
5.	*Vidangasav*	*250* *500*	*6* *5.4*	*14* *11.2*
6.	*Distilled waterControl*	*-*	*-*	*-*

Table 1: Anthelmintic activity of F. carica, F. racemosa, F. religiosa.

CONCLUSION

The anthelmintic activity of F. carica, F. racemosa, F. religiosa, latexes has been tested against the Indian earth worm pheritima posthuma. It is concluded that the latex of F. carica, F. racemosa, & F. religiosa showed varying degree of anthelmintic activity. The metronidazole & Vidangasav which was used as a standard drug. .

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