



IN VITRO ANTHELMINTIC ACTIVITY OF *FICUS BENGHALENSIS*, *FICUS CARICA* & *FICUS RELIGIOSA*: A COMPARATIVE STUDY

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ABSTRACT

Aqueous extract of fruits of some commonly occurring plants of genus *Ficus* (*F. benghalensis*, *F. carica* & *F. religiosa*) compared for their invitro anthelmintic activity in order to estimate the most potent of them. Results revealed that *F. benghalensis* killed all the test worms (*Pheretima Posthuma*) within an hour of post exposure being 100% effective. *F. religiosa* was equally effective at 1-2 hrs of post exposure while *F. carica* was effective at 2-3 hrs of post exposure. The results were compared with Piperazine hydrate as a positive control and normal saline solution as a negative control. Piperazine hydrate was found 100% effective at 0-0.5 h of exposure. While worms exposed to normal saline remained alive till 3hrs of post exposure (16.66% Effective). Thus *Ficus benghalensis* was found to be potent than *F. religiosa* and *F. carica*.

Keywords: Anthelmintic activity, *Ficus benghalensis*, *Ficus carica*, *Ficus religiosa*, *Pheretima posthuma*.

INTRODUCTION

Medicinal plants have served through the ages, as a constant source of medicaments for the exposure of variety of diseases. The history of herbal medicine is as old as human civilization. The plants are known to provide a rich source of botanical anthelmintics, antibacterials and insecticides.^{1,2}

There are more than 800 species and 2000 varieties of *Ficus* genus, most of which are native to old world tropics. *Ficus benghalensis* (Banyan tree), *Ficus Religiosa* (Pipal tree) and *Ficus carica* (Anjir tree) are some of the commonly occurring trees of this genus belonging to family Moraceae.^{3, 4, 5} *F. benghalensis*, *F. religiosa* and *F. carica* were reported to have anthelmintic potential. Various extracts of roots of *F. benghalensis* were found not only to paralyze (Vermifuge) but also kill the earthworms (Vermicide).⁶

Stem and bark extracts of *F. Religiosa* proved lethal to *Ascaridia galli* in vitro.⁷ Methanolic extract of bark of *F. Religiosa* was 100% lethal to *Haemonchus contortus* worms.⁸ The latex of some species of *Ficus* (Moraceae) i.e. *F. inspida* and *F. carica* was also reported to have anthelmintic activity.⁹ Based on this an attempt has been made to compare and evaluate the anthelmintic potency of aqueous extracts of fruits of *F. benghalensis*, *F. religiosa* and *F. carica*.

MATERIALS & METHODS

Plant material

Fresh fruits of *F. benghalensis*, *F. religiosa* and *F. carica* were collected from Raipur district, Chattisgarh, India. These Plant materials were authenticated at the Department of Botany, Govt. Science College, Raipur. These fresh fruits were then crushed and used to obtain aqueous extracts.

Preparation of extract

Aqueous Extract (by decoction method)

200 G of fruits of *Ficus benghalensis*, *Ficus carica* and *Ficus religiosa* were boiled separately with 1500 ml of double distilled water for 1h. Then it were kept at room temperature for 24h and then filtered through the muslin cloth. The filtrate thus obtained was then concentrated to thick slurry and then residue was again boiled for 1h and filtered. The filtrate obtained was added to the thick slurry of first step. The resultant solutions thus obtained were boiled again to get thick concentrated extract. These are then dried and used as powders. The percentage yields were found to be 5.46%, 6.5%, 10.24% for *Ficus benghalensis*, *Ficus carica* and *Ficus religiosa* respectively.

Experimental animals

Indian adult earthworms (*Pheretima posthuma*) were used to study anthelmintic activity. The earthworms were collected from moist soil and washed with normal saline to remove all fecal matter. The earthworms of 3-5 cm in length and 0.1- 0.2 cm in width were used for all experimental protocol. The earthworm resembles both anatomically and physiologically to the intestinal roundworms parasites of the human beings, hence can be used to study the anthelmintic activity.^{7,10}

Drugs and chemicals

Albendazole (Glaxo Smithkline Pvt. Ltd.), Dimethyl Formamide, DMF, (Thomos Baker Chemicals Pvt. Ltd.) were used during the experimental protocol.

Anthelmintic activity

For the anthelmintic activity of aqueous extract of fruits of *F.benghalensis*, *F.religiosa* and *F. carica*, the animals were divided in to five groups containing six earthworms in each group. All the extracts and standard drug solution were freshly prepared before starting the experiment. Extracts and the standard drug solution were freshly poured in different petridishes. All the earthworms were washed in normal saline before they were released into 10 ml of respective formulation as follows: Vehicle (5% DMF in normal Saline), albendazole (37.5 mg/ml), aqueous extract (37.5 mg/ml) of *F. benghalensis*, *F. religiosa* and *F. carica*. Observations were made on the motility/ survival of worms at 0, 0.5, 1, 1.5, 2.0, 2.5 and 3.0 h post exposure (PE).

The numbers of worms dead at 3 h post exposure to various plant extracts were compared statistically with those to control group by Z- test using Microsoft Excel 2000 program.

RESULTS AND DISCUSSION

Preliminary phytochemical analysis showed the presence of carbohydrates, flavanoids, aminoacids, steroids, saponins and tannins like phytoconstituents. Some of these phytoconstituents are responsible for anthelmintic activity. It is evident from the observations in the table I *F. benghalensis* killed all the test worms within an hour of post exposure being 100% effective. *F. religiosa* was equally effective at 1-2h of post exposure while *F. carica* was effective at 2-3 h of post exposure.

The results were compared with albendazole hydrate as positive control and normal saline water as negative control. Albendazole was found 100% effective at 0- 0.5 h of exposure while worms exposed to normal saline remained alive till 3 h of post exposure (33.33% Effective).

Table 1: Effects of aqueous extract on the motility/ survival of *Pheretima posthuma*.

Botanical name	Time post exposure (h)							Efficacy (At 3h post exposure)
	0	0.5	1.0	1.5	2.0	2.5	3	
Normal saline	A=6	A=6	A=6	A=6	A=6	A=6	A=5	16.66% NS
	D=0	D=0	D=0	D=0	D=0	D=0	D=1	
Albendazole	A=6	A=0	A=0	A=0	A=0	A=0	A=0	100%*
	D=6	D=6	D=6	D=6	D=6	D=6	D=6	
<i>F. benghalensis</i>	A=6	A=3	A=0	A=0	A=0	A=0	A=0	100%*
	D=0	D=3	D=6	D=6	D=6	D=6	D=6	
<i>F. religiosa</i>	A=6	A=6	A=4	A=2	A=0	A=0	A=0	100%*
	D=0	D=0	D=2	D=4	D=6	D=6	D=6	
<i>F. carica</i>	A=6	A=6	A=6	A=5	A=3	A=1	A=0	100%*
	D=0	D=0	D=0	D=1	D=3	D=5	D=6	

* indicates significant (P< 0.05) difference compared with control independently; NS non significant.

CONCLUSION

It is concluded based on the findings of the present study that aqueous extracts of fruits of *F. benghalensis* possess potent anthelmintic activity when compared to aqueous extract of fruits of *F. religiosa* and *F. carica*. *F. carica* was found to be least potent of them. Further studies using in vivo models are required to carry out and establish the effectiveness and pharmacological rationale. Moreover, phytochemical studies are also needed to lay down recommendation on scientific ground.

REFERENCES

- Satyavati GV, Raina MK, Sharma M. Medicinal Plants of India. Indian Council of Medical Research, New Delhi; 1976; 1: 201-206.
- Lewis WH, Elvin- Lewis MPH. Medicinal Botany Plants Affecting Man's Health. John Wiley and Sons, New York; 1977.
- The Wealth of India, Volume- (F-G). In: A dictionary of Indian Raw materials and industrial products. Council of Scientific and Industrial Research, New Delhi; 2005:24-26.
- Husain A, Virmani OP, Popli SP, Misra LN, Gupta MM, Srivastava GN. Dictionary of Indian Medicinal Plants CIMAP, Lucknow, India. 1992; 546.
- Mousa O, Kiviranta J, Wahab SA, Hiltohen R, Vuorela H. Bioactivity of certain Egyptian *Ficus species*. J Ethnopharmacol 1994; 41: 71-76.
- Manoj Aswar, Urmila Aswar, Bhagyashri Watkar, Minakshi Vyas, Akshaya Wagh., Kishore N Gujar. Anthelmintic activity of *Ficus benghaensis*, Int J Green Pharm. 2008; 170-172.
- Kaushik RK, Katiyar JC, Sen AB. A new in vitro screening technique for anthelmintic activity using *Ascaridia galli* as a test parasite. Indian J Anim Sci. 1981; 51: 869-72.
- Iqbal zafar, Nadeem Qazi Khalid., Khan MN, Akhtar MS, Aisal Nouman Waraich. In vitro anthelmintic activity of *Allium sativum*, *Zingiber officinale*, *Cucurbita mexicana* and *Ficus religiosa*. Int J Agr Biol 2001; 3: 454-457.
- De Amorin A, Borba HR, Carauta JP, Lopes D, Kaplan MA., Anthelmintic activity of the latex of *Ficus Species*. J Ethnopharmacol 1999; 64: 255-258.
- Nirmal SA, Malwadkar G, Laware RB. Anthelmintic activity of *Pongamia glabra*, Songlanakarini J Sci Technol. 2007; 29: 755-757.