

ANTHELMINTIC AND PRELIMINARY PHYTOCHEMICAL SCREENING OF LEAVES OF *FICUS CARICA* LINN AGAINST INTESTINAL HELMINTHIASIS

Patil Amol P*, Patil Vikas V, Patil Vijay R, Chaudhari Rajesh Y

Tapi Valley Education Society's Honorable Loksevak Madhukarrao Chaudhari, College of Pharmacy, Faizpur, Jalgaon, Maharashtra, India

Received: 08-11-2010; Revised: 23-11-2010; Accepted: 05-12-2010

ABSTRACT

As per WHO, only few drugs are frequently used in the treatment of helminthes in human beings. Anthelmintics from the natural sources may play a key role in the treatment of these parasite infections. Other species of *Ficus* viz., *Ficus benghalensis*, *Ficus racemosa*, *Ficus insipida* were found to be reported to have anthelmintic activity. In view of this an attempt has been made to study the, *in vitro* anthelmintic activity of different extracts of leaves of *Ficus carica* Linn. against *Pheritima posthuma*.

Each extract was studied at 20 mg/ml in the bioassay, which involved determination of time of paralysis and time of death of the worms. Mebendazole (20 mg/ml) included in the assay as standard reference drug. The result shows that methanol and aqueous extracts of *Ficus carica* were showed significant anthelmintic activity and thus *Ficus carica* Linn. would be useful as an anthelmintic.

KEYWORDS- *Ficus carica*, Anthelmintic, mebendazole, *Pheritima posthuma*, earthworm

*Corresponding Author

Amol P. Patil

Ph.D Scholar

Tapi Valley Education Society's Honorable Loksevak Madhukarrao Chaudhari,

College of Pharmacy, Faizpur,

Jalgaon, Maharashtra, India

Contact No: +9109405444295

Email: amolpatil311@gmail.com

INTRODUCTION

Helminth infections are among the most common infections in man, affecting a large proportion of the world's population. In developing countries they pose a large threat to public health and contribute to the prevalence of malnutrition, anaemia, eosinophilia, and pneumonia. Although the majority of infections due to worms are generally limited to tropical regions, they can occur to travellers who have visited those areas and some of them can develop in temperate climates.

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 anthelmintic drug is poor. As per WHO, only few drugs are frequently used in the treatment of helminthes in human beings. Anthelmintics from the natural sources may play a key role in the treatment of these parasite infections¹.

The plant named *Ficus carica* Linn. (Moraceae), commonly known as *Anjir*. The plant is considered to be a native of carica in Asia Minor and is grown in nearly all tropical and sub-tropical countries. In India its commercial production is limited to a few centers near Pune^{2,3}. Its fruit, root and leaves are used in the alternative system of medicine in different disorders such as gastrointestinal (colic, indigestion, loss of appetite and diarrhoea), respiratory (sore throats, coughs and bronchial problems), inflammatory and cardiovascular disorders^{4,5}. Fig has been traditionally used for its medicinal benefits as metabolic, cardiovascular, respiratory, antispasmodic and anti-inflammatory remedy. *Ficus carica* was scientifically studied for its anti-diarrhoeal⁶, Hypoglycemic⁷, antioxidant⁸, antispasmodic, antiplatelet⁹ and Hepatoprotective¹⁰, activities. Literature survey revealed that, other species of *Ficus* viz., *Ficus benghalensis*¹¹, *Ficus racemosa*¹ *Ficus insipida*¹² was found to be reported to have anthelmintic activity. But still the plant of *Ficus* species named *Ficus carica* was not studied for anthelmintic activity. Based on these, an attempt has been made to explore anthelmintic activity of leaves of *Ficus carica*.

MATERIAL AND METHODS

Plant material

The leaves of *Ficus carica* Linn. were collected from local habitat. The plant specimens were authenticated by Botanical Survey of India, Pune. The voucher herbarium specimen is deposited in botanical department, authentication certificate number is BSI/WC/Tech/2008/ 355 (voucher number is VVP-1)

Preparation of extracts

The leaves were cut into small pieces and dries at room temperature. The dried leaves were subjected to size reduction to coarse powder by using pulverization. This powder is packed into soxhlet apparatus and successively extracted with petroleum ether (60-80°C), chloroform, methanol, water. The extracts were evaporated to dryness at 40°C (yield: 9%, 12%, 8%, 6% w/w respectively)¹³. A phytochemical screening of various residues revealed the presence of phenolic compounds and tannins, flavonoids, sterols¹⁴.

Animals

Indian adult earthworms (*Pheretima posthuma*) collected from moist soil of the Horticulture Department of the P.V.P. College, Loni and washed with normal saline to remove all the faecal matter, were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol due to its anatomical and physiological resemblance with the intestinal roundworm parasites human beings^{15,16}.

Anthelmintic assay

The anthelmintic activity was carried out on adult Indian earthworms, *Pheretima posthuma* in view of its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings^{17,18}. Group of test organisms each containing six earthworms of approximately equal sizes were released into 10ml of desired preparation¹⁹. The dose suspensions were prepared using carboxymethylcellulose sodium (1% CMC), which is nontoxic and nonirritant used in oral and other formulations^{20,21}. Each group was

treated with the following, vehicle (1% CMC in normal saline) and solutions of pet. ether, chloroform, methanol and aqueous (20 mg/ml each) extracts of *Ficus carica* leaves. These extracts were prepared in normal saline containing 1% CMC. Mebendazole (20mg/ml in 1% CMC) was used as standard reference²². All drugs and extract suspensions were freshly prepared before starting the experiment. Observations were made for the time taken for paralysis and death of individual worms²³. Paralysis was said to occur when the worms were not able to move even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colors.

RESULT AND DISCUSSION

It is evident from the experimental data that, various extracts of leaves of *Ficus carica* showed significant anthelmintic activity at 20 mg/ml. Results were comparable with the standard drugs, Mebendazole, at same concentration. Aqueous extracts of *Ficus carica* at 20 mg/ml concentration shows paralysis at 2.59 min and death at 6.36 min, whereas methanolic extract shows paralysis at 3.25 min and death at 8.01 min. These two extracts showed good Anthelmintic activity as compared to other extracts. These extracts were required the least time for causing paralysis and death of the earthworms. Chloroform extract of *Ficus carica* at 20 mg/ml concentration showed paralysis at 4.01 min and death at 8.45 min. Pet. Ether extract of *Ficus carica* at 20 mg/ml concentration showed paralysis at 7.40 min and death at 14.35 min. Standard drug treatment mebendazole at 20 mg/ml concentration showed paralysis at 2.31 min and death at 6.10 min. Control (saline solution treated) earthworms were observed for 24 hrs, no paralysis and death found during 24 hrs. All the values are expressed as mean \pm SEM (n = 6).

Helmintic infections of the gastrointestinal tract of human beings and animals have been recognized to have adverse effects on health standards with a consequent lowering of resistance. In search of compounds with anthelmintic activity, a number of substances were screened using different species of worms, for example, earthworms, *Ascaris*, *Nippostrongylus*, and *Heterakis*. Of all these species, earthworms have been used widely for the initial evaluation of anthelmintic compounds *in vitro* because they resemble intestinal "worms" in their reaction to anthelmintics and are easily available. It has been demonstrated that all anthelmintics are toxic to earthworms and a substance toxic to earthworms is worthy for investigation as an Anthelmintic.

Earthworms have the ability to move by ciliary movement. The outer layer of the earthworm is a mucilaginous layer and composed of complex polysaccharides. This layer being slimy enables the earthworm to move freely. Any damage to the mucopolysaccharide membrane will expose the outer layer and this restricts its movement and can cause paralysis. This action may lead to the death of the worm. Preliminary phytochemical screening of these extracts were showed presence of flavonoids like rutin, phenolic acids, phytosterols like taraxasterol such compounds further studies using *in-vivo* are required to carry out to establish effectiveness for the use of *Ficus carica* as an anthelmintic drug. The drug may be further explored for its phytochemical profile to identify the active constituents responsible for anthelmintic activity.

ACKNOWLEDGEMENT

Authors are thankful to Mr. S. A. Nirmal, from P R C Pharmacy, Loni, (M.S.), India, who provide us earthworms. The authors wish to thank the management of the college for encouraging and providing research facilities.

REFERENCES

1. Chandrashekhar CH, Latha KP. Anthelmintic activity of the crude extracts of *Ficus racemosa* Int J of Green Pharma, 2008: 100-103.
2. Kirtikar KR, Basu BD., Indian Medicinal Plants, 2nd ed., Vol. 3, Dehradun: Int Book, 1986, pp. 2329–2331.
3. The Wealth of India. Raw Materials. Vol. 4. New Delhi: Publication and Information Directorate, CSIR; 1969.pp 26.

4. Burkill IH, A Dictionary of the Economic Products of Malay Peninsular. Ministry of Agriculture, Malaysia, 1935, pp.1005–1006.
5. Ponelope, O, 100 Great Natural Remedies. Kyle Cathic Limited, NewYork, USA, 1997, pp. 98–99.
6. Mukherjee Pulok K., Saha Kakali, Screening of anti-diarrhoeal profile of some plant extracts of a specific region of West Bengal, Ind J of Ethnopharma, 1998, 60, 85–89.
7. Perez C, Dominguez E, Canal JR. Hypoglycaemic activity of an aqueous extract from *Ficus carica* (fig tree) leaves in streptozotocin diabetic rats, Pharm. biol. 2000; 38: 181-186.
8. Perez C, Canal JR, Torres MD, Experimental diabetes treated with *Ficus carica* extract: effect on oxidative stress parameters, Acta Diabetic 2003;40:3–8.
9. Hassan Anwarul Gilania, Malik Hassan Mehmood, Ethnopharmacological studies on antispasmodic and antiplatelet activities of *Ficus carica* Ind J of Ethnopharma 2008; 119: 1–5.
10. Gond NY, Khadabadi SS. Hepatoprotective activity of *Ficus carica* leaf extract on rifampicin-induced hepatic damage in rats, Ind J of Pharma sci 2008; 70(3): 364-366.
11. Aswar Manoj, Aswar Urmila, Watkar Bhagyashri, Anthelmintic activity of *Ficus benghalensis*, Int J of Green Pharma 2008: 170-172.
12. De Amorin A, Borba HR, Carauta JP, Anthelmintic activity of the latex of *Ficus* species. J of Ethnopharma 1999; 64(3): 255-258.
13. Ghosh Dipankar and Laddha KS. Herbal drug extraction: An Update Chemical Weekly 2005; Feb.8.
14. Khandelwal KR. Practical Pharmacognosy Techniques and experiments, 8th edn, .Nirali Prakashan, Pune. 2001 pp. 149-156.
15. Dembitsky VM and Rezanika T. Metabolites produced by nitrogen fixing Nostoc species, Folia microbial, 2005; 50(5): 363.
16. Muhamed Fawzy Ramadan *etal.*, Functional bioactive compounds and biological activities of *Spirulina platensis* lipids, Czech J. Food Sci 2008; 26(3): 211.
17. Khan Abedulla K *etal.*, Antifungal And Anthelmintic Activity of Extracts of *Mucuna Pruriens* Seeds, Pharmaonline 2008; 2: 776-780.
18. Thorn GW, Adams RD, Braunwald E, Isselbacher KJ, Petersdorf RG. Harrison's Principle of Internal Medicine, New York: Mcgraw Hill Co., 1977, pp. 1088.
19. Gangurde SA. *etal.*, *In Vitro* Evaluation Of Antioxidant And Anthelmintic Activity Of Different Extracts of *Soymida Febrifuga.*, Pharmaonline 2008: 2726.
20. Indian Pharmacopoeia, Drug Substances, Dosage Forms and Pharmaceutical Aids, vol. 2, Government of India, Ministry of Health and Family Welfare, Pub. By The Ind Pharma Commission, Ghaziabad, 2007, pp. 861.
21. Raymond C Rowe, Paul J Shaskey, Paul J Weller, Handbook of Pharmaceutical Excipients, 4th edn. Pub by American Pharmac Association, Washington, 2003, pp. 97.
22. Dahiya Rajiv, Pathak Devender, Malipeddi Himaja and Bhatt Sunita, First total synthesis and biological screening of hymenamide E, Acta Pharm 2006; 56: 399.
23. Grime AS *etal.*, Comparative *In vitro* Anthelmintic Activity of *Mentha piperita* and *Lantana camara* from Western India, Dhaka Univ. J. Pharm. Sci 2006; 5: 5.

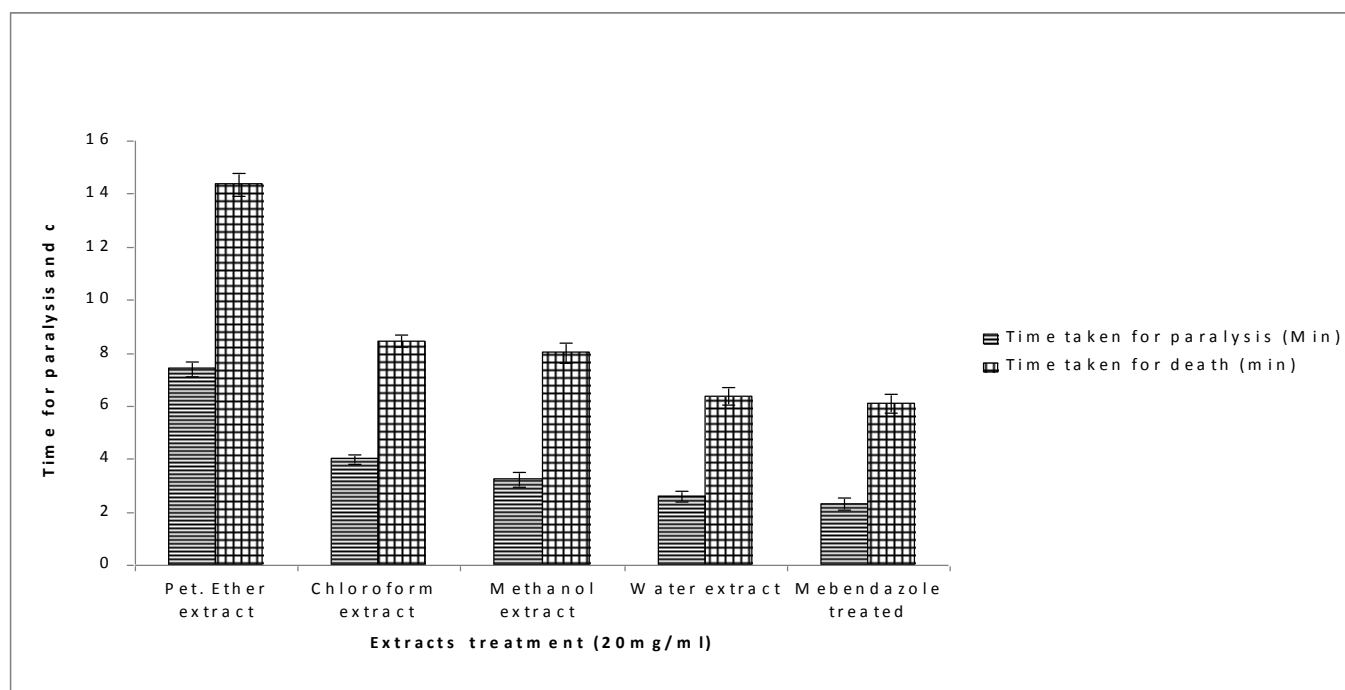


Figure 1: Shows Time Taken For Paralysis And Death For Each Extracts Of Leaves Of *Ficus Carica*

All the values are expressed as mean \pm SEM (n = 6).. Control worms were alive up to 24 hrs.

Source of support: Nil, Conflict of interest: None Declared