

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

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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 inspida* 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

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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 edicine 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).

Helminthic 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.

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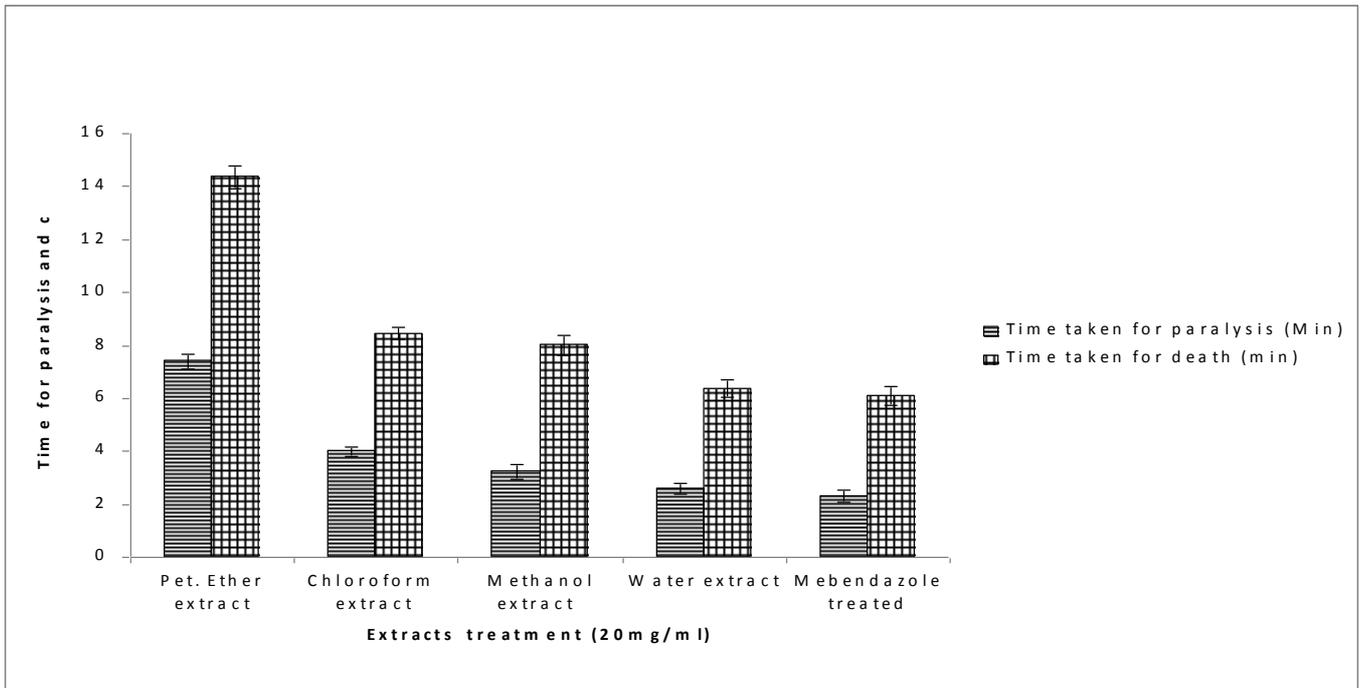


Figure 1: Shows Time Taken For Paralysis And Death For Each Extracts Of Leaves Of *Ficus Carica*

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

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