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## *In vitro* anthelmintic activity of aqueous extract of *Embelia ribes*

T.R.Prashith Kekuda\*, S.V.Praveen Kumar, B.C.Nishanth, M.Sandeep  
 Dept. of Microbiology, S.R.N.M.N College of Applied Sciences, N.E.S Campus, Balraj Urs Road,  
 Shivamogga-577201, Karnataka, (INDIA)  
 E-mail : prashith\_kekuda@rediffmail.com

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### ABSTRACT

The present study was undertaken to investigate the anthelmintic potential of aqueous extract of *Embelia ribes* (locally called Vidanga) using earthworm model. Different concentrations of standard drug (piperazine citrate) and aqueous extract of *E.ribes* fruits were employed and the average time required for paralysis and death was noted. 3% and 5% concentration of extracts were found to possess more activity than the same concentration of standard drug. The results justify the traditional use of the plant against worms. © 2009 Trade Science Inc. - INDIA

### KEYWORDS

*Embelia ribes*;  
 Anthelmintic activity;  
 Earthworm;  
 Vidanga;  
 Piperazine citrate.

### INTRODUCTION

The increasing resistance of helminths against synthetic anthelmintics is a worldwide problem. Therefore, alternative anthelmintic strategies are urgently needed. In addition to anthelmintic strategies such as grazing management, biological control with nematophagous fungi or food supplementation with leguminous plants accumulating high amounts of condensed tannins, phytotherapy could be a part of an integrated control system. Results of *in vitro* tests with plant products against helminthic parasites using methods such as larval and adult paralysis tests, egg hatch assays, or motility and biochemical tests have been reported<sup>[1]</sup>. The family Myrsinaceae consists of nearly 1000 species of trees and shrubs spread over 33 genera including four genera namely *Myrsine*, *Maesa*, *Rapanea* and *Embelia*, which are widely used in herbal medicines<sup>[2]</sup>. *Embelia ribes* is a large scandent shrub, distributed throughout India and belongs to the family *Myrsinaceae*.

It is commonly known as *Baberang* in Hindi and *Vidanga* in Sanskrit. The dried fruits are being used for the preparation of medicine. The plant is widely used as anthelmintic, anticarminative, antibacterial, antiinflammatory, antidiuretic and antiastringent as reported in various literatures<sup>[3]</sup>. Embelin has been isolated and quantified in *Embelia ribes* Burm. f. and other species of Myrsinaceae family. Embelin as such evaluated against *Heligmosomoides polygyrus* in mice significantly reduced the total worm counts and it is also reported to be a potent oral contraceptive<sup>[2]</sup>. In the present study, the anthelmintic potential of traditionally used medicinal plant *Embelia ribes* was scientifically explored against Earthworm model to substantiate the folklore claims.

### MATERIALS AND METHODS

#### Collection and extraction of plant material

The material of *E.ribes* were purchased from local shops and authenticated to their identity in Department

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of Botany, S.R.N.M.N College of Applied Sciences, Shivamogga and voucher specimens were deposited in the department for future references. The material was mechanically powdered. 10g of powdered material was added to 100ml of distilled water taken in a beaker and boiled for about half an hour. The contents were filtered and the filtrate was condensed to 1/3rd of the original volume. The condensed aqueous extract was kept in refrigerator and used for the anthelmintic studies. For anthelmintic study, extract concentration of 1%, 3% and 5% in normal saline was used.

### Anthelmintic assay

#### Collection of earth worms

In this study, Indian earthworm model was selected as the earthworms are easily available and used widely for the initial evaluation of anthelmintic activity of compounds. Indian adult earthworms (*Pheretima posthuma*) collected from the local earthworm breeder in the outskirts of Shivamogga city were used for the Anthelmintic study. Equal sized ( $8 \pm 1$  cm) worms were selected for the study. The worms were washed with normal saline to remove all the extraneous matter.

#### Standard drug

Piperazine citrate manufactured by GlaxoSmithKline Pharmaceutical Ltd, Bangalore was used as reference standard for anthelmintic study. The dilutions of drug namely 1%, 3% and 5% in normal saline were employed to assess anthelmintic activity. 0.85% normal saline was used as control.

### Methodology

The assay was performed on adult Indian earthworm due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings. Various dilutions of standard drug (Piperazine

citrate) and test were prepared in normal saline (0.85%). Different concentrations of standard drug and test compounds in normal saline were poured into respective labeled Petri plates (50 ml in each plate) and 6 worms of equal size (or nearly equal) were introduced into each of the plates. Observations were made for the time taken to paralysis and death of individual worm. 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*<sup>[4]</sup>. Death was also confirmed by dipping the worms in slightly warm water. The mortality of parasite was assumed to have occurred when all signs of movement had ceased<sup>[5]</sup>.

## RESULTS AND DISCUSSION

The results of anthelmintic activity of different concentrations of Standard drug and aqueous extract of *E.ribes* are depicted in TABLE 1. The results revealed concentration dependent activity. The average paralysis time (in min) in different concentrations of Standard drug (Piperazine citrate) was found to be 78, 23 and 16 while the average death time (in min) was found to be 105, 43 and 28. Aqueous extract of *E.ribes*, in 1%, 3% and 5% was found to cause paralysis of worms in 66, 18 and 14 minutes respectively. Death of worms occurred in 94, 52 and 42 minutes respectively in different concentrations. From the results it is evident that 3 and 5% of aqueous extract of *Embelia ribes* is more potent than the same concentrations of standard drug.

The origin of many effective drugs is found in the traditional medicine practices and in view of this several workers have undertaken studies pertaining to testing of folklore medicinal plants for their proclaimed anthelmintic activity<sup>[5]</sup>. The false black pepper *Embelia ribes* Burm. (Myrsinaceae), a climbing shrub which is distributed in the Indo-Pakistan region. Seeds and fruit show anthelmintic activity in goats and sheep<sup>[1]</sup>. *E.ribes* (common name, Vidanga) is extensively used in traditional system of medicine for treatment of various disorders. It is described in Ayurveda, as a powerful anthelmintic, antifertility and antihyperlipidemic agent<sup>[2]</sup>. In a study employing extracts or ingredients of six different plant species and reference anthelmintic Pyrantel tartrate against exsheathed infective larvae of *Haemon-*

**TABLE 1: Average paralysis and death time in various concentrations of standard drug and aqueous extract of *E.ribes***

Treatment	Conc. (in %)	Average paralysis time in minutes	Average death time in minutes
Embelia ribes	1	66	94
	3	18	52
	5	14	42
Piperazine citrate	1	78	105
	3	23	43
	5	16	28

*chus contortus*, the fruit of *E.ribes* (Myrsinaceae) showed an anthelmintic efficacy of up to 93%, relative to pyrantel tartrate<sup>[1]</sup>. Apart from the potent anthelmintic activity, *E.ribes* also showed other promising activities as revealed in several literatures. Oral administration of *E.ribes* ethanolic extract in dose of 100 mg/kg and 200 mg/kg significantly reduced the levels of blood glucose, glycated haemoglobin, heart rate and systolic blood pressure in animals when compared with diabetic rats<sup>[6]</sup>.

### CONCLUSION

Today, the principal mode for control of gastrointestinal parasites is based on the commercial anthelmintics. Because of the increasing anthelmintic resistance and the impact of conventional anthelmintics on the environment, it is important to look for alternative strategies against gastrointestinal nematodes. The results of the present study reveal the potential of the plant against the worms. The extract was found to be even more effective in higher concentrations than the standard drug. The results are in justification with the traditional use of the plant for exclusion of worms.

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