

IN VITRO EVALUATION OF ANTHELMINTIC ACTIVITY OF EMBELIN

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ABSTRACT

One of the well-known herbal pharmaceutical ingredients- Embelin (*Embelia ribes* Burm.f.) which belongs to family (Myrsinaceae) showed significant anthelmintic results after lot many experimental trials. Thus Embelin is acting as a good anthelmintic agent. Experimental trials were carried out using Indian earthworms (*Pheretima Posthuma*). The various concentrations were tested for Anthelmintic activity & Albendazole is used as a standard for comparison. This is the first attempt to reveal the anthelmintic activity of embelin. The effect of Embelin against parasite was observed in very shorter time. It shows paralysis time 03 minutes 21 seconds and death time 04 minutes 07 seconds which is much superior to that of Albendazole (14.53 minutes and 23.46 minutes). By in vitro evaluation it is proved that Embelin potentiates paralysis in earthworm & ultimately it results in death of worms.

KEYWORDS: Anthelmintic, Albendazole, Embelin, Tween 80.

INTRODUCTION

Development of anthelmintic resistance and high cost of conventional anthelmintic drugs requires alternative sources of anthelmintics. Infection with helminths or parasitic worms, affect more than two billion people worldwide.^[1] It is often found in the developing countries. Helminth infection produces a global burden of disease which often leads to malnutrition, anaemia, eosinophilia and pneumonia.^[2] Helminthosis plays an important role in economic losses.^[3] Major threat to the control of parasites is their survival against drugs which are generally effective at the recommended dose. Anthelmintics are the drugs used to

treat helminth infections by expelling them from body either stunning or by killing them without damaging host cells. They are either vermifuges (those that stun) or vermicides (those that kill).

Embelia ribes Burm. f., mentioned since the ancient times, in the form of the drug 'Vidanga' or 'Baibidanga' has been an important ingredient in a number of ayurvedic formulations. Vidanga has found a mention in all the three ancient Indian ayurvedic texts namely Charakh Samhita, Sushurta Samhita and Ashtanga hridayam. Besides Ayurveda, Vidanga is reported to be used in Unani (Baobarang), Siddha (Vaivilangam), Folk, Tibetan (Byi dan ga) and Homopathic (*Embelia ribes*) systems of medicines as well. Many scholars of Ayurveda and botany have correlated Vidanga to the plant *Embelia ribes* Burm. f. Vidanga was included as official drug in the Indian Pharmacopoeia in the year 1966 and the botanical origin was described as fruits of *E.ribes* only. Since then, it is widely accepted that the botanical source of the drug 'Vidanga' is the dried berries of fruits of *E. ribes* belonging to family Myrsinaceae.^[4]

Physicochemical properties of embelin

Molecular formula	C ₁₇ H ₂₆ O ₄
Molecular weight	294.391 g/mol
Synonyms	Embeline, emberine, embelic acid
Melting point	142.50C

MATERIALS & METHODS

1. Materials

Embelin, Tween 80 and Albendazole were obtained from the institute, Vikhe Patil Pharmacy College, Ahmednagar. While performing the experiment, we have confirmed that Tween 80 is not showing any anthelmintic activity at the given concentration.

2. Preparation of solutions

a. Preparation of Albendazole (1.5%) solution-Albendazole has Minimum Inhibitory Concentration of 1.5%. 1.5 mg Albendazole was accurately weighed. It is mixed with 0.1% Tween 80 and volume is made up to 100 ml with distilled water. It will give 1.5 % Albendazole solution.

b. Preparation of Embelin Solution-

Solutions of embelin with concentration ranges 2%, 4%, 6%, 8% & 10 % were prepared using distilled water.

3. Selection of worms

The assay was performed using adult earthworm, *Pheretima Posthuma*.^[5] These earthworms show anatomical and physiological resemblance with the intestinal round worm parasites of human beings. As they are easily available, widely used for the initial *in vitro* anthelmintic evaluations.^[6, 7] Adult earthworms were collected from moist soil. They are washed properly to remove all faecal matters and then used for the study. The earthworms of 5-6 cm length and 0.1-0.2 cm widths were used for all experimental protocol.

4. Grouping of worms

Seven groups, having six earthworms in each group were prepared. Group I serves as a 'control' and receive only distilled water. Group II serve as 'standard' and receives 1.5% Albendazole solution. Group III, IV, V, VI and VII receive embelin preparations with concentration 2%, 4%, 6%, 8% and 10% respectively. Observations were made for the paralysis time and death time of individual earthworm. Six groups, six earthworms in each group were prepared.

Table 1: Scheme Used for Evaluation of Anthelmintic activity of Embelin.

Sr. No	Group	Condition	Concentration (%)
1.	I	Control (Distilled Water)	---
2.	II	Standard (Albendazole)	1.5%
3.	III	Embelin	2%
	IV		4%
	V		6 %
	VI		8 %
	VII		10 %

All the results were expressed as mean $\pm$ SEM.

STATISTICAL ANALYSIS

Data was analysed by applying t-test on each group. P values were calculated in each case and consequences were noted. Statistical analysis for both paralysis time and death time of earthworm were carried out and results are shown in Table No 2.

RESULT & DISCUSSION

Results obtained from the experiment confirm the anthelmintic activity of Embelin with shortest time of paralysis and deaths. Paralysis was confirmed when earthworms lost their motility and death was confirmed with fading of their colour. No activity was observed even after dipping them in warm water (50° C).

Table 2: Anthelmintic activity of embelin on Pheretima Posthuma.

Group	Treatment		Concentration	Time taken for paralysis (min)	Time taken for death (time)
1	Control	I	-	-	-
2	Standard (Albendazole)	II	15 mg/ml	14:53±0.342***	23:46±0.03011***
3	Embelin	III	2 mg/ml	27:52±0.3284***	28:43±0.3336***
		IV	4 mg/ml	20:52±0.3421***	21:43±0.3336***
		V	6 mg/ml	12:41±0.003651***	13:35±0.004651***
		VI	8 mg/ml	06:17±0.007923***	07:40±0.003774***
		VII	10 mg/ml	03:21±0.004773***	04:07±0.003473***

Values are expressed as Mean± SEM, ***p<0.0001 when compared with standard drug.

Hence the above results prove that the activity of embelin is much superior as compared to Albendazole. All the concentrations were found to possess anthelmintic activity.

CONCLUSION

In vitro evaluation of embelin on earthworms showed that it has profound activity against worms and it is much better than standard (Albendazole) at very low concentrations. It achieves the better therapeutic effect in lower dose with no side effects. The probable mechanism of action is also supportive to the study. In future we may use glycerine directly as an anthelmintic or as an adjunct to reduce the dose of drug.

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REFERENCE

1. Holden- dyes L, Walker R. J, Anthelmintic drugs (Internet) obtained from: www.wormbook.org/chapter/www_anthelminticdrugs/anthelminticdrugs.html

2. Bundy D. A, "Immunoepidmiology of intestinal helminthic infection: the global burden of intestinal nematodes diseases;, Trans Royal Soc Med Hyg, 1994; 8: 59- 61.
3. Waller P.J, "Sustainable helminth control of ruminants in developing countries", Vet Parsitol, 1997; 71: 195- 207.
4. Ved D K, Archana Singh. Identity of vidanga - a plant drug in trade. Newsletter- medicinal plants of conservation concern., April-June 2006.
5. Chatterjee K.D, Patasitology, Protozoology and Helminthology, Guha Ray. Sree Saraswati Press Ltd, Calcutta, 1967; 168-169.
6. Vidyarthi R. D, A textbook of zoology, S. Chand and Co, New Delhi, 1967; 329- 70
7. Vigar Z, Atlas of medical Parasitology, P. G Publishing House, Singapore, 1984; 216.
8. <http://www.who.int/wormcontrol/statistic>.
9. EO Ajaiyeoba;OTOlarenwaju. Pharm.biol., 2001; 39(3): 217-220.
10. C.S.I.R, "The wealth of India" National Institute of Science communication & Information Resources, 1985; I(A): 86.
11. YM Shivkarand; VL Kumar.Pharm .biol., 2003; 41(4): 263-265.