

## Research Article

# ANTHELMINTIC ACTIVITY OF *Cuminum cyminum*, *FOENICULUM VULGARE* AND *Eugenia caryophyllus* AGAINST *Pheritima posthuma*

Satish Kumar\*<sup>1</sup>, Kamal Kumar Goyal<sup>2</sup>, Syed Bilal<sup>1</sup>

1. Satish Kumar B.N,  
Department of  
Pharmacognosy, Gautham  
college of Pharmacy,  
Bangalore, Karnataka,  
560032 India.

2. Kamal Kumar Goyal,  
Department of  
Pharmacognosy, Sree  
Balaji college of  
Pharmacy, Jaipur,  
Rajasthan, 302 004 India.

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\*Corresponding author  
Satish Kumar

Email :  
satish02p@gmail.com

## ABSTRACT

Ethanol extract of fruit of *Cuminum cyminum* (EECC), aqueous extract of fruit of *Cuminum cyminum* (AECC), Ethanol extract of fruit of *Foeniculum vulgare* (EEFV), aqueous extract of fruit of *Foeniculum vulgare* (AEFV) and Ethanol extract of flowering bud of *Eugenia caryophyllus* (EEEE), aqueous extract of flowering bud of *Eugenia caryophyllus* (AEEC) were taken up for in vitro studies on the Anthelmintic activity against *Pheritima posthuma*. Different concentrations (25, 50, 100, 200mg/mL) were used for the activity is compared with the reference standard Albendazole at concentration 20mg/mL and normal saline( 0.9% NaCl) was used in control treatment. The results were expressed in terms of time in minutes to report the time of paralysis and time of death of the earth worms. The results obtained from study indicate towards anthelmintic activity, supporting folk used of all three plants compared with reference standard. The result established that EEEC and AEEC is more potent as compared with EECC, AECC and EEFV, AEFV.

**Key words:** Anthelmintic activity, *Cuminum cyminum*, *Eugenia caryophyllus*, *Foeniculum vulgare*, *Pheritima posthuma*.

## INTRODUCTION

Helminthiasis is prevalent globally one third of population harbours them, but is more common in developing countries with poorer personal and environmental hygiene. In human body gastro intestinal tract is adobe of many helminthes, but some also live in tissues or their larvae migrate into tissues. They harm the host by depriving him of food, causing blood loss, injury to organ, intestinal or lymphatic obstruction and by secreting toxins (Tripathi *et al.*, 2003). Anthelmintics are the agent which expels the worms from the body, either by killing them or by stunning them in body.

However, increasing problems of development of resistance in helminthes (Coles, 1997; Geert, 1995) against anthelmintics have led to the proposal of screening medicinal plants for their anthelmintic activity. The plants are known to provide a rich source of botanical anthelmintics (Satyavati *et al.*, 1976; Lewis *et al.*, 1977). Some of the plants like *Carum copticum* (Kalesaraj, 1974),

*Coriandrum sativum* (Eugale *et al.*, 2007), *Seseli diffusum* (Pullaiah, 2006), *Carum copticum* (Panda, 2002) are known to possess anthelmintic activity. The family of Umbelliferae is a large one with 2850 species. It is well represented in Europe with some 500 taxa grouped into 110 genera (Punt, 1984). We have focused our attention on search of anthelmintic activity of herbal home remedy belonging to Myrtaceae and Umbelliferae family and selected *Eugenia caryophyllus*, *Cuminum cyminum*, and *Foeniculum vulgare* to prove their anthelmintic activity (Kokate *et al.*, 2004).

## METHODOLOGY

### Preparation of Ethanolic extract

Twenty g of the *Cuminum cyminum*, *Foeniculum vulgare*, *Eugenia caryophyllus* powder were repeatedly extracted in a 250mL round bottomed flask with 95% ethanol solution. The reflux time for each solvent was 40 cycles. The extracts were cooled at room temperature, filtered, and evaporated to dryness.

Table I. Ethanolic and Aqueous extract of *Cuminum cyminum*.

Extract	Dose(mg/mL)	Paralysis time (min)	Death time(min)
Control	0	0	0
Albendazole	20	38.30±9.08	56.00±6.66
EECC	25	66.00±5.79	122.00±12.31
EECC	50	57.00±5.61	108.00±11.25
EECC	100	51.00±7.42	84.00±8.57
EECC	200	50.00±2.74	69.40±1.96
Albendazole	20	38.30±9.08	56.00±6.66
AECC	25	0.00±0.00	0.00±0.00
AECC	50	0.00±0.00	0.00±0.00
AECC	100	49.00±5.56	113.00±8.60
AECC	200	48.00±2.55	84.00±4.30

Table II. Ethanolic and Aqueous extract of *Foeniculum vulgare*.

Extract	Dose(mg/mL)	Paralysis time (min)	Death time(min)
Control	0	0	0
Albendazole	20	38.30±9.08	56.00±6.66
EEFV	25	79.00±7.48	111.66±30.87
EEFV	50	80.00±15.08	108.75±3.75
EEFV	100	67.00±2.55	71.00±5.10
EEFV	200	47.00±2.55	75.00±7.91
Albendazole	20	38.30±9.08	56.00±6.66
AEFV	25	0.00±0.00	0.00±0.00
AEFV	50	46.00±2.92	67.00±5.15
AEFV	100	69.00±6.96	45.00±10.41
AEFV	200	34.00±2.92	44.00±4.30

Table III. Ethanolic and Aqueous extract of *Eugenia caryophyllus*.

Extract	Dose(mg/mL)	Paralysis time (min)	Death time(min)
Control	0	0	0
Albendazole	20	38.30±9.08	56.00±6.66
EEEC	25	56.00±1.87	67.00±4.64
EEEC	50	40.00±1.55	50.00±3.54
EEEC	100	35.00±2.74	45.00±1.58
EEEC	200	27.00±2.74	39.00±3.32
Albendazole	20	38.30±9.08	56.00±6.66
AEEC	25	61.00±4.18	88.00±9.43
AEEC	50	44.00±1.87	55.00±3.54
AEEC	100	40.00±2.74	52.00±4.06
AEEC	200	22.60±2.54	43.00±2.55

#### Preparation of Aqueous extract

Twenty g of the *Cuminum cyminum*, *Foeniculum vulgare*, *Eugenia caryophyllus* powder was subjected for decoction with water. The extracts were cooled at room temperature, filtered, and evaporated to dryness.

#### Anthelmintic Bioassays

The Earth worms *Pheretima posthuma* nearly equal size (8cm) collected from University of Agricultural sciences, Bangalore was used for evaluating the anthelmintic activity of various extracts using reference

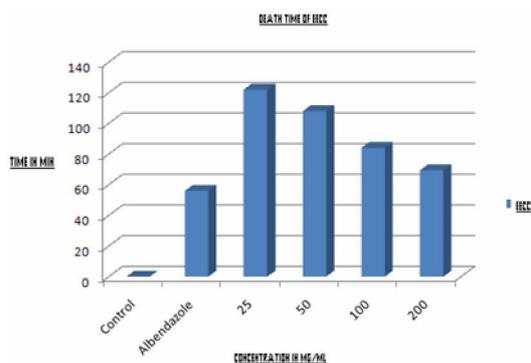


Figure 1: Death time of Ethanol extract of *Cuminum cyminum*

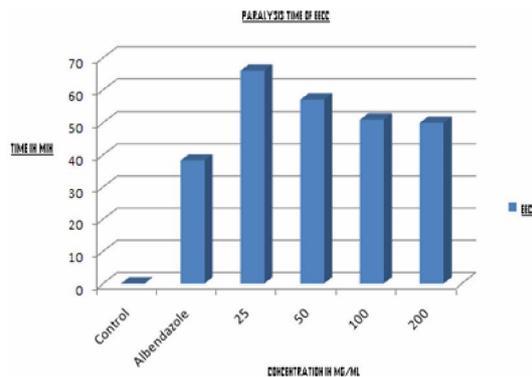


Figure 2: Paralysis time of Ethanol extract of *Cuminum cyminum*

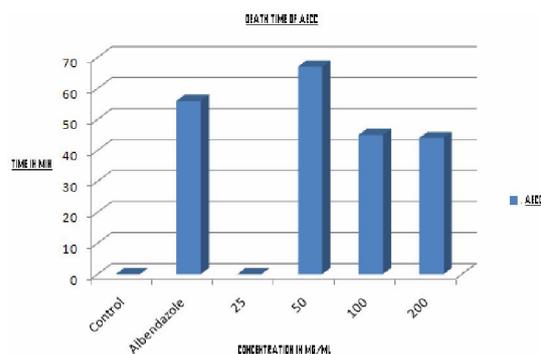


Figure 3: Death time of Aqueous extract of *Cuminum cyminum*

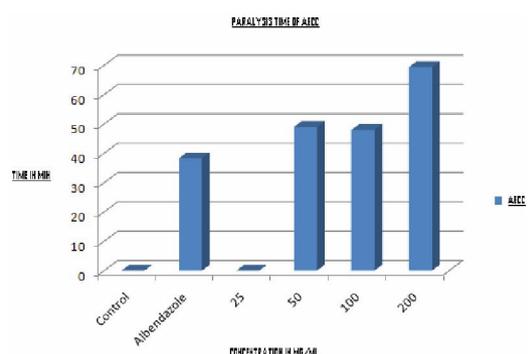


Figure 4: Paralysis time of Aqueous extract of *Cuminum cyminum*

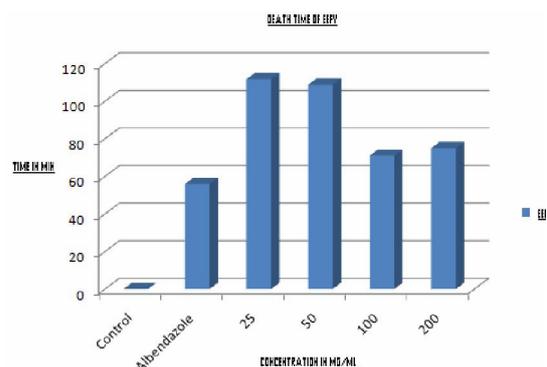


Figure 5: Death time of Ethanol extract of *Foeniculum vulgare*

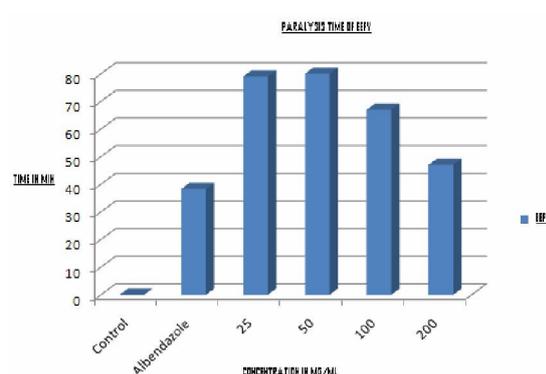


Figure 6: Paralysis time of Ethanol extract of *Foeniculum vulgare*

substance Albendazole for comparison. These were procured from local suppliers GSK Pharmaceuticals Ltd, Tumkur road, Nelamangala and maintained at Gautham College of Pharmacy, Bangalore, India.

#### Activity against Earthworms

Anthelmintic activity was assessed using earthworms *Pheritima posthuma*, as it has

anatomical and physiological resemblance with the intestinal roundworm parasites of humans (Thorn *et al.*, 1977). *Pheritima posthuma* was placed in petridish containing four different concentrations (25, 50, 100, 200mg/mL) each of EECC, AECC; EEV, AEFV and EEEV, AEVC. Each petridish was placed with 6 worms and observed for paralysis (or) death.

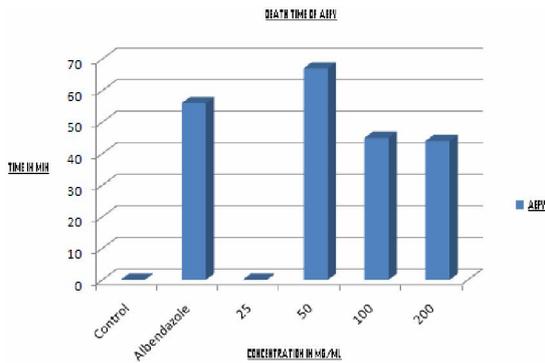


Figure 7. Death time of Aqueous extract of *Foeniculum vulgare*

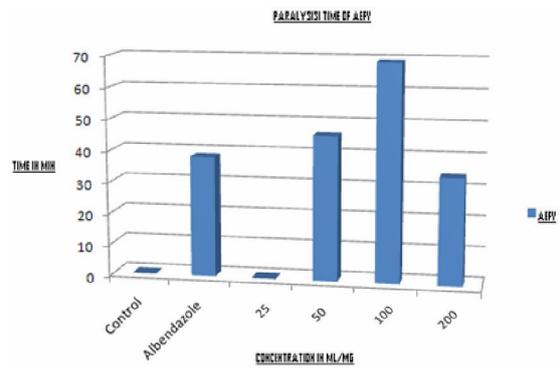


Figure 8. Paralysis time of Aqueous extract of *Foeniculum vulgare*

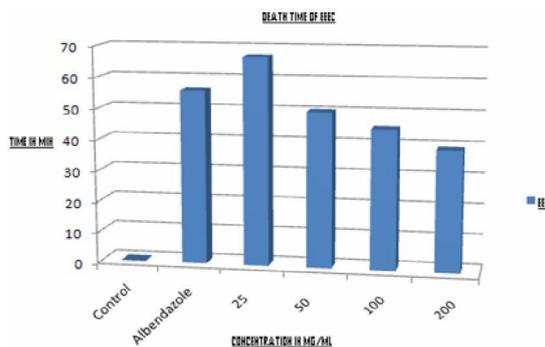


Figure 9. Death time of Ethanol extract of *Eugenia caryophyllus*

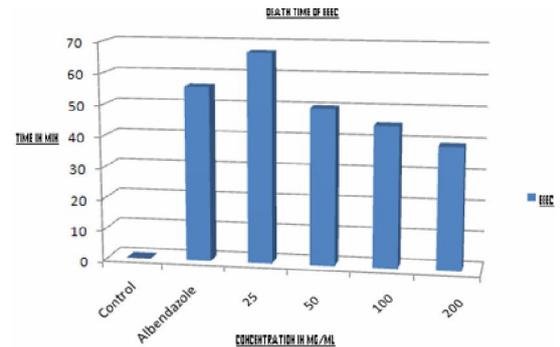


Figure 10. Paralysis time of Ethanol extract of *Eugenia caryophyllus*

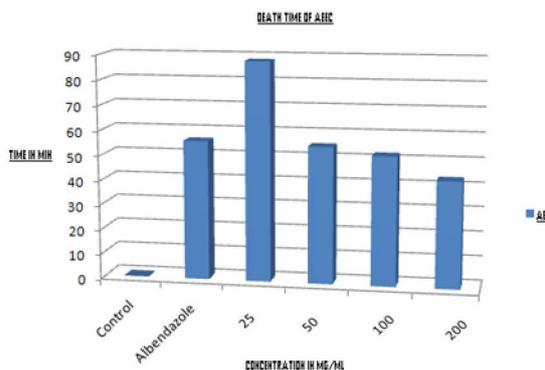


Figure 11. Death time of Aqueous extract of *Eugenia caryophyllus*

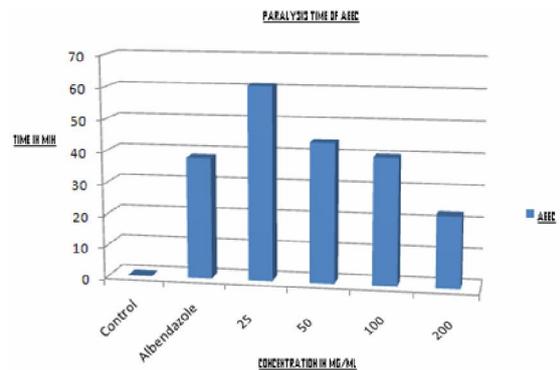


Figure 12. Paralysis time of Aqueous extract of *Eugenia caryophyllus*

Observations were made up to 4hrs of test period for the time taken to paralysis or death of individual worms. The mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; the time death of worm(min) was recorded after ascertaining that worm neither moved when shaken nor when given external stimuli with fading away their color. In the same manner Albendazole was

included as a reference compound. The test results were compared with reference standard Albendazole (20mg/mL) treated sample (Ghosh *et al.*, 2005).

#### Statistical analysis

All values represent Mean±SEM (n=6) in each group. Control group worms were alive up to 24 hours of the experiment. Statistically analyzed by using one way of ANOVA.

## RESULT AND DISCUSSION

As in table I and figure 1, 3, both the EECC and AECC possess the anthelmintic activity, whereas the EECC have shown death at both lower (25mg/mL) and higher dose (200mg/mL), but AECC have shown death at only higher dose (200mg/mL). Hence EECC is more significant than the AECC. In the figure 2, 4, the paralysis of worms were observed in both EECC and AECC and paralysis time of worms were dose dependent, but paralysis were not observed at lower doses of AECC, but AECC have shown significant paralysis time at higher dose.

As in table II and Figure 5, 7, both EEFV and AEFV have shown dose dependent anthelmintic activity, the extracts shown the death of worms at both lower and higher concentration respectively. AEFV have not shown death at least dose, but it shown rapid death at 50, 100 and 200mg/mL. EEFV have shown death of worms at all the doses, but death time is long when compared to AEFV. So the AEFV is more significant than the EEFV. In the figure 6, 8 both the extracts shown paralysis of the worms, it is a dose dependent effect, but AEFV have not shown paralysis at lower dose (25mg/mL).

As in Table III and Figure 9, 11, EEEC and AEEC are very potent anthelmintic drugs, both the extracts caused rapid death of worms at very less time. Both extracts shown the dose dependent activity, but on comparison EEEC is more significant than the AEEC. In figure 10, 12 both EEEC and AEEC have shown significant paralysis action at both low and high dose. The paralysis effect shown is dose dependent.

All the selected plants for the activity are home remedial plants. All these plants have various activities, but many have not proved scientifically. Hence an attempt is done to identify their anthelmintic activity. The EECC, AECC; EEFV, AEFV and EEEC & AEEC at various concentrations (25, 50, 100, 200mg/mL) were tested on earthworms *Pheritima posthuma* and noticed its paralysis time and death time. This recorded time was compared with the Standard drug Albendazole 20mg/mL. All the extracts shown significant activity against earth worms when compared to Albendazole.

*Eugenia caryophyllus* contains tannins (Kokate CK et al., 2004), Tannins in several plants reported to show anthelmintic property (Athnasiadu et al., 2001; Waller et al., 1997). *Cuminum cyminum* and *Foeniculum vulgare* contain Anethol,  $\alpha$ -pinenin as their chief constituents (Kokate et al., 2004), whereas in *Croton zebtneri* and *Lippa sidoides* Anethol,  $\alpha$ -pinenin have shown significant anthelmintic activity (Camure et al., 2007).

## CONCLUSION

The results obtained from study indicate towards anthelmintic activity, supporting folk used of all three plants compared with standard. The result established in reference to their paralysis time and death time EEEC and AEEC has shown more potent action when compared with EECC, AECC and EEFV, AEFV. Thus the report support that *Eugenia caryophyllus* and *Cuminum cyminum* and *Foeniculum vulgare* selected to prove their anthelmintic activity uses have shown significant activity, one of the reason to show the activity may be the presence of volatile oil and tannins.

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