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## Anthelmintic Activity of Leaves of *Anethum graveolens* against *pheretima posthuma*

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### Abstract:

The aim of the present study was to evaluate anthelmintic activity of aqueous extracts of the leaves *Anethum Graveolens* against Indian earthworms (*Pheretima posthuma*).

*Anethum Graveolens* is commonly known as 'Dill' and has been used in ayurvedic medicines since ancient times. It has been found to have antimicrobial, antifungal, carminative, diuretic, anti-inflammatory, antioxidant, antispasmodic, hypolipidemic activity. Different concentrations (20, 40, 60, 80, 100 mg/ml) of aqueous extracts of the plants were studied for anthelmintic activity in terms of paralysis and time of death of the worms. Albendazole (20 and 40 mg/ml) was used as a reference standard and Normal saline as a control group. Our study found that extracts of different concentrations exhibited significant anthelmintic activity. The encouraging results indicate that aqueous extracts of the leaves of *Anethum Graveolens* can be considered as natural anthelmintic for the treatment of helminth infections, could be an inexpensive and readily available source of anthelmintic treatment.

**Keywords:** *Anethum graveolens*, anthelmintic, albendazole, *pheretima posthuma*

### 1. Introduction

Infections with helminths, or parasitic worms, affect large population worldwide. (Tagbota S *et al.*, 2001)

Helminthiasis is a macroparasitic disease of humans and animals in which a part of the body is infested with parasitic worms such as pinworm, roundworm, or tapeworm. (Van Riet E *et al.*, 2007)

An anthelmintic drug is used to destroy or cause the expulsion of such parasitic intestinal worms and helps to treat helminthiasis, one of the most common infections in humans and cattle.

Because of the increasing toxicity and allergic manifestations of the anthelmintic drugs and the gastrointestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there is a problem in the treatment of helminthes diseases. (Tuse TA *et al.*, 2011, Singh D *et al.*, 2002). Hence there is an increasing demand towards natural anthelmintics.

Herbal medicine is the main source of medicine and large population, particularly in developing countries relies on herbal medicine. The whole plant or different parts of plants such as roots, tubers, stems, leaves, flowers, fruits and seeds have been used to evaluate the anthelmintic efficacy. (Ravindra G *et al.*, 2008)

Many of the medicinal plants have anthelmintic properties and are safe to use. The activity of medicinal plants is consistent and they work against most of the helminthes are having less or no side effects, cost effective and available easily.

Increasing problems of development of resistance in helminthes have led to the demand of screening medicinal plants for their anthelmintic activity. (Dorny P *et al.*, 1993, Dorny, P *et al.*, 1994)

*Anethum graveolens* (dill) has been used in ayurvedic medicines since ancient times and it is a popular herb that is used as a spice and also yields essential oil. It is an aromatic and annual herb of apiaceae family.

The *Anethum graveolens* has been cultivated Mediterranean region, and found in many places such as India, China, Europe and United States. The various parts of plant *Anethum graveolens* has been used traditionally for many of the diseases like antidiabetic, antimicrobial, antifungal, carminative, diuretic, anti-inflammatory, antioxidant, anticancer, antispasmodic, hypolipidemic etc. (Yazdanparast R *et al.*, 2001, Heamalatha S *et al.*, 2011)

The whole plant of dill is used as anthelmintic agent to eradicate or reduce the number of helminthic parasites in the intestinal tract traditionally. (Shewale R *et al.*, 2014)

With this objective *in vitro* study is used to validate the *Anethum graveolens* plant for medicinal use as anthelmintics.

### 1.1. Vernacular Names

- Hindi: Savaa
- English: Dill
- Sanskrit: Shatapushpa
- Punjabi: Soa
- Gujarati: Suva
- Kannada: Sabbasige soppu
- Malaylam: Chathakuppa or Sathakuppa
- Marathi: Shepu
- Tamil: Sada Kuppi
- Telugu: Soa-Kura



Figure 1: *Anethum Graveolens* leaves

## 2. Materials and Methods

### 2.1. Collection of Plant Material and Extraction

The leaves of *Anethum graveolens* were collected from Igatpuri, Nashik District, State of Maharashtra. These specimens were identified and authenticated from Botanist, Guru Nanak Khalsa College, Mumbai.

### 2.2. Preparation of Extract

#### 2.2.1. Aqueous Extract Preparation

For the preparation of aqueous extract, aerial part was collected, shade dried at room temperature, pulverized and extracted with water by maceration process for 24 hrs. The extract was further dried and stored at 4°C until required.

### 2.3. Reference Drug

Albendazole (Healthy Life Pharma Pvt. Ltd.) was used during the experimental protocol at a concentration of 20 and 40 mg/ml.

### 2.4. Control Group

Normal saline was used to treat control group.

### 2.5. Animals

Indian adult earthworms (*Pheretima posthuma*) were used to study anthelmintic activity. The earth-worms were collected from moist soil and washed with normal saline to remove all fecal matter. Earthworms 4-10 cm in length and 0.2-0.4 cm in width were used for all experimental protocol.

### 2.6. Anthelmintic Activity

The anthelmintic assay was carried as per the method of Ajayieoba E. O. et al. with minor modifications. (Ajaiyeoba E. et al., 2001)<sup>[11]</sup> For the anthelmintic activity of plant extract of *Anethum graveolens*, Indian adult earthworms (*Pheretima posthuma*) of 4-10 cm in length and 0.2-0.4 cm in width were used.

The animals were divided into eight groups containing six earthworms in each group.

Different dilutions of aqueous extract of *Anethum graveolens* (20, 40, 60, 80, 100 mg/ml) has been made and standard drug Albendazole were prepared and poured in to petri dishes. Worms observed for paralysis or death. Time for paralysis was noted when no movement of any sort could be observed except the worms were shaken vigorously. Time for death of worms were recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water at 40°C. The test results were compared with Reference compound Albendazole (20 and 40 mg/ml) treated samples. (Gaind KN et al, 1967, Chandan HS. et al., 2011, Kosalge SB et al., 2009).

### 3. Results and Discussion

The anthelmintic effect of different concentrations of aqueous extracts is comparable with that of the effect produced by the standard drug albendazole. From the results shown in the Table No.1. Aqueous extract of *Anethum graveolens* exhibited anthelmintic activity giving shortest time of paralysis and deaths related to Albendazole especially with 100 mg/ml concentration.

Therefore, it is concluded that *Anethum graveolens* used to treat intestinal worm infections, showed significant anthelmintic activity. The activity was concentration dependent of the different extract.

### 4. Conclusion

It was concluded that aqueous extract of leaves *Anethum graveolens* possess potent anthelmintic activity by exhibiting effectiveness for the parameters studied. The plant possesses significant anthelmintic activity at 100 mg/ml concentration measured by time taken for paralyse / death of the earth worms. The current investigation leads to conclusion that the leaves of *Anethum graveolens* have potent anthelmintic activity when compared with the conventionally used drug. Hence we can conclude that this herb as alternative source of anthelmintic drugs and also can generate new active lead for suitable anthelmintic drug. Further research is to be carried out to fractionate and purify the extract, in order to find out the molecule responsible for the anthelmintic activity observed.

Drug/treatment	Concentration	Time taken for paralysis (min.)	Time taken for death ( min.)
Normal Saline (Control)	-	-	-
Albendazole (Standard)	20 mg/ml	34.13 ± 0.62	48.30 ± 0.71
	40 mg/ml	21.72 ± 0.53	35.22 ± 0.42
Aqueous extract	20 mg/ml	70.38 ± 0.15	95.46 ± 0.12
	40 mg/ml	61.53 ± 0.49	81.10 ± 0.68
	60 mg/ml	53.12 ± 0.26	75.51 ± 0.24
	80 mg/ml	41.19 ± 0.16	63.75 ± 0.36
	100 mg/ml	27.24 ± 0.27	39.11 ± 0.18

Table 1: Anthelmintic Activity of Aqueous Extracts of leaves of *Anethum graveolens*

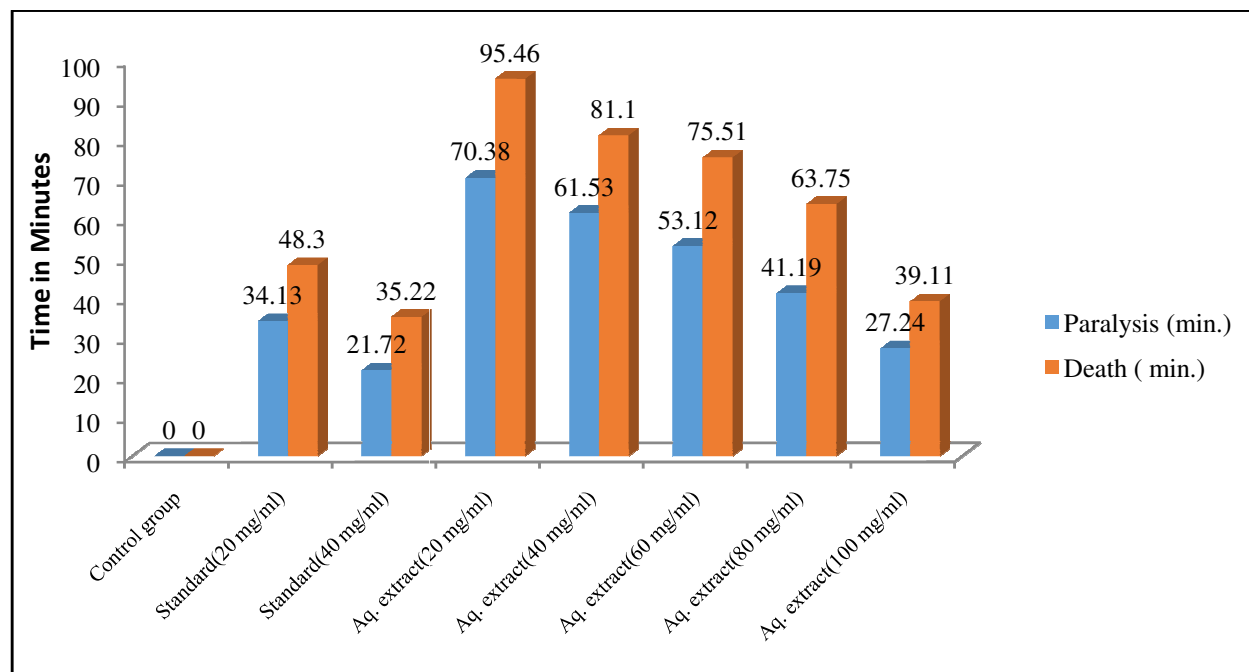


Figure 2: Anthelmintic activity of Control, Standard and Aqueous extract

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