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Available online at: [www.jpardonline.com](http://www.jpardonline.com)**Evaluation of anthelmintic activity of *Brassica oleracea* on earthworms**

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**ABSTRACT: Background:** In Indian medicinal plant literature, plant of *Brassica oleracea* has been traditionally reported to have medicinal value as astringent, Anti-Inflammatory, Antioxidant, and Skin Regenerative, Antidiabetic activity, Nootropic activity. **Aim:** The present study was aimed to evaluate the anthelmintic activity of aqueous extract of *B. oleracea* on Indian earthworms. **Method:** The aqueous extract of the whole plant of *B. oleracea* was screened for anthelmintic activity on Indian earth worm in comparison to standard drug Albendazole. The concentrations *B. oleracea* extracts and Albendazole were kept the same for comparative activity. Saline water was kept as control. Determination of anthelmintic activity was done by recording the paralysis time and death time. Phytochemical tests on plant extracts were carried out. **Results:** The result showed that the anthelmintic activity of plant extracts were well comparable to that of the reference drug Albendazole. Even the plant extract showed greater anthelmintic activity than the standard drug Albendazole. As the dose of the plant extract was increased, there was an increase in the anthelmintic activity. **Conclusion:** The result of the experimental study revealed that the aqueous extract of *B. oleracea* showed a significant anthelmintic activity.

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**INTRODUCTION:**

Helminth is a Greek word meaning worm. Helminth infections among the most common infections in men. Helminthiasis is a macro parasitic disease and the most common infectious agent of humans in developing countries<sup>[1,2]</sup>. Helminthiasis, or worm infestation, is one of the most prevalent diseases and one of the most serious public health problems in the world<sup>[3]</sup>. Helminth infections are 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, anemia, etc. Human beings have depended on nature for their simple requirements as being the sources for medicines; plants have been playing an

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essential role in human culture<sup>[4-6]</sup>. For much of our past history, medicinal plant parts or entire plant extracts have been used to cure Helminths infections<sup>[7-8]</sup>. According to the WHO current estimate, roundworms alone infect 1.5 billion people worldwide<sup>[9,10]</sup>.

The *B. oleracea* is a biennial plant (Fig 1) belonging to the *Brassicaceae* family that is eaten as a vegetable throughout the world. The edible plant parts are the stalk and large flowering head. It is commonly called Broccoli. It is a rich source of vitamin C and vitamin K.



**Fig 1. The whole *Brassica oleracea* plant.**

The objective of the study was to evaluate the anthelmintic activity of methanolic extract of *B. oleracea*.

## MATERIAL AND METHODS:

### Drugs and Chemicals:

The standard drug Albendazole tablet was procured from the local market of Sangamvadi. The Saline water was purchased from the local market. All other chemicals were purchased from Hi-Media, India and were of analytical grade.

### Collection, identification and processing of plant samples:

The Plant material was collected from Satara, identified, and authenticated by the Department of Botany, Yashwantrao Chavan Institute of Science, Satara, and Maharashtra, India. A voucher specimen (No: 57) of *B. oleracea* was collected in the month of December. Collected plant material was initially rinsed with water to remove soil and other contaminants. The *B. oleracea* collected part was kept shade dried for two weeks at room temperature. By the help of a grinder the part of *B. oleracea* was powdered to get coarse powder and stored in an airtight container for further study.

### Preparation of Extract:

The powdered plant of *B. oleracea* (40 g) was successively extracted with water in a Soxhlet extractor at elevated temperature (30 to 50 °C). The extract was double filtered by using muslin cloth and Whatman no.1 filter paper and concentrated by evaporation on water bath<sup>[11,12]</sup>.

### Preliminary Phytochemical Screening:

Chemical tests for the screening and identification of bioactive chemical constituents in *B. oleracea* were carried with extracts prepared using the standard procedures for the detection of Alkaloids, Carbohydrates, Glycosides, Proteins, Saponins, etc<sup>[13-16]</sup>.

### ANTHELMINTIC ACTIVITY:

The entire plant extract of *B. Oleracia* was evaluated for anthelmintic activity in earthworms. Indian adult earthworms collected from moist soil and washed with normal saline to remove all fecal matter were used for the anthelmintic study. The earthworms of 4 to 6 cm in length and 0.3 to 0.4 cm in width were used for all experimental protocols<sup>[17,18]</sup>.

Indian earthworm is used due to its physiological and anatomical resemblance with the intestinal roundworm parasite of human beings, Because of easy availability of earthworms; they have been used widely for the initial evaluation of the anthelmintic compounds<sup>[19-20]</sup>. The worms were acclimatized to the laboratory condition before experimentation.

The earthworms were divided into five groups of six earthworms in each and placed in eight Petri dishes containing the extract solutions<sup>[21-23]</sup>. Group I- Normal saline solution which served as the control, Group II - Standard (Albendazole 10 mg/ml), Group III - Aqueous extract of *B. oleracea* 100 mg/10 ml, Group IV - Aqueous extract of *B. oleracea* 200 mg/10 ml, and Group V- Aqueous extract of *B. oleracea* 300mg/10 ml.

**Table 1. Phytochemical screening of *Brassica Oleracia* extracts.**

Sl. No.	Phytochemical Tests	Results
1	Alkaloids	+
2	Flavonoids	+
3	Carbohydrates	+
4	Glycosides	+
5	Saponin	+
6	Proteins	-
7	Steroids	-
8	Phenols	-

(+) indicates the presence of compounds, (-) indicates the absence of compounds.

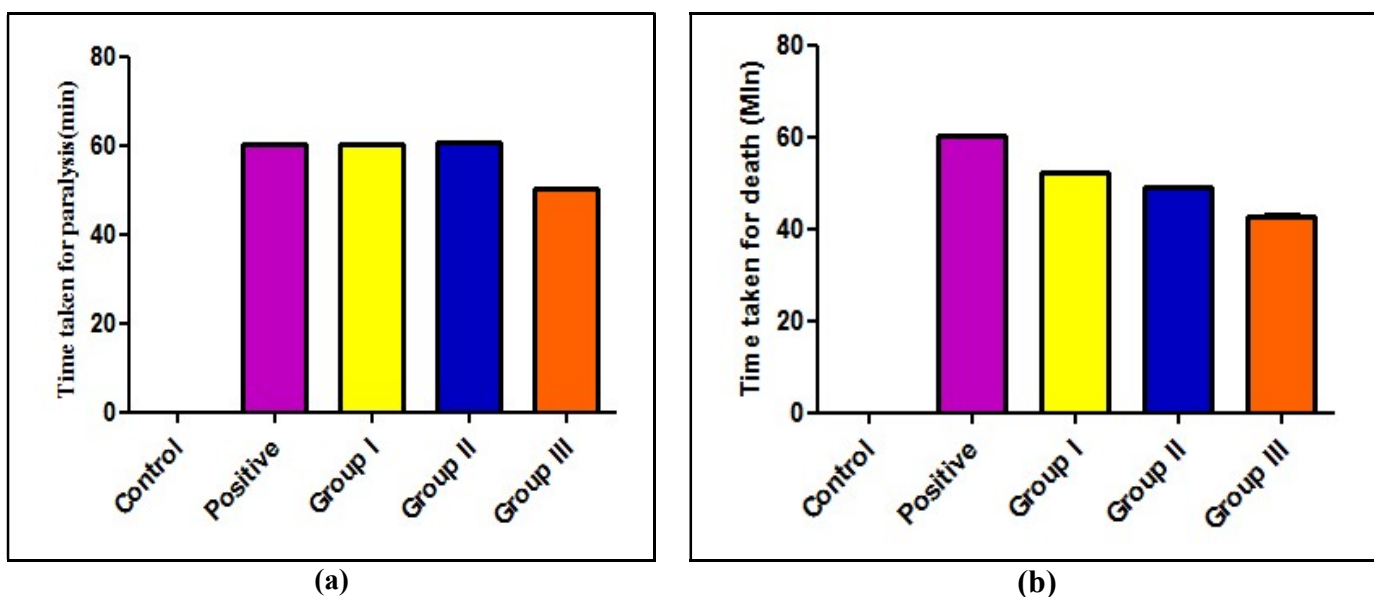
**Table 2. Effect of aqueous extract of *B. Oleracea* on Indian earthworm.**

Groups	Treatment	Conc. (mg/ml)	Time taken for paralysis (min) (X±SEM)	Time taken for death (min) (X±SEM)
Control	Saline Water	-	No Paralysis	No Death
Positive	Albendazole	10	60.12 ± 0.003	60.37 ± 0.003
Group I	Aqueous extract of <i>B. oleracea</i>	100	52.20 ± 0.03	60.40 ± 0.005
Group II		200	49.18 ± 0.03	60.51 ± 0.003
Group III		300	42.73 ± 0.23	50.28 ± 0.004

Each value is expressed as mean ± standard error of mean (n = 6).



**Fig 1. Effect of aqueous extract of *B. oleracea* on anthelmintic activity on earthworm.**



**Fig 2. The anthelmintic (Paralysis and Death time) activity of aqueous extract of *B. Oleracea*.**

The values are represent mean ± SEM; n=6; Analysis was performed using one way ANOVA Followed by Tukey’s multiple comparison tests. A p value less than 0.05 was considering as statistically significant. p value: a<0.05, b< 0.01, c< 0.001 when compared with control. p< 0.05, q<0.01, r<0.001 when compared with positive group. x< 0.05, y< 0.01, z< 0.001 when compared with standard group.

The time it took for total paralysis and death to occur was measured in min. Each earthworm was applied superficial inducements to assess its movement and to determine if it were alive.

**RESULTS AND DISCUSSION:**

**Preliminary Phytochemical Analysis:**

From the phytochemical studies, it has evaluated in all extracts remarkable presence of Flavonoids,

Carbohydrates, Glycosides, and Alkaloids. Other metabolites and bioactive compounds were identified such as Saponosides. They are present in methanolic extracts. Proteins, hydrolysable tannin, and Phenols are absent in the extracts (Table 1).

#### Anthelmintic activity:

The aqueous extract of *B. Oleracea* at 100, 200, and 300 mg/ml was given, which shows significant activity on earthworm. It was seen that when control group was compare with that of positive treatment and extract groups, both positive and extract groups showed highly significant anthelmintic activity. The anthelmintic activity shown by Positive group was well compared with group 100 and 200 mg/ml group of extract group, it showed significant ( $p < 0.001$ ) that is paralytic condition and death.

As dose of the aqueous extract of *B. Oleracea* was increased, there was decrease in paralysis and death time. Though the dose of the aqueous extract of *B. oleracea* was more than the dose of the standard drug, the aqueous extract of *B. oleracea* showed greater anthelmintic activity than the standard drug albendazole. When control was compared with standard and 100, 200, and 300 mg/ml of extract groups, it plant extract showed significant ( $p < 0.001$ ) that is paralytic condition and death. When positive group was compared with group 100 and 200 mg/ml group of extract group it showed significant ( $p < 0.001$ ) that is paralytic condition and death.

#### CONCLUSION:

Phytochemical analysis of the extracted revealed presence of phytoconstituents such as alkaloid, flavonoids, carbohydrates, glycoside, and protein. The present data indicate that *B. oleracea* is to be a safe anthelmintic effect and could be used as a part of therapy to treat parasitic infections of humans. Based on the findings of the present study it is concluded that, the *B. Oleracea* to have confirm their anthelmintic activity. We can conclude that *B. oleracea* exhibited most significant anthelmintic activity among the other Group. During study this plant showed very significant anthelmintic activity at a dose of 100 mg/ml measured by time taken for paralyse/ death of the earth worms.

Therefore, further study must be carried out so that the general people can get actual benefit from this important medicinal plant.

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