



## Anthelmintic activity of *Hibiscus rosa sinensis* (Malvaceae) leaves

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### ABSTRACT

*Hibiscus rosa sinensis* belonging to family Malvaceae is a glabrous shrub commonly known as the Chinese hibiscus, China rose and shoe flower. Present study is carried out to investigate and prove ethnomedicinal value of the plant. Authenticated leaves were taken for the study includes extraction of leaves using different solvents and evaluation of Anthelmintic activity. Coarse dried leaves of the plant were extracted successively by soxhlet using petroleum ether, ethanol, methanol, ethyl acetate and distilled water as a solvent according to their increasing polarity. Extract were tested for Anthelmintic activity using *Pheretima posthuma* as a species of earth worm and compare the paralysis time and death time with standard drug Albendazole. Ethanolic and Aqueous extract shows comparable Anthelmintic activity with standard drug Albendazole. Ethanolic and aqueous extract were tested by different chemical tests. It showed the presence of tannins, flavonoids compounds. These phytoconstituents may responsible for the said activity.

**Keywords:** *Hibiscus rosa sinensis*, Anthelmintic, Ethanolic extract, Aqueous extract.

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### INTRODUCTION

Helminthes infections are the most common infections in man which affects the large proportions of the world's population. In the treatment of parasitic diseases, the anthelmintic drugs are used in discriminately. Recently the use of anthelmintic produces toxicity in human beings. Hence the improvement and invention of new substances acting as anthelmintic are being derived through plants which are considered to be the best source of bioactive substances<sup>1</sup>. Anthelmintic are the drugs which are used to expel out the worms that are parasitic in nature by either stunning them or by killing them. They are also called as vermicides or vermifuges.

Natural anthelmintic drug includes: Tobacco, Walnut, Wormwood, Clove, Kalonji seeds, Garlic, Male fern, Pineapple, Diatomaceous earth, Soya and other legumes. Honey, water and vinegar are mixed with warm water act as vermifuges.

In other words, anthelmintic drugs that are used for the treatment of infections caused by the worms, flukes, nematodes, round worms, tapeworms etc. Anthelmintic drugs are the tropical and veterinary types of medicines which are of huge importance. Parasitic worms also infect the livestock and crops thus affecting the food production with a resultant economic impact.

*Hibiscus Rosa-Sinensis* Linn is a well known member of Malveace Family. It grows as an evergreen herbaceous plant and native to tropical, sub-tropical regions, this plant is widely cultivated as an ornamental plant. It bears large

flowers on the bushy hedges. These enormous flowers are red, white, and pink, yellow in color and are not usually fragrant<sup>3</sup>.

The detailed study of *Hibiscus rosa sinensis* have been carried out worldwide which showed that Leaves are used as emollient, anodyne and laxative and aperients; juice beneficial in gonorrhoea, alopecia and also used for blacking of hair in Ayurveda. In South Asian traditional medicine, various parts of the plant is used in the preparation of a variety of foods<sup>4,5</sup>. Leaves show the Antifungal<sup>6</sup>, Anti-inflammatory<sup>7</sup>, Antipyretic<sup>7</sup>, Antibacterial<sup>8</sup> and antioxidant activity<sup>9</sup>.

There is no systemic or scientific study on anthelmintic activity in spite of its traditional use. So the present study was focused to estimate the anthelmintic activity of various extract of *Hibiscus rosa-sinensis* Linn Leaves.

## EXPERIMENTAL SECTION

### Plant material:

The leaves of *Hibiscus rosa sinensis* were collected from University campus of S.R.T.M. University, Nanded, Maharashtra. The plant was authenticated by Department of Botany, Science College Nanded (M.S.) and voucher specimen (S-1) was submitted for future reference.

### Preparation of extracts:

The leaves of *Hibiscus rosa-sinensis* were collected from University campus of S.R.T.M. University, Nanded (Maharashtra) and dried in shade and coarsely powdered. It was then passed through the sieve no. 40. A weighted quantity (75g) of the powder drug was extracted with petroleum ether (60-80<sup>0</sup> C) using soxhlet extractor. Defatted drug was subjected for successive extraction of Ethanolic, Methanolic, Ethyl acetate and Aqueous extraction and extracts were dried by distilling off the solvent and then dried in desiccators. The marc collected after extraction was subjected to further activity.

### Animal:

Adult Indian earth worms (*Pheretima posthuma*) were collected from the rural area of soils, Kalamnuri, Hingoli, Maharashtra and washed with normal saline to remove all fecal matter were used for the anthelmintic activity. The earth worms of 4-5 cm in length and 0.1-0.2 cm in width were used for the experimental protocol due to their anatomical and physiological resemblance with the intestinal roundworms parasites of human beings.

### Drugs and chemicals:

Albendazole was used as standard drugs. Ethanol, Tween 80 and sodium chloride were used in various part of experiment.

### Phytochemical screening:

The preliminary phytochemical screening was carried out for the ethanol and aqueous extracts of *Hibiscus rosa sinensis* leaves to find out the presence of various phytochemical constituents. The result of preliminary phytochemical screening was showed the presence of flavonoids, glycosides, tannins, alkaloids, sterols and mucilage. Data is shown in table 1.

**Table 1: Estimation of various chemical constituents**

Sr.no	Chemical constituents	Pet. Ether extract	Ethanolic extract	Aqueous extract
1	Alkaloids	-	+	+
2	Sterols	+	-	-
3	Proteins	-	-	-
4	Tannins	-	+	+
5	Amino acid	-	-	-
6	Glycosides	-	+	+
7	Mucilage	-	+	+
8	Flavonoids	-	+	+
9	Reducing sugar	-	+	+
10	Saponins	-	-	+

**In-Vitro anthelmintic activity:**

The In-vitro anthelmintic activity was evaluated on adult Indian earth worms (*Pheretima posthuma*). Worms were divided in the three groups of six worms in each group, to evaluate the anthelmintic activity of aqueous and ethanolic extract of *Hibiscus rosa-sinensis* Linn leaf.

The earthworms were divided into the respective groups containing six earth worms in each group. All the extracts were dissolved in minimum quantity of 2% tween 80 and the volume was adjusted to 10 ml with normal saline for making the concentration of 5, 10 and 20 mg/ml. All the extracts and the standard drug solution were freshly prepared before commencement of the experiments. All the earthworms washed in normal saline solution before they were released in to 10 ml of respective formulation as follows, vehicle (2% v/v tween 80 in normal saline), Albendazole (20 mg/ml) and Ethanol and aqueous extracts (5, 10 and 20 mg/ml). The anthelmintic activity was determined in six observations. Six worms about the same size per Petri dish were used. The time taken for complete paralysis and death were recorded. The mean paralysis time and standard error of mean were calculated for each sample given in table. The time taken for worms to become motionless was noted as paralysis time and to ascertain death, each worm was frequently applied with outer stimuli which stimulates and induce movement in the earthworms, if alive.

**Table 2: Observation table**

Plant extract	Paralysis time			Death time		
	5mg/ml	10mg/ml	20mg/ml	5mg/ml	10mg/ml	20mg/ml
Ethanol extract	25.043±0.3023	15.847±0.2021	12.922±0.3156	31.212±0.6808	22.487±0.2057	15.623±0.1780
Aqueous extract	36.238±0.4494	27.59±0.3026	12.410±0.2059	48.71±0.3219	42.64±0.3280	39.74±0.3967
Standard (Albendazole)	-	-	29.321±0.693	-	-	38.415±1.524
Control	Absent	Absent	Absent	Absent	Absent	Absent

Results are expressed as Mean ± SEM, n=6 in each group  
A=absent of activity

**RESULTS**

The qualitative screening of *Hibiscus rosa sinensis* leaf extracts contains flavonoids, glycosides, alkaloids, tannins, sterols and mucilage. In this study both the extracts (Aqueous and Ethanolic) of *Hibiscus rosa sinensis* produce paralysis as well as death of the worms.

All the investigated extracts shows Anthelmintic activity at minimal dose of 20 mg/ml of ethanol and aqueous extract compared to standard drugs like Albendazole. While increasing the concentration (20 mg/ml) there is reduction in the paralysis time and death time as well. Ethanol extract shows significant activity than the standard drug.

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