

PHYTOCHEMICAL AND *IN-VITRO* ANTHELMINTIC ACTIVITY OF HYDRO ALCOHOLIC EXTRACT OF *BOUGAINVILLEA GLABRA*

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ABSTRACT

Bougainvillea glabra, a flowering plant generally used as ornamental plant and seen mostly in areas with warm climate. Apart from its use as ornamental plant, the leaf of *B. glabra* is reported to have various medicinal values. This current study deals with preliminary phytochemical evaluation and determination of anthelmintic activity of hydro alcoholic leaf extract of *Bougainvillea glabra*. The study includes preparation of extract by solvent extraction method with soxhlet apparatus using hydro alcohol and petroleum ether as solvents. Then both extracts are evaporated separately at ambient temperature to concentrate it. Preliminary qualitative chemical test done for both extracts show the presence of alkaloids, glycosides, carbohydrates, anthraquinone, flavanoids, terpenoids, saponins, steroids, proteins, fixed oils, fats and tannins. The *in-vitro* anthelmintic activity of extracts performed with the Indian earth worm shows better results when compared with Metronidazole as the standard drug.

Keywords: Anthelmintic, Soxhlet, Hydro alcoholic extraction.

INTRODUCTION

In recent years traditional medicines has gained a lot of importance in the daily life and also in the field of pharmaceutical industries. Medicinal plants which are a part of earth's biodiversity have been in use from ancient time and are still utilized by the mankind. Now-a-days the most important industrial medicines are also based on these plants of which constitutes about more than 90 species. The research for medicinal plants discovered various common plants having distinguishable medicinal properties, among which one is *Bougainvillea glabra*.

Bougainvillea spp., named after Louis Antione de Bougainville¹ (1729–1811) who discovered it and *Bougainvillea glabra* is an ornamental flowering plant from the genus of *Bougainvillea*; family Nyctaginaceae² and a native to Brazil. The genus *Bougainvillea* has 18 species, of which *B. spectabilis*, *B. glabra* and *B. Peruvian*³ are horticulturally important. *Bougainvillea glabra* is a woody climber with thorny thin stems and long branches; also it has papery bracts and smooth leaves, which grows to more than 10 meters of height⁴. The studies on *Bougainvillea glabra* revealed its medicinal properties like antidiabetic^{2,5,6,7}, antifertility⁸, antioxidant, antibacterial^{3,4,9}, antiulcer, antidiarrheal¹⁰, antifungal¹⁰, anti-inflammatory⁶ and antiviral activities¹¹. It has been reported that in some areas, *B. spectabilis* as herbal combination is used to treat diabetes and also to control leishmaniasis by shortening the life span of sand flies¹⁰.

The commercially available drugs for helminth infections are becoming less effective day by day due to the developing resistance of helminths against these drugs. Various reports reveal that helminth infections have been categorised under the most widespread infections in human, distressing a huge population of the world¹². In order to find a remedy for the infection recently various herbal extracts are being screened for the anthelmintic activity.

This present investigation also intends to perform the preliminary phytochemical evaluation of *B. glabra* leaf extract and to identify and prove the anthelmintic activity of hydro alcoholic extract of the leaves.

MATERIALS AND METHODS

Plant materials

Fresh leaves of *B. glabra* were collected from Trichy, Tamil Nadu, India and this was authenticated by Dr. N. Ravichandran, CARISM, SASTRA University, Thanjavur- 613 401.

Worm collection

For the anthelmintic activity study, earth worms were collected and authenticated by M/s Sri Amman Biocare, Thanjavur, Tamil Nadu, India. Two species of worms collected are *Eudrilus eugeniae* (small size) and *Eisenia foetida* (large size) and transported to lab in a well ventilated bag with sufficient nutrition content.

Drying and Milling

The fresh leaves were shade dried for 2 weeks at room temperature and ground to coarse powder using a mixer.

Preparation of extract

The coarse powder leaves (45 g) was treated with petroleum ether (40-60^o C) for the removal of fats and unwanted compounds using soxhlet apparatus for 24 hrs. The treated powder was then dried and retreated with hydro alcoholic solution (25:75) using same soxhlet extraction process for 24 hrs. The extract was further evaporated using water bath at ambient conditions to get hydro alcoholic crude extract devoid of solvents.

Phytochemical evaluation

Phytochemical analysis of various secondary phytoconstituents was carried out with petroleum ether and hydroalcoholic extract using standard chemical test protocols¹³ and tabulated.

Anthelmintic activity

The anthelmintic activity study was performed by estimating the survival time of the earth worms when treated with the extracts¹⁴. This study was conducted by exposing the worms of two different species to different concentrations of hydro alcoholic extract of the leaves. All the worms were washed in normal saline solution and their length measured before exposing to the extracts. Worms of approximately equal sizes were taken in petri plates (3 worms / plate) and various concentrations of hydro alcoholic extracts were added. Metronidazole (10mg/ml) was used as the positive control and distilled water as the negative control for the study. Time taken for paralysis and death were observed for each individual worm in each plate. For all the above samples, the experiments were performed in triplet and the data tabulated.

RESULTS AND DISCUSSION

Phytochemical evaluation

Results of Phytochemical evaluation for the presence of secondary phytoconstituents are shown in table 1.

Table 1: Qualitative Phytochemical Evaluation of *B. glabra*

S. No.	Tests	Pet. ether extract	Hydro alcoholic extract
1.	Alkaloid	-	+
2.	Anthraquinones	-	+
3.	Flavanoids	-	+
4.	Glycosides	-	+
5.	Proteins	-	+
6.	Reducing sugar	-	+
7.	Saponin	-	+
8.	Starch	-	+
9.	Steroids	+	+
10.	Tanins	-	+

The phytochemical evaluation showed the presence of Alkaloids, Flavanoids, Reducing sugars, Starch, Saponins, Steroids, Glycosides, Anthraquinone, Flavanoids, Proteins and tannins in the hydro alcoholic extract of the leaves.³

Anthelmintic activity

From the results of the Anthelmintic activity of the hydroalcoholic extract it was found that the time taken for paralysis of *Eudrilus eugeniae* was 1.5 min - 0.5 min and time taken for death was 8 min - 4 min while the time taken for paralysis of *Eisenia foetida* was 4.35 min - 3.15 min and time taken for death 26 min - 8.30 min for the different concentrations (200 mg, 400 mg and 600 mg) of extracts.

The paralysis time and death time of *Eisenia foetida* was more compared to *Eudrilus eugeniae*, which may be due to the differences in size and body surface area. *Eudrilus eugeniae* was in the size range of 4 - 6 cm and diameter of 3 mm and *Eisenia foetida* was 13 - 15 cm size range and 5 mm diameter. When the anthelmintic activity was compared to the standard drug Metronidazole (10mg/ml) for which, the time taken for paralysis was 8 min and for causing death was 30 min for *Eudrilus eugeniae* and 26.70 min for paralysis and 2 hrs for the death in the case of *Eisenia foetida*.

Based on the above results it can be reported that the activity of hydro alcoholic crude extract of *Bougainvillea glabra* is greater when compared to the commercially available standard drug The results of the study are shown in Table 2, Fig 1 and Fig 2.

Table 2: Comparative Anthelmintic activity of *B. glabra* in two different species

S. No.	Groups	Dose	<i>Eudrilus eugeniae</i>		<i>Eisenia foetida</i>	
			Time for paralysis (min)	Time for death (min)	Time for paralysis (min)	Time for death (min)
1.	Control (Metronidazole)	10mg/ml	8	30	26.70	2hrs
2.	Negative control (Distilled water)	-	-	-	-	-
3.	Hydroalcoholic extract	200mg	1.25	8	4.35	26
		400mg	1.0	6	4.00	13.75
		600mg	0.5	4	3.15	8.30



Fig. 1: It shows Anthelmintic activity of the Extract in *Eisenia foetida*



Fig. 2: It shows Anthelmintic activity of the Extract in *Eudrilus eugeniae*

CONCLUSION

The *in vitro* studies carried out using hydro alcoholic extract of *Bougainvillea glabra* revealed a perfect anthelmintic activity on *Eudrilus eugeniae* and *Eisenia foetida*. The results of this study provide an evidence to conclude that the hydro alcoholic extract of *Bougainvillea glabra* can be used for the effective treatment of helminthiasis.

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