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## Anthelmintic activity of leaves extract of *Barleria gibsoni* Dalz. against *Pheretima posthuma*

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### Abstract

We evaluated anthelmintic activity of aqueous and ethanolic extracts of leaves of *Barleria gibsoni* Dalz. (Acanthaceae) and experiment was carried out against Indian adult worm *Pheretima posthuma*. Various concentrations (5-15mg/ml) aqueous and ethanolic extracts were evaluated in the bioassay involving determination of time of paralysis (P) and time of death (D) of the worms. Albendazole (Std.) was used as standard anthelmintic drug and distilled water was used as control. The results of present study indicated that the ethanolic and aqueous extracts significantly exhibited paralysis ( $P < 0.01$ ) in worms in lower doses (5, 10 and 15 mg/ml) and also caused death of worms especially at higher concentration of 15mg/ml, as compared to standard drug. Further studies are in process to isolate the active principles responsible for the anthelmintic activity.

**Keywords:** Leaves extract of *Barleria gibsoni* Dalz., *Pheretima posthuma*, Albendazole, Anthelmintic activity.

### 1. Introduction

Helminths are parasitic worms. They are the most common infectious agents of humans in developing countries and produce a global burden of disease that exceeds better-known conditions, including malaria and tuberculosis [1]. Helminthes infection causes chronic illness in human beings and cattle. Majority of cattle suffers from worm infections. Most of the Anthelmintics are used to expel parasitic worms (helminthes) from the body, by either stunning or killing [2]. But, chemotherapeutic practice, parasites developed to resistance against Anthelmintics [3]. Furthermore, it has been reported that anthelmintic substances having significant toxicity to human beings and are present in foods derived from livestock, posing a serious threat to human health [4]. A number of medicinal plants have been used to treat parasitic infections in man and animals. [5-6]

*Barleria gibsoni* Dalz. (Acanthaceae) is widely distributed throughout Africa, India, Sri Lanka and tropical Asia. It is commonly known as Neel koranti, the juice of the leaf is used in cataract and fever. The dried bark is used in cough treatment and the leaves chewed to relieve toothache. The paste of the root is applied to disperse boils and glandular swellings [7]. It exhibits several medicinal properties. Juice of the leaves is used in ulcer and fever. Paste of the roots is applied to disperse boils and glandular swellings. Leaves are also used by some tribal communities for the treatment of piles and to control irritation. Plant is also used in stiffness of limbs, enlargement of scrotum and sciatica [8-11].

### 2. Materials and Methods

#### Plant Collection and authentication

The fresh leaves of the *B. gibsoni* were collected during the month of May-June when flowering, from Satara region, Maharashtra, India. The plant authenticated by Botanical survey of India, Pune, Maharashtra, India. A voucher specimen (BSI/WRC/Tech/2013/FAT 01 dated 27<sup>th</sup> December, 2013) has been deposited at the herbarium of same place for further reference.

#### Preparation of extraction

The collected fresh matured leaves of *Barleria gibsoni* were washed with tap water, air-dried at room temperature for 2-3 weeks at 35-40 °C and then reduced to coarse powder. A 100 gm powdered leaves was obtained after defatted with petroleum ether and successively extracted with ethanol using Soxhlet apparatus finally 12.0 g of extracts were obtained. Aqueous extract was obtained by maceration method. Leaves powder soaked in water with stirring for week then filter and evaporate to concentrate the aqueous extract.

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### Worms Collection

Indian earthworms *Pheretima posthuma* (Annelida) were collected from the water logged areas of soil.

### Preparation of test sample

Samples for in-vitro study were prepared by dissolving and suspending 2.5 g of each extract (ethanolic and aqueous) in 25 ml of distilled water to obtain a stock solution of 100 mg/ml. From this stock solution, different working dilutions were prepared to get concentration range of 5, 10 and 15 mg/ml.

### Anthelmintic assay

The anthelmintic assay was carried out as per the method of Ajayieoba *et al* with minor modifications. The assay was performed on adult Indian earthworm *Pheretima posthuma*, due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings [12]. *Pheretima posthuma* worms are easily available and used as a suitable model for screening of anthelmintic drug [13]. The 50 ml formulations containing four different concentrations of each ethanolic and aqueous extract (5, 10 and 15 mg/ml in distilled water) were prepared and six worms (same type) were placed in it. 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 50 °C. Albendazole (5-15 mg/ml) was used as reference standard while distilled water as the control.

### 3. Results and Discussion

From this Table 1, it is indicate that anthelmintic activity ethanol and aqueous extract of *Barleria gibsoni* leaves was shown more significant paralysis and death as compared to standard drug albendazole at different concentration 5,10,15 mg/ml, The ethanol extract at concentration 15 mg /ml showed 69 min for paralysis and 78 min for death and standard drug 99 min for paralysis and 119 min for death. The aqueous extract showed less activity as compared to ethanol and standard. Albendazole by increasing chloride ion conductance of worm muscle membrane produced hyperpolarization and reduced excitability that led to muscle relaxation and flaccid paralysis [14]. The leaves extracts of *Barleria gibsoni* not only demonstrated paralysis, but also caused death of worms especially at higher concentration of 15 mg/ml, in shorter time as compared to standard drug Albendazole. Phytochemical analysis of the crude extract revealed the presence of poly phenolic compounds among other chemical constituents contained within them.

**Table 1:** Anthelmintic activity ethanol and aqueous extract of leaves of *Barleria gibsoni*

| Extracts                  | Concentrations mg/ml | <i>Pheretima posthuma</i> (Earthworm)     |                                       |
|---------------------------|----------------------|---|---------------------------------------|
|                           |                      | Time for paralysis(P) in min. (Mean &SEM) | Time for death (D)in min. (Mean &SEM) |
| Std. Albendazole          | 5                    | 135 ±0.022                                | 180 ±0.026                            |
|                           | 10                   | 124 ±0.022                                | 169 ±0.028                            |
|                           | 15                   | 99 ±0.015                                 | 119 ±0.020                            |
| Ethanol extract of leaves | 5                    | 88 ±0.015                                 | 102 ±0.011                            |
|                           | 10                   | 74 ±0.021                                 | 95 ±0.022                             |
|                           | 15                   | 69 ±0.024                                 | 78 ±0.025                             |
| Aqueous extract of leaves | 5                    | 99 ±0.023                                 | 135 ±0.018                            |
|                           | 10                   | 95 ±0.020                                 | 129 ±0.016                            |
|                           | 15                   | 91 ±0.022                                 | 117 ±0.024                            |

Values are mean ± S.E.M. from six observations. P: Time for Paralysis (min), D: Time for Death of worms (min)The data were verified as statistically significant by using two way ANOVA at 1% level of significance (P-value<0.01)

### 4. Conclusion

The study has shown that ethanolic and aqueous extracts of leaves of *Barleria gibsoni* have significantly determined anthelmintic activity. Mostly ethanolic extracts of *Barleria gibsoni* shown most significant anthelmintic activity as compare to the aqueous extracts. Further studies are in process to identify the possible Phytoconstituents responsible for anthelmintic activity.

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