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Evaluation of anthelmintic activity of aqueous leaf extract of *Delonix regia*

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Abstract

Delonix regia is a flowering plant (Family: Fabaceae) and occurs locally in Madagascar. Anthelmintics rely on various herbal plant as an alternative as they have good disease preventive property and high drug value. The present study was aimed to evaluate the potential anthelmintic effect of crude fresh juice leaves of *Delonix regia* by using adult earthworms (*Pheretima posthuma*). Three concentrations (25, 50, 100 mg/ml) of *Delonix regia* leaf juice were studied. The examination was conducted to see the paralysis and death of earthworms. Alben Ds tablet Standard reference and normal saline were considered as control. Research results reveal *Delonix regia* leaves fresh juice showed significant paralysis and death of worms especially at high concentration 100mg/ml, (73 ± 10 paralyist and 120 ± 13 death) compared to the control.

Keywords: *Delonix regia*, anthelmintic, earthworm, *Pheretima posthuma*, paralysis, Alben Ds

Introduction

Intestinal parasites or worms are known as helminths. They are soil-borne and infect the gastrointestinal tract. There are other categories of parasitic worms too; some are called schistosomes that live in blood vessels and some others that look like leeches [1]. Helminthiasis is a disease that affects more or less every animal worldwide. The disease is particularly difficult to control. For effective control of helminths the developing countries takes numerous precautionary measures such as the use of anthelmintic drugs, pest management by control of stock and also a variety of vaccination programmes [2]. Anthelmintics are drugs that are used to treat animal infections caused by parasitic worms. The human body harbors a variety of parasites that are of great importance to tropical as well as veterinary medicine. Examples of such includes flatworms, flukes (Trematodes), tapeworms (Cestodes) and roundworms (Nematodes) [3].

Traditionally, *Delonix regia* plant is antifeedant which inhibits the growth of malarial parasites in humans [4]. *Delonix regia* is called flamboyant or royal poinciana. It occurs in various tropical areas and is endemic to Madagascar as well as becoming deciduous in winter, but otherwise evergreen. Gulmohar is an ephemeral tree. It is a large tree with fern-like leaves additionally stated as Gulmohar shikha [5]. Various chemical constituents are derived from the leaves and flowers of *Delonix regia* such as terpenoids, flavanoids and these are divided into different classes such as phenolics, phyto sterols reported in glycosides [6].

Fresh leaves of *Delonix regia* have not yet been investigated for their anthelmintic activity. So the present study was an aim to investigate the anthelmintic activity of fresh juice of *Delonix regia* leaves for the treatment of helminthiasis.

Materials and Methods

Collection and Identification of plants

Delonix regia leaves were collected from Chandrima Garden, Dhaka, Bangladesh and identified at Bangladesh National Herbarium, Mirpur, Dhaka where the accession no: DACB-87253 has been deposited. Fresh leaves were carefully collected. All kinds of dust, dirt, pollen and unwanted materials were carefully separated.

Chemicals and drugs

All chemicals and drugs were obtained commercially and were of analytical grade.

Alben Ds tablet was collected from Eskayef Pharmaceuticals Ltd., Bangladesh. Sakoride (normal saline) were purchased from local pharmacy and one syringe of 10ml was also purchased.

Preparation of Fresh juice extract

The collected fresh leaves were first blended in a blender machine. The blended leaves were divided into three groups and taken as 1st, 2nd, 3rd group respectively (100, 50 and 25 mg/ml) and the juice was prepared with 50 ml normal saline in each group.

Collection of worm

Humans have intestinal roundworm parasites that resemble earthworms (*Pheretima posthuma*). Earthworms have been used for initial evaluation of anthelmintics as it is readily available. Earthworms are found in moist soil in various areas. It was collected from an adult earthworm (*Pheretima posthuma*) from wet soil in Tungi area of Gazipur district. Each earthworm was 3-5 cm in length and 0.1-0.2 cm in width and were used for all experimental protocols and to eliminate all faecal matters normal saline water was used.

Experimental

Anthelmintic tests were performed according to the method of Dash *et al.*, 2017 [7]. To ensure anthelmintic activity, evaluation was done using adult Bangladeshi earthworms (*Pheretima posthuma*) which is anatomically similar to human intestinal parasite. All drugs and extracts were freshly

prepared before starting the experiment. In this experiment, five cleaned beakers were taken (500 ml, 250 ml, 200 ml, 100 ml, 100 ml) respectively. Fresh leaf juice in three beakers, solution of alben Ds Tablet mixed with normal saline in one beaker and normal saline in one beaker were taken. Six earthworms were taken in each case. The collected earthworms were released in a mixed solution of *Delonix regia* fresh leaf extract, Alben DS 400 mg tablets and 50 ml (normal saline). Alben Ds (10 mg/ml) tablet was taken as standard. Paralysis and death of worms are observed as worms cannot move in saline solution after paralysis. The time of paralysis and death of worms is carefully noted and well observed until all the worms stop moving.

Result and Discussion

The exact mechanisms of some flavonoids and other secondary metabolites having anthelmintic activities are not clearly established [8]. According to literature review the following chemical constituents were found in the extract-carbohydrates, tannins, alkaloids, saponins, flavanoids, steroids and cardiac glycosides [9]. The anthelmintic activity of aqueous leaf extract of *Delonix regia* has been demonstrated in a dose dependent manner which gives the shortest duration of paralysis and death at 100 mg/ml concentration. The activity of *Delonix regia* leaf aqueous extract was compared with the controls. Control worms were alive up to 24 hours after observation while the extracts showed significantly higher duration of paralysis and death.

Table 1: Anthelmintic activity of aqueous leaf extract of *Delonix regia*

Animal Group	Concentration	No. of worms	Time taken for paralyist [min]	Time taken for death [Min]
Control	50 ml	6	---	---
Standard	10 mg/ml	6	115±16	225±17
Group-I	25 mg/ml	6	239±19	---
Group-II	50 mg/ml	6	120±11	132±15
Group-III	100 mg/ml	6	73±10	120±13

All values represent Mean±SD; n=6 in each group, Standard: Alben Ds

Conclusion

This test can be done in a dose dependent manner. *Delonix regia* fresh leaf juice study in this experiment shows profound anthelmintic activity. This study strongly supports the traditional use of leaves of *Delonix regia* as anthelmintic. But this study is preliminary and it would be interesting to take it further.

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