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Research Article

IN VITRO ANTHELMINTIC ACTIVITY OF *ABUTILON INDICUM* (L.) SWEET AND *ABELMOSCHUS MANIHOT* (L.) MEDIK

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ABSTRACT

The present study was designed to evaluate the anthelmintic potential of extracts of various parts of plant, *Abutilon indicum* (L.) Sweet (*A. indicum*) and *Abelmoschus manihot* (L.) Medik (*A. manihot*) are important medicinal plants in Indian traditional system of medicine. Methanol extract from the leaves, stems and roots of *A. indicum* and *A. manihot* were investigated for their anthelmintic activity against the earthworms, *Pheritima posthuma*. Each extract was studied in the bioassay at 20 mg/ml, which involved determination of time of paralysis and time of death of the worms. Both the extracts of both plants exhibited considerable anthelmintic activities, and the order of sensitivity of the extracts to the worms was stems > roots > leaves for the *A. indicum* and stems > roots > leaves for the *A. manihot*. The methanol extracts of stems of both *A. indicum* and *A. manihot* were found to be most active. Albendazole (20 mg/ml) and distilled water were included in the assay as a standard reference drug and control respectively. Present study of evaluation of anthelmintic potential of plants, *A. indicum* and *A. manihot* were found that methanolic extracts of both plants showed more prominent activity. These findings will be useful toward the better acceptability of these medicinal plants in therapeutics.

KEYWORDS: *Abutilon indicum* (L.) Sweet, *Abelmoschus manihot* (L.) Medik, *Pheritima posthuma*, *In vitro* anthelmintic activity

INTRODUCTION

The plant *Abutilon indicum* (L.) Sweet (*A. indicum*) belongs to family “*Malvaceae*” commonly known as ‘Pethari’ is used to treat various diseases. Although the stem bark are also have been possess medicinal properties, and are used for treating strangury and urinary complaints. The bark used as a anthelmintic, febrifuge, alexeteric and diuretic. [1].

Leaves of this plant shows anti-diarrhoeal activity and roots of this plant are reported for analgesic activity [2, 3]. The aerial part of the plant reported for the presence of mosquito larvicidal compound [4]. The plant *Abelmoschus manihot* (L.) Medik (*A. manihot*) (Syn: *Hibiscus manihot* L.) is an undershrub of the “*Malvaceae*” family commonly known as ‘Jangali bhenbi’ has been a great medicinal value [5]. Total flavones of *A. manihot* flowers showed protective effect against poststroke depression injury and cerebral ischemic reperfusion injury [6, 7]. It also reported for neuroprotective and antiviral activity [8, 9]. The leaves of the plant, *A. manihot* showed preventive effect on bone loss in the ovariectomised rats [10]. The aerial part of *A.*

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manihot reported for the treatment of the dampness-heat of glomerulonephritis and diabetic nephropathy [11, 12]. The flowers of the plant showed presence of Hibifolin, the highest-content bioactive flavonoid and its four metabolites were elucidated as gossypetin 8-O-beta-D-4"-deoxy-Delta(4")-glucopyranoside, gossypetin, quercetin and 8-methoxy-quercetin respectively [13]. After oral administration of the total flavonoids from *A. manihot* determine presence of flavonols, isoquercitrin, hibifolin, myricetin, quercetin-3'-O-d-glucoside and quercetin in rat plasma and urine [14]. Flowers reported for the presence of myricetin, cannabiscitrin, myricetin-3-O-beta-D-glucopyranoside, glycerolmonopalmitate, 2, 4-dihydroxy benzoic acid, guanosine, adenosine, maleic acid, heptatriacontanoic acid, 1-triacontanol, tetracosane, beta-sitosterol, beta-sitosterol-3-O-beta-D-glucoside [15].

Although a long traditional uses of *A. indicum* and *A. manihot* in the treatment of various diseases, no one reported for anthelmintic potential of these plants. Therefore present investigation was planned to evaluate the anthelmintic potential of extracts of various parts of plant, *A. indicum* and *A. manihot*.

MATERIALS AND METHODS

Plant materials

The stems, leaves and roots of the plant, *A. indicum* and *A. manihot* were collected in Trimbakeshwar Hills, Nashik District (Maharashtra) in May 2008. The plants was authenticated and herbarium deposited in Botanical Survey of India, Pune, Maharashtra, India under voucher specimen number CDSAI3 (No.BSI/WC/Tech/2008/163) and CDSAM3 (No.BSI/WC/Tech/2008/164) respectively. The stems, leaves and roots of these plants were dried, powdered and passed through 40 mesh sieve and stored in an airtight container for further use.

Preparation of extracts

The dried powdered material of stem, leaf and root parts (500 gm, each) of *A. indicum* and *A. manihot* were separately subjected to

extraction in Soxhlet extractor by using methanol. Then the extract was filtered through muslin and the filtrate was evaporated under reduced pressure and vacuum-dried [16, 17].

Animals

Indian adult earthworms (*Pheretima posthuma*) was collected from moist soil and authenticated at Horticulture Department of the S. N. Arts, D. J. M. Commerce & B. N. S. Science College, Sangamner, Ahmednagar, Maharashtra. The earthworm of 3-5 cm in length and 0.1-0.2 cm in width was washed with normal saline to remove all the earthy and foreign matter and were used for the experimental protocol of anthelmintic activity because of due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human being [18, 19].

Drugs and chemicals

Albendazole was procured from Mankind Pharma Ltd., New Delhi. All chemicals such as methanol, dimethyl formamide (DMF) and saline water were purchased from Modern Chemicals, Nashik.

Anthelmintic activity

Methanolic extracts of stem, leaves and roots of *A. indicum* and *A. manihot* were dissolved in minimum amount of dimethyl formamide (DMF) and the volume was adjusted to 10 ml with saline water. All drugs and extract solutions were freshly prepared before starting the experiment.

In each case, six earthworms were released into 10 ml of desired formulations as follows; vehicles (5% DMF in normal saline), Albendazole (20 mg/ml), total methanolic extracts of stem, leaves and roots of *A. indicum* and *A. manihot* (20 mg/ml, each) in normal saline containing 5% DMF. Observations were made for the time taken to paralysis and death of individual worm. Paralysis was said to occur when the worms were not able to move even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colors [20].

Statistical analysis

The statistical significance was assessed using one way analysis of variance (ANOVA) followed by Dunnett's multiple comparison test. The values are expressed as mean \pm SEM and $P < 0.05$ was considered significant.

RESULTS AND DISCUSSION

In the present investigation, the methanolic extract of various parts of the plants *A. indicum* and *A. manihot* were evaluated for its anthelmintic potential. It is evident from the experimental data that, the methanolic extracts

of various parts of the plants *A. indicum* and *A. manihot* showed significant ($P < 0.01$) anthelmintic activity at 20 mg/ml when were comparable with the standard drugs, Albendazole at same concentration. It reveals that methanolic extract of stem of *A. indicum* group (IV) showed the significant paralysis at 3.28 ± 0.085 and death at 3.37 ± 0.045 and stem of *A. manihot* group (VII) showed the paralysis at 3.42 ± 0.103 and death at 3.94 ± 0.022 when compared with standard Albendazole drug group (II) showed the paralysis at 3.21 ± 0.046 and death at 3.39 ± 0.012 (Table 1).

Table: 1- In vitro anthelmintic activity of *A. indicum* and *A. manihot* at 20 mg/ml

Group	Treatment	Time taken for the paralysis (min)	Time taken for the death (min)
I	Control (in normal saline)	-	-
II	Albendazole (5% DMF)	3.21 ± 0.046	3.39 ± 0.012
III	AbuL	4.40 ± 0.157	$6.02 \pm 0.057^*$
IV	AbuS	3.28 ± 0.085	$3.37 \pm 0.045^{**}$
V	AbuR	4.03 ± 0.031	$4.78 \pm 0.049^*$
VI	AbeL	4.21 ± 0.131	$4.52 \pm 0.021^*$
VII	AbeS	3.42 ± 0.103	$3.94 \pm 0.022^{**}$
VIII	AbeR	3.98 ± 0.122	$4.26 \pm 0.026^*$

(-) no any mortality observed in control worm group (I) during 24 hr observation.

Values are expressed as mean \pm SEM, n=6.

When Group (III, IV, V, VI, VII, VIII) are compared with Group (II) * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Methanolic extracts of leaves, stems and root parts of *A. indicum* and *A. manihot* used for the study were designated as AbuL, AbuS, AbuR, AbeL, AbeS, AbeR, respectively.

The methanolic extracts of stems of plants, *A. indicum* and *A. manihot* showed least time required for paralysis as well as death of earthworm rather than the methanolic extracts of leaves and roots of both plants. Hence it observed that the stems of plant *A. indicum* and *A. manihot* having prominent significant activity as compared to leaves and roots of both medicinal plants when compared with

standard, Albendazole As shown in results, the stems of these medicinal plants required the least time for causing paralysis and death of the earthworms followed by leaves and root parts. Stems of *A. indicum* and *A. manihot* displayed intrinsic anthelmintic properties at 20 mg/ml giving a shortest time of paralysis and death of earthworm, *Pheretima posthuma* (Figure 1 & 2).

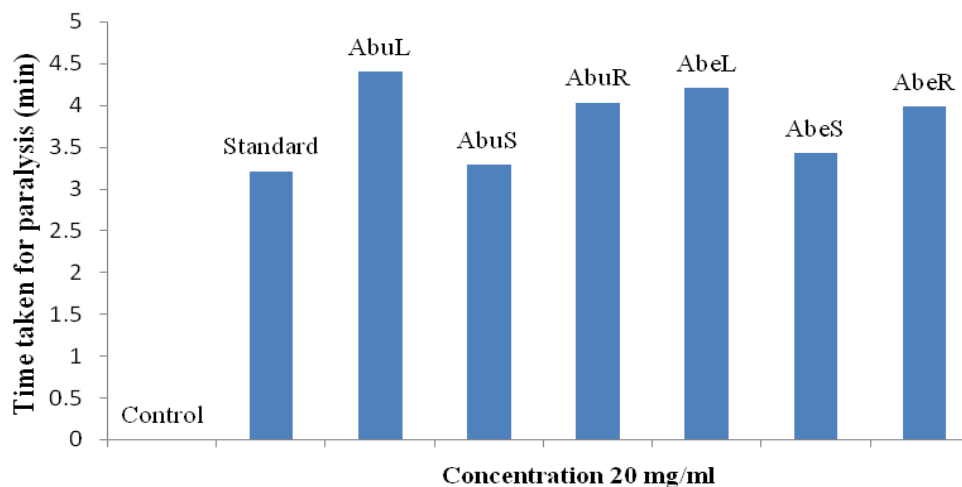


Figure: 1- Graph showing time taken for paralysis (min) (Concentration Vs Time)

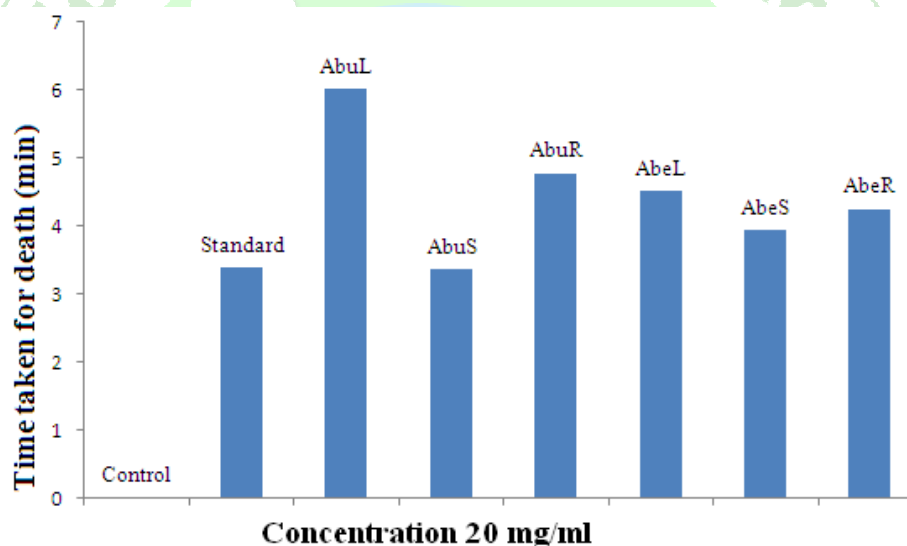


Figure: 2- Graph showing time taken for death (min) (Concentration Vs Time)

The function of the anthelmintic drugs like Albendazole is to cause paralysis of worms so that they are expelled in the faeces of man and animals. The methanolic extracts of these plants not only demonstrated this property, they also caused death of the worms, especially at 20 mg/ml as compared with Albendazole. Therefore this may conclude that the traditional medicinal plants, *A. indicum* and *A. manihot* have been scientifically confirmed to display anthelmintic potential and anticipated for acceptable in therapeutics.

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