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EVALUATION OF ANTIHELMINTHIC ACTIVITY OF *KALANCHOE PINNATA LEAVES*

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ABSTRACT: In this study, the anthelmintic activity of *Kalanchoe pinnata* leaves extract against Indian earthworm *Pheretima posthuma* was evaluated and compared with the standard drug Albendazole. This activity was concentration dependent. As the concentration increases the extract produce maximal effect. Higher concentrations of ethanolic leaf extract of *Kalanchoe pinnata* produce a paralytic effect much earlier and time taken for death was shorter. It shows maximum efficacy at 100 mg/ml concentration than the standard drug. The results indicated that the extract had significant anthelmintic activity, as demonstrated by the time of paralysis and death of worms. These findings suggest that *Kalanchoe pinnata* leaves extract could be a promising natural anthelmintic agent. Further research is recommended to isolate and identify the active principles responsible for its activity, which could lead to the development of new drugs for the treatment of worm infections. This study provides valuable information on the medicinal properties of *Kalanchoe pinnata* and highlights the potential of natural products as an alternative to conventional drugs for managing parasitic infections.

INTRODUCTION: Plants serves as a constant source of medicament for the treatment of variety diseases [1]. Nature is an important source of medicines. Medicinal plants are back bone of traditional medicine, which more than 3.3 billion people in the less developed countries utilize medicinal plants on regular basis [2]. Medicinal plants constitute main sources of pharmaceuticals and health care products and nutraceuticals [3]. Helmintic infections are large threat to human beings health in developing countries. It contributes malnutrition, anemia and pneumonia [4].

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The World Health Organization (WHO) reveals that over two people are suffering from parasitic infections due to worms [5]. It is estimated that by the year 2025, about 57% of the population in developing countries will be influenced [6]. Helminthes infections are now being recognized as cause of many acute as well as chronic ill health's among the various human beings as well as cattle's. More than half of the populations of the world suffer from infection and majority of cattle's suffering from worm infections [7].

Herbal drugs have been in use since ancient times for the treatment of parasitic disease in human and could be of value in preventing development of resistance [8]. Anthelmintics from natural source play a key role in the treatment of these parasite infections without side effects, when compared to synthetic drugs [9]. Most of the existing anthelmintics produce side effects such as

abdominal pain, loss of appetite, nausea, Vomiting, headache and diarrhea [10]. Present treatment regimens for these diseases have limitations as the currently used anthelmintic drugs are mainly microfilaricidal; the drugs currently used for helminthes infections include combinations of DEC (diethylcarbamazine) and albendazole, ivermectin and Albendazole [11]. Previous studies have also reported that none of these is effective in killing the adult worms, which can live in the host for several years [12]. To show effective mechanism most of the population is using natural plant products by replacing chemical and synthetic drugs. Because of the increasing anthelmintic resistance and the impact of conventional anthelmintics on the environment, it is important to look for alternative strategies against parasitic worms. Natural plant products do not have any side effects in majority of cases.

The *kalanchoe pinnata* belongs to the Crassulaceae family and comprises about 125 species, *Kalanchoe pinnata* commonly known as cathedral bells, air plant, life plant, miracle leaf [13]. The primary goal of this study is to offer preliminary data for drug discovery research using *Kalanchoe pinnata*, a heavenly plant that has a broad variety of active chemicals, including alkaloids, Phenols, Phenylpropanoids, Flavanoids, Triterpenoids, steroids, organic Salts. This plant was discovered to have a variety of pharmacological properties, including Antihypertensive activity, Anti-ulcer activity [14] Anti oxidant activity [15], Hepatoprotective and Nephroprotective [16], anti-inflammatory, anti-ulcer, anti-diabetic, anti-tumors, hepatoprotective, analgesic, insecticidal, anti-lithic activity, anti-histaminic, anti-microbial, muscle relaxant, cytotoxic and sedative [17]. The present study is about evaluation of antihelminthic activity of *Kalanchoe pinnata*.

MATERIALS AND METHODS:

Plant Collection and Authentication: The leaves of the plant *Kalanchoe pinnata* was collected in the month of February in Narsapur, Medak District, Telangana, India. The plant was authenticated by M.Malla Reddy (M.Sc, M. Phil in Botany), Retired lecturer in Botany, Vikarabad, Telangana.

Material Used: In the present investigation of Anthelmintic activity, Carboxy Methyl Cellulose (CMC), Ethanol, Saline was used. All the material was used in laboratory grade.

Worm Collection: The Indian adult earthworm *Pheretima posthuma* were collected from water logged areas and washed with water to remove all kinds of dirty water from them. They have physiological resemblance with the intestinal round worm parasites of human beings [18, 19, 20].

Preparation of Plant Extract: The leaves of *Kalanchoe pinnata* was shade dried and crushed in an electrical blender into powder and sieved to get a coarse powder. The powder was subjected to Soxhlet extraction using ethanol for 72 hours. The solvent was evaporated using rotary evaporator then the extract was used for the evaluation of anthelmintic activity.

Preparation of Concentrations: The ethanolic leaf extract of *Kalanchoe pinnata* was made into four different concentrations such as 25 mg/ml, 50 mg/ml, 75 mg/ml and 100mg/ml by dissolving in normal saline. Albendazole was used as reference drug. 0.5% w/v Carboxy Methyl Cellulose (CMC) used as a suspending agent.

Anthelmintic Assay: The anthelmintic activity was carried according to the standard method [21, 22, 23]. Adult Indian earthworm *Pheretima posthuma* has an anatomical and physiological resemblance to the intestinal roundworm parasites of human beings. Indian earthworms were placed in a Petridish containing different concentrations (25 mg/ml, 50 mg/ml, 75 mg/ml and 100mg/ml) of ethanolic leaf extract of *Kalanchoe pinnata* and standard drug Albendazole **Fig. 1**. Each Petri dish contains earthworms and observed for time of paralysis as well as time death. Time of paralysis recorded when no movement of any sort could be observed, except when the worm was shaken vigorously as well as the time of death was recorded after ascertaining that worms neither moved when shaken. Finally, the test results were compared with standard reference compound Albendazole.

RESULTS AND DISCUSSION: The ethanolic leaf extract of *Kalanchoe pinnata* shows potent Anthelmintic activity on *Pheretima posthuma*. This activity was concentration dependent.

As the concentration increases the extract produce maximal effect. Higher concentrations of ethanolic leaf extract of *Kalanchoe pinnata* produce a paralytic effect much earlier and time taken for death was shorter **Fig. 2**.

It shows maximum efficacy at 100 mg/ml concentration than the standard drug (Albendazole) **Table 1.**

FIG. 1: *IN-VITRO* EXPERIMENTAL MODEL SETUP TO EVALUATE THE ANTIHELMINTIC ACTIVITY

TABLE 1: ANTHELMINTIC ACTIVITY OF ETHANOLIC LEAF EXTRACT OF *KALANCHOE PINNATA* AND STANDARD ALBENDAZOLE

Extract	Concentration	Paralysis	Death
Ethanolic Leaf Extract	25mg/ml	23.5min±0.51	27.5min±0.13
	50mg/ml	21min±0.42	25.3min±0.24
	75mg/ml	19.50min±1.0	22min±0.94
	100mg/ml	17.05min±0.8	19.5min±1.2
Albendazole	25mg/ml	40min±0.43	43min±1.38
	50mg/ml	35min±0.60	39min±0.59
	75mg/ml	31min±0.81	30min±1.38
	100mg/ml	21min±1.4	23min±0.92

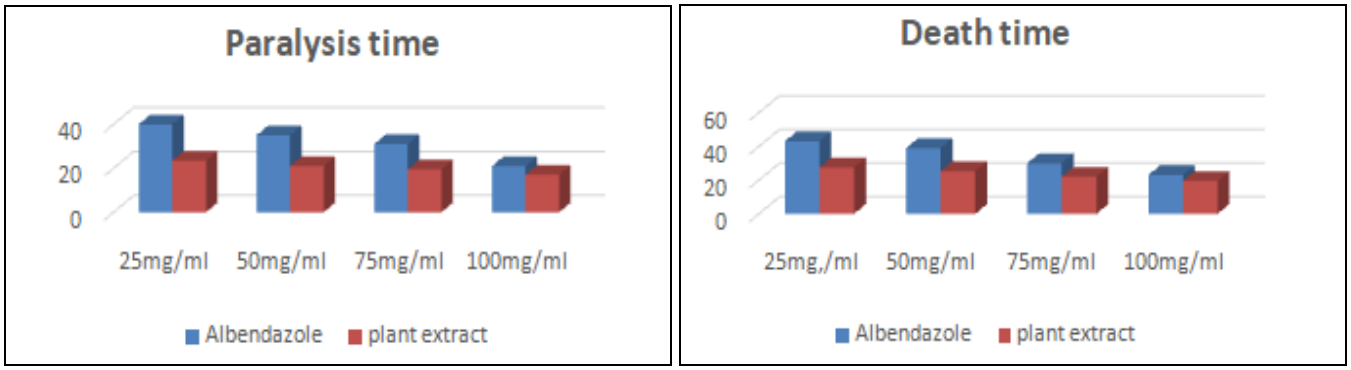

FIG. 2: PARALYSIS AND DEATH TIME OF ETHANOLIC LEAF EXTRACT OF *KALANCHOE PINNATA* AND STANDARD ALBENDAZOLE

CONCLUSION: It can be concluded that the ethanolic leaf extract of *Kalanchoe pinnata* has shown more significant anthelmintic activity when compared to Albendazole against Indian earthworm *Pheretima posthuma*. The product of *Kalanchoe pinnata* is used as an Anthelmintic agent. Further, the active constituents responsible for Anthelmintic activity can be explored.

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CONFLICT OF INTERESTS: The authors have no conflicts of interest regarding this investigation**.**

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