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Anthelmintic activity of methanolic extract of *Talinum portulacifolium* (forssk.) asch.ex schweinf

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Abstract

The *in vitro* anthelmintic activity of crude methanolic extracts of the leaves *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf on the Indian adult earthworms *Pheritima posthuma* was investigated. The time the earthworms took to become paralyzed and die was calculated from the test results using the standard medicine albendazole suspension. The study found that *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf leaf extracts exhibited considerable anthelmintic action in a dose-dependent reduction of earthworm's spontaneous death.

Keywords: *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf, Anthelmintic, methanolic leaf extract, *Pheritima Posthuma*

Introduction

Anthelmintics are substances that eject parasitic worms from the body by stunning or killing them. Gastrointestinal parasites pose a significant hazard to live cattle production in underdeveloped countries. Infections with helminthic parasites are widespread and have negative social and economic effects in developing nations. Many people and animals are affected by diseases in terms of their health. There are currently just a few effective treatments for some deadly Helminthes infections, such as filariasis. Herb use could be one of the main methods for controlling helminthic infections, which are frequently present in the population and are known to cause many acute diseases in cattle ^[1].

Due to the reason that *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf is used to treat gastrointestinal issues, an effort has been made to assess the Anthelmintic activity of the leaves on the adult earthworm *Pheritima Posthuma*. *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf is a member of the Talinaceae family and is also known as flame flower, Dimiliankwasia, Nyengele, etc.

It is obtained in India, Assam, north-western India, western India, peninsular India, Myanmar, China, etc.

Plant Description

Annual subshrubs that are upright, 1 m tall, strong, and glabrous. Lamina of the simple, alternate, subsessile leaves are around 6x2 cm, obovate or oblanceolate, obtuse or round at the base, mucronate at the apex, whole, fleshy, glossy above, and obscurely nerved. paniculate, racemose, or terminal inflorescences. Flowers are about 1.5 to 2 cm across; bracts are 1-6 mm long and linear; pedicels are 0.7 to 1.5 cm long; petals are 5 to 12 mm wide and obovate to ovate-round; stamens are many; filaments are 2 to 3.5 mm long and uneven; anthers are 1 mm long; the ovary is superior and about 2 mm long and 1-loculed; ovules are numerous on the free central globose, 3-valved capsules measuring about 5-7 mm in diameter. Every capsule contains 35 seeds, around 1 ^[2,3].

It has various therapeutic qualities. Moreover, this essential herb is utilized to heal liver and kidney issues. *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf is a common ingredient in herbal remedies for boosting energy, managing diabetes, inflammatory skin conditions, gastrointestinal issues, generalized weakness, bloating, constipation, and nausea. In addition, the herb is a diuretic and is used in salads to encourage lactation.

Material and Methods

Collection of Plant and Authentication

In September 2022, *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf was obtained from the JNTUH Campus in Kukatpally, Hyderabad, Telangana. The plant specimen was authenticated and taxonomically recognized by Dr. A. Vijaya Bhasker Reddy, Assistant Professor, Department of Botany, University College of Sciences, Osmania University,

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Hyderabad, Telangana State-500007, vide voucher number OUAS-85, and it was stored for future use.

Preparation of Plant Extract

Talinum portulacifolium (Forssk.) Asch. Ex Schweinf leaves were shade dried (2 kg) and then ground into a coarse powder (30gm) and thereafter stored in an airtight container. Using a Soxhlet apparatus, the powdered material was placed in a thimble(25gm) and methanolic extraction was carried out at 70°C for 12 hours. To separate the solvent from the solute and produce dried plant extract, the extract was added to a rotary evaporator under reduced pressure. From the dried methanolic extract, the crude extract was carefully measured at 20 mg/mL, 40 mg/mL, 60 mg/mL, and 100 mg/mL before being dissolved in distilled water to the necessary concentrations for the experiment.

Worm Collection

For this study, adult *Pheritima posthuma* (Indian earthworms) measuring between 5 and 6 cm in length were used.

Standard Drug Used

As a standard, test results were compared using albendazole suspension with a 10 mg/mL concentration.

Anthelmintic Activity

For this investigation, a random selection of worms from the genus *Pheritima posthuma* was chosen. Before the experiment, the worms were acclimatized to the laboratory environment. Earthworms were then separated into 6 groups, and placed in each petri dish.

In a petri dish, 10 mg/mL of the albendazole suspension was added (standard). The concentrations of test extracts were 20 mg/mL, 40 mg/mL, 60 mg/mL, and 100 mg/mL were taken then regular saline was used as a control

Earthworms were cleaned to get rid of soil particles and then put in Petri plates. For each concentration, earthworms were put into a Petri plate and left to rest at room temperature.

It was noted how long it took for both death and total paralysis. Each worm is frequently applied with external stimuli which stimulate or induce movements in the earthworm, if alive, to determine death and the time necessary for the worms to become immobile, which is indicated as paralysis time.

Table 1: Anthelmintic activity of methanolic extract of *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf leaves

Treatment	Concentrations	Paralysis time (min)	Death time(min)
Standard- albendazole	10mg/ml	20±5.0	31±0.23
Control-Saline	10ml	0.00	0.00
Methanolic extract of <i>Talinum portulacifolium</i> (Forssk.) Asch. ex Schweinf	20mg/ml	61±3.26	60±10.30
	40mg/ml	36±5.44	52±0.34
	60mg/ml	07±0.28	10±0.18
	100mg/ml	08±0.00	09±0.00



Fig 1: Different concentrations of methanolic extract of *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf

Results

The *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf plant was shown to include alkaloids, cardiac glycosides, tannins, saponins, flavonoids, and polyphenolics^[4] in earlier studies on basic phytochemical examinations. *Talinum portulacifolium* (Forssk.) Asch. Ex Schweinf methanolic extracts utilized to assess the anthelmintic activity and the impact was dose-dependent.

The results of the anthelmintic activity on the earthworm *Pheritima posthuma* are shown in Table 1. It was determined that varying concentrations of the extracts caused paralysis and death of the earthworms when compared to albendazole. In comparison to the reference medicine, methanolic extract

at a dosage of 100 mg/ml took somewhat lesser time for the death of earthworms than a standard drug (albendazole).

Discussion

By using appropriate experimental methods, some of the traditionally used plants have been shown to possess strong anthelmintic properties.

The main impact of albendazole on the worm is flaccid paralysis, which leads to the worm being expelled by peristalsis.

Albendazole causes hyperpolarization and reduced excitability in the worm's muscular membrane, which results in muscle relaxation and flaccid paralysis^[5].

The extract showed worm paralysis and death at a time, comparable to albendazole at higher concentrations of 100 mg/mL.

Chemically, tannins are polyphenolic chemicals, which have proven anthelmintic action. The tannins in the *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf extract's active constituent may have similar effects^[6].

Another potential anthelmintic action of tannins is their ability to attach to free protein in the host animal's gastrointestinal tract or glycol protein on the parasite and kill them.

Conclusion

The above finding indicates that *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf methanolic extracts, showed higher activity when compared to albendazole at higher concentrations.

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