



Research Article

Anthelmintic Activity of *Hymenocallis Littoralis* Leaves Extract on Indian Earthworm (*Pheretima Posthuma*)

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ABSTRACT

The present study aimed to evaluate the anthelmintic activity of both aqueous and ethanolic extracts of *Hymenocallis littoralis* using Indian earthworms (*Pheretima posthuma*) as the test organisms. The findings demonstrated that all extracts exhibited anthelmintic properties in a dose-dependent manner. Notably, the effectiveness of each extract was inversely related to the time taken for the paralysis or death of the worms. The anthelmintic effects were found to be comparable to those of the standard reference drug, Albendazole. Among the two extracts, the ethanolic extract showed the most significant anthelmintic activity, surpassing both the aqueous extract and the standard drug. The ethanol extract of *Hymenocallis Littoralis* caused paralysis time for 50 mg/ml is 26.44 and death time is 157.27 and for 100 mg/ml the paralysis time is 18.61 min. and death time are 94.06 min. The reference drug Albendazole (10 mg/ml) showed the paralysis at 11.30 min and death time 34.15 min respectively. These results support the traditional use of *Hymenocallis littoralis* in folk medicine as a natural anthelmintic agent.

INTRODUCTION

The traditional uses of medicinal plants in healthcare practices are providing clues to new areas of research and hence its importance is now well recognized.^[1] *Hymenocallis littoralis* (Jacq.) Salisb commonly known as ‘Spider Lily’ is a bulbous, herbaceous plant from the family of

Amaryllidaceae.^[2] The plant is distributed by the sea and in swamps in tropical, sub-tropical, and temperate regions throughout the world.^[3] Throughout the history of *Hymenocallis littoralis*, many alkaloids have been identified from its bulb.^[4, 5, 6] Plants of the family Amaryllidaceae included more than 1000 species in about 85 genera. More than 30 species in 11 genera were

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used in the treatment of human cancer. Chemical investigations of Amaryllidaceae were carried out for about 200 years.^[4] Toxic constituents are Amaryllidaceae alkaloids such as lycorine and tazettine and other toxic plant alkaloids. A number of additional alkaloids have cholinergic, analgesic, hypotensive and cytotoxic actions among which lycorine is the main alkaloid having centrally emetic action, which is responsible for clinical symptoms.^[7] In pets, chewing on or ingesting leaves generally causes mild gastrointestinal upset and ingestion of parts of the bulb may lead to more severe signs. Hymenocallis alkaloids are the main biological activity constituents in this family.^[8] The plant *Hymenocallis littoralis*, which is the main commercial species in Western India, it is around 60-70 cm tall with light green foliage. The sword-shaped leaves are broad in size (4-5 cm) and the plant flowers throughout the year. It is used mainly as an ornamental plant; flowers used in perfumes. Herbal remedies have a solid traditional or conceptual foundation and the potential to be effective pharmaceuticals for treating a variety of diseases due to their safety and efficacy.^[9] *Hymenocallis* bears tender bulbs. *Hymenocallis* has nearly ovoid, green, fleshy, and often viviparous seeds. Sealy, *Hymenocallis* forms the tribe Hymenocallideae.^[10]



Fig no 1: Leaves of *Hymenocallis littoralis*

Hymenocallis is native to warmer regions of the New World, i.e. southern part of North America,^[11] southern United States, (Florida, Georgia, Indiana, Louisiana, New Carolina, Texas, and Mexico] to the Andes in South America,^[12] Bahamas, Bolivia, Brazil, Cayman Islands, Chile,

Colombia, Cuba, Ecuador, Guatemala, Haiti, Peru, Surinam, Venezuela, West Indies, etc.) And one species (*H. senegambica*) to West Africa. There are over 40 species in the genus, but *Hymenocallis littoralis* is the most economically significant and is widely grown in western India, specifically in Gujarat and Maharashtra, and it takes up a premium position in the flower market of Mumbai. There is production of around 2000 lakh bundles (50 flower buds per bundle) of spider lily per annum from Gujarat alone. This genus is widely distributed in Mexico.^[13]

SCIENTIFIC CLASSIFICATION:^[14]

- **Kingdom:** Plantae
- **Clade:** Angiosperms
- **Clade:** Monocots
- **Order:** Asparagales
- **Family:** Amaryllidaceae
- **Subfamily:** Amaryllidoideae
- **Genus:** *Hymenocallis*
- **Species:** *H. littoralis*

COMMON NAMES:^[15]

Alligator lily (*H. palmeri*, syn. *H. humilis*), Basket flower/Basket lily (*H. narcissiflora*, syn. *Ismene calathina*, *Pancratium calathinum*, *P. narcissiflorum*), Caribbean lily (*H. caribbaea*), Cayman Islands spider lily/Crysolite lily (*H. latifolia*), Crown beauty, Green pine lily (*H. henryae*), *Ismene* of Peruvian daffodil (*H. speciosa*), *Ismene* lily/Peruvian daffodil (*H. calathina*, *H. narcissifolia*), Sea daffodil, Spider flower, Spider lily (*H. calathina*).

VERNACULAR NAMES:

- **Marathi:** Nagdavana (नागदवणा)^[16]
- **Hindi name:** Sudharshan Spider Lily (सुदर्शन स्पाइडर लिली)^[17]

- **English:** Beach spider lily^[18]
- **Malayalam:** Kadal thali
- **Tamil:** Kadarkarai Ilanganrai^[19]

PHYTOCHEMICAL CONSTITUENTS:

Several phytochemical constituents, including flavonoids, phenols, alkaloids,^[20] and other secondary metabolites,^[4] were identified from this plant; but, as Sundarasekar and companions observation, there aren't many research specifically examining these phytochemical compounds.^[21] several alkaloids, including lycorine, littoraline, hippeastrine, lycorenine, tazettine, pretazettine, macronine, homolycorine, lycoramine, vittatine, and haemanthamine, have been obtained from *Hymenocallis littoralis*.^[22] These compounds were reported to possess various pharmacological effects such as antiviral, antiparasitic, anticancer, antibacterial, antioxidant, and wound healing.^[23,24] Lycorine, a pyrrollophenanthridine alkaloid, is one the major alkaloids found in *H. littoralis*. It exhibits potent antiviral properties against the measles, poliovirus, and herpes simplex type 1 viruses.^[25]

MATERIALS AND METHODS:

Collection of plant material:

Fresh *Hymenocallis littoralis* plant leaves that were acquired from the local area of Chaupale, Nandurbar and were authenticated by Dr. M.B. Patil, JESS's Arts, Science, and Commerce College in Nandurbar. Fresh plant leaves were collected, cleaned using fresh cloths, and dried for seven days in the shade following verification and then using a mechanical grinder, made in to a coarse powder. Dry powder was stored in airtight containers.

Worm's collection:

Adult Indian earthworms (*Pheretima posthuma*), ranging from 8 – 12 cm in length were selected for the study. These worms were obtained from moist soil in agricultural fields or purchased from a certified vermiculture source. *Pheretima posthuma* is widely used in anthelmintic studies because its anatomical and physiological properties closely resemble those of human intestinal roundworms, especially regarding their neuromuscular physiology. After collection, the worms were washed with normal saline to remove soil. They were kept in a tray containing moist soil at room temperature and maintained under laboratory conditions prior to experimentation. Only active and healthy worms were selected for the study.

Preparation of extract:

Ethanol extract:

Each 100 g of powdered coarse leaves was steeped in 250 ml of ethanol using the maceration method for a Continuous 1 week. The concentrate was then filtered, evaporated on a water bath until no more concentrate remained, and dried.^[26]

Aqueous extract:

Each 100 g of powdered coarse leaves was steeped in 250 ml of petroleum ether using the maceration method for a continuous 1 week. The concentrate was then filtered, evaporation a water bath until no more concentrate remained, and dried.^[26, 27]

Chemicals:

- a. Saline solution
- b. Albendazole
- c. Tween 80

ANTHELMINTIC ACTIVITY:



The anthelmintic activity was executed.^[28] The activity was performed on adult Indian earthworm *Pheritima posthuma*, due to its anatomical and physiological resemblance with the intestinal round worm parasite of human being. Earth worms have been routinely employed for preliminary in vitro evaluation of anthelmintic drugs due to their easy availability. A total of thirty *Pheritima posthuma* earthworms, each around the same size (8 ± 1 cm), were put in each petri dish with 20 ml of normal saline, as well as various dilutions of the aqueous and ethanolic extracts (25, 50, 75, and 100 mg/ml) and the standard Albendazole with normal saline. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Time for death of worms were recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water. ^[28, 29]



Fig. 2: Ethanol 25 mg/ml



Fig. 3: Ethanol 50 mg/ml



Fig. 4: Ethanol 75 mg/ml



Fig. 5: Ethanol 100 mg/ml



Fig.6: Control (Saline Solution)



Fig.9: Aqueous 50 mg/ml



Fig. 7: Standard (Albendazole)



Fig.10: Aqueous 75 mg/ml



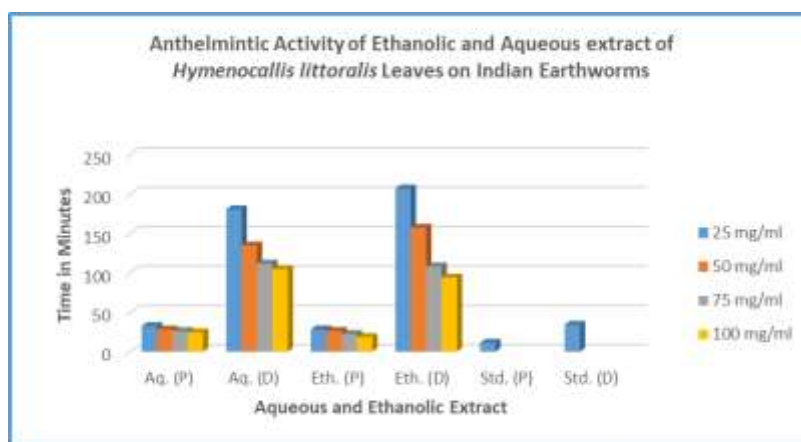
Fig.8: Aqueous 25 mg/ml



Fig.11: Aqueous 100 mg/ml

Table No 1: Anthelmintic Activity of Ethanolic and Aqueous extract of *Hymenocallis littoralis* Leaves.

Sr. No.	Extracts	Concentration in mg/ml	Indian Earthworm (<i>Pheritima Posthuma</i>)	
			Time of paralysis in min (P)	Time of Death in min (D)
1	Ethanolic extract	25	28.37 ± 1.15	207.17 ± 1.14
		50	26.44 ± 1.35	157.27 ± 1.19
		75	22.52 ± 1.22	108.29 ± 1.36
		100	18.61 ± 1.32	94.06 ± 1.28
2	Aqueous extract	25	32.46 ± 1.26	180.6 ± 1.17
		50	28.28 ± 1.12	134.91 ± 1.25
		75	26.32 ± 1.18	111.67 ± 1.41
		100	24.51 ± 1.42	104.82 ± 1.29
3	Standard (Albendazole)	20	11.30 ± 1.28	34.15 ± 1.38
4	Control (Normal saline solution)	-	-	-

**Fig.12: Anthelmintic activity of Aqueous and Ethanolic extract of *Hymenocallis littoralis* Leaves**

RESULT AND DISCUSSION:

The literature review shows that *Hymenocallis Littorallis* plant contains alkaloids, Flavonoids, phenols and other secondary metabolites. Some of these phytoconstituents may be responsible to show potent anthelmintic activity from the observation made higher Concentration of extract produced paralytic effect much earlier and the time of death was shorter for all worms All the extracts shows anthelmintic activity but ethanolic extract show anthelmintic activity in dose dependent manner giving shorter time of paralysis (P) and Death (D) with 50 mg/ml and 100 mg/ml is concentration of worms The ethanol extract of *Hymenocallis Littorallis* caused paralysis time for

50 mg/ml is 26.44 ± 1.35 and death time is 157.27 ± 1.19 and for 100 mg/ml the paralysis time is 18.61 ± 1.32 min. and death time is 94.06 ± 1.28 min. The reference drug Albendazole (10 mg/ml) showed the paralysis at 11.30 ± 1.25 min and death time 34.15 ± 1.34 min respectively. The experimental evidence obtained in the laboratory model could provide a rationale for the traditional use of this plant as anthelmintic.

SUMMARY AND CONCLUSION:

From the above result, it is concluded that ethanolic extract of plant *Hymenocallis littoralis* show potent anthelmintic activity to standard anthelmintic drug. Further Studies using in vivo model are required to carry out and

established the effectiveness and pharmacological rational for the use of *Hymenocallis littoralis* as an anthelmintic drug.

CONFLICT OF INTEREST:

The authors declare that there is no conflict of interest.

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