

EVALUATION OF ANTHELMINTIC ACTIVITY OF *GYROCARPUS ASIATICUS* WILLD AND *LACTUCA RUNCINATA* DC ON THE *PERITIMA POSTHUMA* MODEL

LAKSHMI KANTA KANTHAL^{*1}, AKALANKA DEY², K. SATYAVATHI¹, P. BHOJARAJU¹

¹Koringa College of Pharmacy, Korangi 533461, Tallarevu (M), Andhra Pradesh, ²Annamalai University, Department of Pharmacy, Annamalai Nagar, Tamil Nadu, India. Email: lkkhaldia@gmail.com

Received: 23 Aug 2013, Revised and Accepted: 02 Oct 2013

ABSTRACT

Objective: The present study was designed to evaluate the anthelmintic activity of methanolic extracts of *Gyrocarpus asiaticus* Willd and *Lactuca runcinata* DC.

Methods: The crude methanolic extracts of *Gyrocarpus asiaticus* Willd aerial parts and *Lactuca runcinata* DC whole plant were taken for in vitro comparative studies on the anthelmintic activity against *Pheritima posthuma*. Different concentrations (25, 50, 100 mg/ml) of both the extracts were used for the activity. Varying albendazole concentrations (25, 50, 100 mg/ml) were used as a reference standard and normal saline (0.9% NaCl) was used for the control treatment.

Results: The results were expressed in terms of time in minutes to report the paralysis and time of death of the earthworms. The results obtained from the study indicate significant anthelmintic activity, supporting folk use of both the plants when compared with the standard. The results also established that *Lactuca runcinata* DC was a more potent candidature as compared with *Gyrocarpus asiaticus* Willd.

Conclusion: The present study concluded that the methanolic extracts of *Gyrocarpus asiaticus* and *Lactuca runcinata* possess potent anthelmintic activity.

Keywords: Methanolic extract, Albendazole, Anthelmintic activity, *Gyrocarpus asiaticus* Willd, *Lactuca runcinata* DC.

INTRODUCTION

From the ancient times, indigenous drugs have been used in the Indian medicinal system to treat different ailments and to provide therapeutic benefits. During the recent years, medicinal chemistry has made great strides, especially in synthetic chemistry but, for the sake of therapeutic effect up to the level and nontoxic treatment for helminthiasis, the research of plant derived drug therapy is mostly needed. [1]Anthelmintic or antihelminthics are drugs that expel parasitic worms (helminths) from the body, by either stunning or killing them. [2]

Gyrocarpus asiaticus Willd commonly known as Taniki or Nalla poliki [3] is a tree belonging to the family Hernandiaceae. *Gyrocarpus asiaticus* is one of the species in the genus *Gyrocarpus* with the class Magnoliopsidae. *Lactuca runcinata* DC [*Lruncinata*, Synonym-*Lactuca heyneana* DC.] commonly known as Undirachakam [4] or Atheli is an annual erect herb belonging to the family Compositae (Asteraceae). Traditionally this plant finds its wide applicability as diuretic and in chronic obstruction of liver and bowel. [4]

A detailed literature review on the plant in investigation has shown that till date there are no published reports worldwide, related to the possible anthelmintic activity of *Gyrocarpus asiaticus* Willd and *Lactuca runcinata* DC on *Pheritima posthuma*. So, the present study was aimed to investigate the anthelmintic activity of *Gyrocarpus asiaticus* Willd and *Lactuca runcinata* DC on *Pheritima posthuma* model.

MATERIALS AND METHODS

Collection of plants

The *Gyrocarpus asiaticus* Willd plant was collected from the nearby area of Tirunelveli District fields (Tamil Nadu) and *Lactuca runcinata* DC Plant was collected from the nearby area of Thoothukudi District fields (Tamil Nadu) in December 2011, identified and authenticated by Dr. V. Chelladurai (Retired Research Officer-Botany, Central Council for Research in Ayurveda and Siddha, Govt. of India), Tirunelveli, Tamil Nadu, India. Herbarium of the plants were prepared and preserved in the Department of Pharmacognosy, Koringa College of Pharmacy, Korangi, East Godavari District, Andhra Pradesh, India.

Collection of earthworms

The earth worms are collected from water logged soils near Korangi, East Godavari district, Andhra Pradesh. They are washed with normal saline solution and stored in tyrode solution.

Preparation of the extracts

Shade-dried small pieces of *Gyrocarpus asiaticus* Willd and shade-dried powder of the *Lactuca runcinata* DC were subjected to hot percolation by the Soxhlet apparatus using methanol as a solvent.

Preliminary phytochemical screening

The two methanolic extracts were tested for alkaloids, anthroquinones, flavonoids, phenols, steroids, tannins, terpenoids,[5] cardiac glycosides, saponins,[6] phlobatannin,[7] reducing sugars. [8]

Experimental Procedure

The anthelmintic activity was performed according to the method of Ghosh *et al.* (2005) on the adult Indian earthworm *Pheritima posthuma*. [9,10]Albendazole, the standard drug, was diluted with normal saline to obtain 25, 50 and 100 mg/ml concentrations and was poured into Petri dishes. Methanolic extracts of both plants were diluted with normal saline to obtain 25, 50 and 100 mg/ml concentrations. Normal saline (0.9% NaCl) alone served as the negative control. All these dilutions were poured into the Petri dishes accordingly. Ten petridishes of equal size were taken & numbered. Six earthworms (n=6) of similar sizes (about 8 cm) were placed in each petridish at room temperature. Time for paralysis was noted down when no movement of any sort could be observed, except when the worms were shaken vigorously. Time of death for worms was recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water (50 °C). The paralysis time and lethal time were recorded in terms of minutes.

RESULTS AND DISCUSSION

Preliminary phytochemical evaluation

The methanolic extract of *Gyrocarpus asiaticus* showed positive results for alkaloids, cardiac glycosides, flavonoids, phenols,

saponins, steroids, tannins and terpenoids but methanolic extract of *Lactuca runcinata* showed positive results for alkaloids, cardiac glycosides, flavonoids, phenols, phlobatannin, reducing sugars, saponins, steroids, tannins and terpenoids.

Anthelmintic activity

In vitro anthelmintic activity was performed and the paralysis time and lethal time were recorded. Statistical evaluation of the data was performed by one-way ANOVA. The results were expressed as mean \pm SD.

The results show that for the 25 mg/ml concentration, albendazole showed the best activity for death time (104.83 ± 6.99 min) and the methanolic extract of *Gyrocarpus asiaticus* and *Lactuca runcinata* showed a death time of 126 ± 2.82 min and 105.83 ± 5.23 min, respectively. Also, for the 50 mg/ml concentration, albendazole

showed the highest activity against the worms (85.5 ± 4.84 min) and the methanolic extract of *Gyrocarpus asiaticus* and *Lactuca runcinata* showed a death time of 117 ± 9.75 min and 92.33 ± 5.87 min, respectively. For the 100 mg/ml concentration, albendazole showed the least death time of 63.83 ± 4.16 min, and the methanolic extract of *Gyrocarpus asiaticus* and *Lactuca runcinata* showed a death time of 76.6 ± 3.26 min and 66.2 ± 1.75 min, respectively. The paralysis and death times of both the plants along with the standard is given in (Table 1). The study revealed that both the plants' methanolic extracts had significant activity at the higher concentration (100 mg/ml). *Lactuca runcinata* has shown better activity than *Gyrocarpus asiaticus* at a higher concentration (100 mg/ml) compared with the standard, albendazole (100 mg/ml). The comparison of the death time of both the plants in different concentrations with respect to the standard is given in (Figure 1).

Table 1: In vitro anthelmintic effect of *Gyrocarpus asiaticus* and *Lactuca runcinata* against *Pheritima posthuma*

Treatment	Concentration(mg/ml)	Paralysis Time(min)	Death Time (min)
Albendazole (Std)	25	53.66 \pm 2.59	104.83 \pm 6.99
	50	42.33 \pm 1.32	85.5 \pm 4.84
	100	31.66 \pm 0.88	63.83 \pm 4.16
GA extract	25	68.16 \pm 3.65	126 \pm 2.82
	50	52.33 \pm 4.13	117 \pm 9.75
	100	38 \pm 4.38	76.6 \pm 3.26
LR extract	25	64.35 \pm 2.80	105.83 \pm 5.23
	50	49.34 \pm 1.24	92.33 \pm 5.87
	100	34.86 \pm 3.03	66.2 \pm 1.75
Control	-	-	-

\pm SD value, n=6, P <0.01.

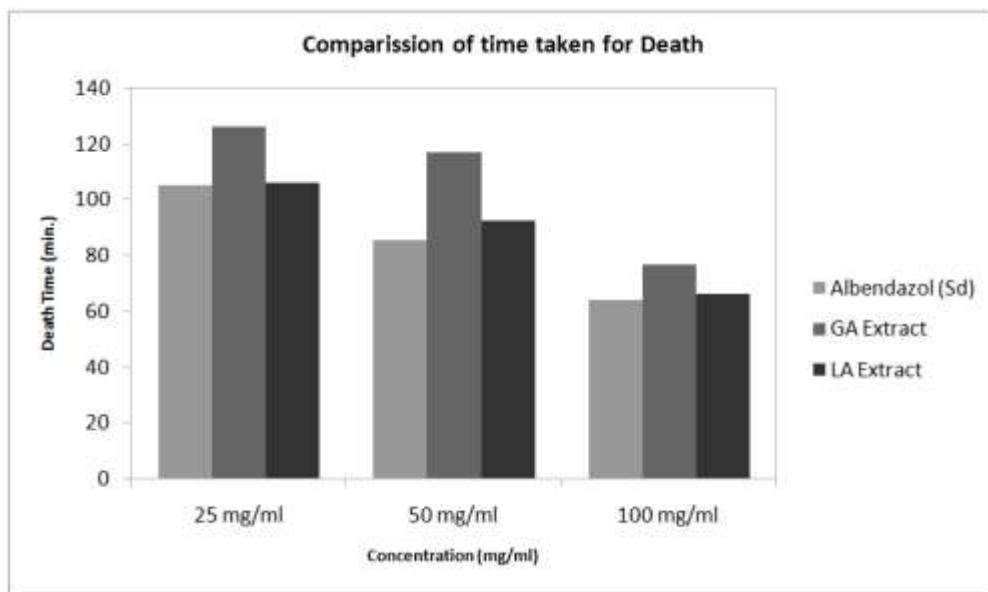


Fig. 1: Comparative studies of death time of *Gyrocarpus asiaticus* and *Lactuca runcinata* and the standard albendazole.

CONCLUSION

In conclusion, the anthelmintic activity was screened by taking *Pheretima Posthuma* as experimental model. The methanolic extracts are having good anthelmintic activity. The phytochemical study shows the presence of tannins and saponins which are may be responsible for the anthelmintic activity. The crude extracts of *Gyrocarpus asiaticus* and *Lactuca runcinata* have to be further studied to isolate the active compounds present and to establish the mechanism of action.

ACKNOWLEDGEMENT

The authors are thankful to the Management and Prof.T.Veerraju of Koringa College of pharmacy, Korangi, Andhra Pradesh, India for availing all the facilities and encouraging this work.

REFERENCES

- Chopra RN. The medical and economic aspect of Indian indigenous Drugs. Academic Publishers; 2006.
- Chandrashekhar D Khadse, Rajendra B Kakde: *In vitro* anthelmintic activity of Fenugreek seeds extract against *Pheritima posthuma*. Int. J. Res. Pharm. Sci. 2010; 1(3): 267-269.
- Basha SKM, Umamaheswari P, Rajyalakshmi E, Rambabu M and Pullaiah T: Medicinal Flora of Penusila Narasimha Sacred Grove, Eastern Ghats, SPSR Nellore District, Andhra Pradesh, India. Indian Journal of Fundamental and Applied Life Sciences 2012; 2 (2): 334-344.
- Khare CP. Indian Medicinal Plants. Springer; 2008; p.357.
- Kumar GS et al.: Antimicrobial effects of Indian medicinal plants against acne-inducing bacteria. Trop. J. Pharm. Res. 2007; 6:717-23.

6. Parekh J, Chanda SV: *In vitro* antimicrobial activity and phytochemical analysis of some Indian medicinal plants. Turk. J. Biol. 2007; 31: 53-8.
7. Edeoga HO, Okwu DE, Mbaebie BO: Phytochemical constituents of some Nigerian medicinal plants. Afr J Biotechnol 2005; 4: 685-8.
8. Akinyemi KO, Oladapo O, Okwara CE, Ibe CC, Fasure KA: Screening of crude extracts of six medicinal plants used in South-West Nigerian unorthodox medicine for anti-methicillin resistant *Staphylococcus aureus* activity. BMC Complement Altern Med 2005; 5: 6.
9. Ghosh T, Maity TK, Boseand A, Dash GK: Athelmintic activity of *Bacopa monierr*. Indian J Nat Prod 2005; 21:16-9.
10. Rastogi T, Bhutda V, Moon K, Aswar PB, Khadabadi SS: Comparative studies on anthelmintic activity of *Moringa oleifera* and *Vitex negundo*. Asian J Res Chem 2009; 2:181-2.