

ORIGINAL RESEARCH ARTICLE

Evaluation of Anthelmintic activity of *Vitex trifolia* Linn. leaves against *Pheretima posthuma***S.Thenmozhi*¹, K.Vibha¹, M.Dhanalakshmi¹, K.Manjuladevi¹, Sumeet Diwedi² and U.Subasini³**¹Swamy Vivekanandha College of Pharmacy, Elayampalayam, Tiruchengode, Namakkal (D.T), Tamilnadu, India²Ujjain Institute of Pharmaceutical Sciences, Ujjain, Madhya Pradesh, India³Department of Pharmacology, Management and Science University, Selangor, Malaysia

Received 18 Jun 2013; Revised 27 Sep 2013; Accepted 09 Oct 2013

ABSTRACT

Helminthic infections are the most common health problems in India, in developing countries they pose a large to treat to public. These infections can affect most population in endemic areas with major economic and social consequences. The present study was undertaken to evaluate anthelmintic activity of various leaf extracts of *Vitex trifolia* Linn. against Indian earth worms *pheretima posthuma*. Various concentrations (25, 50, 100 mg/ml) of aqueous, alcoholic, chloroform and petroleum ether extracts of *Vitex trifolia* Linn. leaves were tested, which involved determination of time of paralysis and time of death of worms. Albendazole in same concentration as that of extract was included as standard reference and normal saline water as control. The study indicated the potential usefulness of aqueous and alcoholic extract of *Vitex trifolia* against earth worm.

Key words: Anthelmintic activity, *Vitex trifolia*, *Pheretima posthuma*, Albendazole.**INTRODUCTION**

Vitex trifolia Linn. belonging to the family of Verbenaceae is commonly known as chaste tree (English), Nirnochi (Tamil) and jalanirgundi (Sanskrit). It is distributed throughout India in tropical and subtropical regions. Height of the plant 1-3.5 meter. Flowers are appearing in summer or late summer, and 6-12 inch long^[1]. Leaves are commonly used as poultice for rheumatic pains, inflammations, sprains, fever, anthelmintic, improve memory, favour the growth of hair, good for the eyes, leucoderma, bad taste in mouth and bronchitis^[2,3]. Roots are used to treat febrifuge, painful inflammations, cough and fever. The leaves are used internally or externally in baths to cure Ciguatera fish poisoning-related pruritus^[4] and used as an anti-pyretic, anti-inflammatory, and nematicidal agent and to increase body weight and it has also been reported to have anti-tumor activity^[5,6]. Flowers are used in treating fever and fruits in amenorrhoea. This plant is known to possess various active constituents viz, essential oils, halimane type diterpenes, vitetrifolins^[7,8] and several pharmacological properties have been studied viz, antipyretic, antibacterial, antifungal, antioxidant, Hepatoprotective activity, wound healing activity,

against asthma and allergic diseases^[9-13]. Literature survey revealed that the plant extract has yet not been screened for its traditional claim of anthelmintic activity. Therefore, the objective of this work was to explore the anthelmintic activity of *Vitex trifolia* against *pheretima posthuma*.

MATERIALS AND METHODS**Plant Material:**

The plant specimens for the proposed study were collected from shevoroyan hills, Salem, Tamilnadu, India during the month of Jan. 2012. The plant material was taxonomically identified and authenticated by Dr. A. Balasubramanian, Consultant, Central Siddha Research, Salem, Tamilnadu. A voucher specimen (svcp/ph.cog/115) has been deposited in the Herbarium of the Department of Pharmacognosy, Swamy Vivekanandha college of pharmacy, Tamilnadu, India, for future reference.

Animal:

Healthy adult Indian earthworm, *Pheretima posthuma*, due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings^[14-16] were used in the

present study. Because of easy availability, earthworms have been used widely for the evaluation of anthelmintic compounds in vitro^[17-19]. Indian adult earth worm *phreretima posthuma* collected from moist soil and washed with normal saline to remove all fecal matter were used for the anthelmintic activity. The earth worms of 4-6 cm in length and 0.3-0.4 cm in width were used.

Anthelmintic assay:

The anthelmintic assay was carried as per the method of Ajaiyeoba *et al*^[20] with minor modifications.

Aqueous, ethanolic, chloroform and petroleum ether extracts of leaves of *Vitex trifolia* were investigated for their anthelmintic activity. Various concentrations (25, 50 & 100 mg/ml) of each extracts were tested in the assay, which involved determination of time of paralysis and time of death of worms. Albendazole was used as reference standard while saline water as control. Six groups of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 50 ml of desired

formulation. Observations were made for the time taken to paralyse or death of individual worms.

RESULTS AND DISCUSSIONS:

Preliminary phytochemical screening reveals the presence of alkaloids, flavonoids, glycosides, tannins, steroids and saponins. The results of anthelmintic activity observed that all the extracts have shown a certain degree of anthelmintic activity. The activity reveals concentration dependant nature of the different extracts. The alcoholic extract exhibited significant activity [time of paralysis (P) of 28.42 min and time for death (D) of 51.78 min] at 25 mg/ml concentration compared with standard drug Albendazole [(P) of 26.78 min and (D) of 30.43 min] at same concentration. Likewise, the aqueous extract showed significant activity [time of paralysis (P) of 27.68 min and time of death (D) of 49.10 min] at same concentration. For petroleum ether, (P) was 65.86 min and (D) was 94.04 min at 25 mg/ml concentration, being the least active among all the extracts (**Table 1**).

Table 1: In-vitro Anthelmintic activity of various extracts of *Vitex trifolia* Linn leaves

Test substances	Concentration (mg/ml)	Time taken for paralysis (P) in min	Time taken for death of worms (D) in min
Control (normal saline)	-	-	-
Albendazole	25	26.78±1.33	30.43±0.81
	50	19.56±1.72	24.86±0.9
	100	14.66±0.79	21.32±1.9
Alcoholic extract	25	28.42±0.58	51.78±1.43
	50	20.53±0.8	38.08±1.71
	100	16.65±1.07	31.76±1.05
Aqueous extract	25	27.68±0.98	49.10±1.89
	50	21.04±0.32	37.44±0.83
	100	15.33±1.5	30.71±0.77
Chloroform extract	25	50.45±1.6	72.78±0.33
	50	44.57±1.31	63.47±1.06
	100	39.34±0.85	58.76±0.92
Petroleum ether extract	25	65.86±0.59	94.04±1.67
	50	54.72±0.78	85.48±0.79
	100	48.43±1.3	77.67±1.7

Values are expressed as Mean ± SEM (n=6)

CONCLUSION

The present study has shown that, all the extracts of *Vitex trifolia* Linn. leaves have significant anthelmintic activity, the aqueous and alcoholic extract being more potent comparable with standard drug. Further, it would be interesting to isolate the possible phytoconstituents which may be responsible for the anthelmintic activity and to find out the possible mechanism(s) of action.

REFERENCE

1. Kritikar KR and Basu BD, Indian medicinal plants, Vol.3, 2nd edition, International book distributors, Book sellers and publishers; 1994. P.1937.
2. Asima Chatterjee, Satyesh Chandra Prakash. The Treatise of Indian Medicinal Plants. New Delhi: National Institute of Science Communication and Information Resources, 1994 (Reprint 2003); Vol.-10: 525.
3. Nair CK, Mohanan N. Medicinal plants of India. New Delhi: NAG publishers; 1997. p. 698.
4. Meena AK, Uttam Singh, Yadav AK, Singh B, Rao MM. Pharmacological and Phytochemical Evidences for the Extracts from Plants of the Genus *Vitex* – A Review. International Journal of

- Pharmaceutical and Clinical Research. 2010; 2(1): 01-09.
5. Li W-X, Cui C-B, Cai B, Wang H-Y, & Yao X-S. Flavonoids from *Vitex trifolia* Linn. inhibit cell cycle progression at G2/M phase and induce apoptosis in mammalian cancer cells. *Journal of Asian Natural Products Research*. 2005; 7(4):615-626.
 6. Wen-Xin Li, Cheng-Bin Cui, Bing Cai, Xin-Sheng Yao. Labdane-type diterpenes as new cell cycle inhibitors and apoptosis inducers from *Vitex trifolia* Linn. *Journal of Asian Natural Products Research*. 2005; 7(2):95 – 105.
 7. Aranda E, Hernandez MM, Heraso C, Villarreal ML, Arispuro IV. Biological activities of crude plant extracts from *Vitex trifolia* L. *Journal of Ethnopharmacology*, 1999; 67(1): 37-44.
 8. Ono M, Ito Y, Nohara T, Four new halimane type diterpenes, vitetrifolins D-G, from the fruit of *Vitex trifolia*. *Chem Pharm Bull*. 2001; 49, 1220-1.
 9. Rahman E, Hossain MM, Paul N, Sohrab MH, Rashid MA. Antibacterial activity of *Vitex trifolia*. *Fitoterapia*, 2001; 72 (6): 695-697.
 10. Shastry JN. *Dravyaguna Vijnana*. Chaudhambha Orientalia publications 2002; Vol-2:411-17.
 11. V Sreedhar, LK Ravindra Nath, N Madana Gopal, M Sanjith Nath. In-vitro antioxidant activity and free radical scavenging potential of roots of *Vitex trifolia*. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 2010; 1(4):1036-44.
 12. Manjunatha BK, Vidya SM, Krishna V, Mankani KL, Singh SDJ and Manohara YN. Comparative evaluation of wound healing potency of *Vitex trifolia* L. and *Vitex altissima* L. *Phytotherapy Research*. 2007;21(5): 457–461.
 13. Ramasamy Anandan, Balasundaram Jayakar, Biusan Karar, Seevalen Babuji, Rajappan Manavalan and Raju Senthil Kumar. Effect of ethanol extract of flowers of *Vitex trifolia* Linn. on CCL₄ induced hepatic injury in rats. *Pak. J. Pharm. Sci*. 2009; 22(4):391-394.
 14. Vidyarthi RD, A Text book of Zoology, 14th edn, Chand and co. Press. New Delhi, 1977; 329-31.
 15. Thorn GW, Harrison's Principles of Internal medicine, Mc Grew Hill, New York, 1977; 1088-90.
 16. Sallaman T, Anthelmintics: Their efficiency as tested on earthworms. *J Pharmacol Exp Ther*. 1981; 12:129-170.
 17. Jain ML, Jain SR. Therapeutic utility of *Ocimum basilicum* Var *album*. *Planta Med*. 1972; 22:66-70.
 18. Dash GK, Suresh P, Kar DM, Ganapathy S, Panda SB. Evaluation of *Evolvulus aisinoids* Linn for anthelmintic and antimicrobial activities. *J Nat Rem*. 2002; 2:182-185.
 19. Shivkar YM, Kumar VL. Anthelmintic activity of latex of *Calotropis procera*. *Pharm Biol*. 2003; 41: 263-265.
 20. Ajaiyeoba EO, Onocha PA and Olarenwaju OT. In vitro anthelmintic properties of *Buchholzia coriaceae* and *Gynandropsis gynandra* extract. *Pharm Biol*. 2001; 39: 217-220.