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Original Article

Anthelmintic Activity of Hydroalcoholic Extract of Leaves of *Valeriana Jatamansi*

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ABSTRACT

The hydroalcoholic extract of leaves of Valeriana jatamansi was investigated for anthelmintic activity using adult earthworms (Pheretima posthuma) and roundworms (Ascaridia galli). Various concentrations (100, 200, 400 mg/ml) of plant extract were used in the present study. Albendazole (10 mg/ml) was used as reference standard drug. Paralysis time and death time of the worms were recorded to assess the anthelmintic activity. Anthelmintic activity was noted at all the concentration (100, 200, 400 mg/ml). However, the hydroalcoholic extract exhibited anthelmintic activity at highest concentration of 400 mg/ml for both the worms. The result shows that hydroalcoholic extract possesses wormicidal activity and found to be effective as an anthelmintic may be due to presence of phenols as revealed in the phytochemical screening.

Keywords: Valeriana jatamansi, Phytochemical Screening, Earthworm, Roundworm and Antihelmintic

INTRODUCTION

Valeriana jatamansi is a perennial herb and tetraploid species belonging to family Valerianaceae, generally known as Tagar, Sugandhawal, Jatamansi. It is widely distributed in Western Himalayan, Kashmir, Garhwal, Khasi hills and Bhutan at the heights of 2500-3000 meters [1, 2]. The major chemical constituents of *Valeriana jatamansi* are valerenic acid (sesquiterpenoids), valepotriates (iridiod esters), alkaloids, baldrinal, homobaldrinal, amino acid, phenolic acid, flavonoids, valerosidatum, chlorogenic acid, caffeic acid and fatty acid [1, 3]. The reported activities of *Valeriana jatamansi* are antioxidant [4], anti-inflammatory [5, 6], anti-diarrhoeal [7] and antimicrobial [6]. Further, the reported activities of *Valeriana jatamansi* are antioxidant due to the presence of phenolic compounds [4], anti-inflammatory due to the presence of volatile oils [6], anxiolytic activity due to the presence of valtrate [8-10], anti-diarrhoeal due to the presence of flavonoids [7] and antimicrobial due to the presence of volatile oils [6]. The traditional uses of *Valeriana jatamansi* are Liver protection, sleep improvement, skin disease, obesity, wound healing, antispasmodic and snake poisoning [11]. Helminths are worm like parasites. Depending on the external and internal morphology of egg, larva, and adult stages, they are mainly divided into three divisions: Nematodes (Round worms), Cestodes (Tapeworms), Trematodes (Flukes) [12]. There are both hermaphroditic and bisexual species. Nematodes are bisexual, cylindrical worms and inhabit in intestinal and extra intestinal sites [13]. Cestodes are elongated, segmented, hermaphroditic flatworms that inhabit the intestinal lumen larval forms, which are cystic or solid, inhabit extra intestinal tissues [14]. Trematodes are leaf shaped flat worms and are hermaphroditic except for blood flukes, which are bisexual [15]. The mode of transmission is faecal-oral route through contaminated food; water, soil and mosquito bite [16]. The main objective of this study was to investigate the Anthelmintic effect of leaves of *Valeriana jatamansi* by using Adult earthworms (*Pheretima posthuma)* and Roundworm (*Ascaridia galli).*

MATERIALS AND METHODS

Plant Material: Leaves of Valeriana jatamansi was collected and authenticated from Dr. Y.S. Parmar University, Solan (HP).

Method of Preparation of Extract:

Preparation of hydroalcoholic extract of *Valeriana jatamansi* extract:

Collection, authentication and extraction: Valeriana jatamansi were collected and authenticated from Dr Y S Parmar University, Solan, Himachal Pradesh. The leaves of the plant

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were washed with running tap water and then shade dried. Leaves were cut into small pieces and grinded into coarse powder using a blender. Then 50 g of coarse powder were defatted by using 140 ml of petroleum ether and further the marc was extracted by using 50% ethanol in soxhlet apparatus. The extract was concentrated on water bath and this extract was stored in airtight container in cool place.

Phytochemical screening: The hydroalcoholic extract of the plant was screened for the presence of various phytoconstituents such as carbohydrates, saponin, glycosides, protein, amino acids, alkaloids, terpenoids, tannins, flavonoids, phenolic compounds, and carbohydrates [17, 18]

Animals: Adult earthworms (*Pheretima posthuma),* Roundworm (*Ascaridia galli)* were used to evaluate anthelmintic activity. Earthworms were collected from moist soil and washed with normal saline to remove all faecal matter were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol. Roundworms were obtained from intestine of freshly slaughtered fowls. Infested intestines of fowls were collected from the local slaughter house and washed with normal saline solution to remove all the faecal matter.

Drugs and Chemicals: Albendazole was purchased from Cipla Limited. All the test solution and standard drug solution were prepared freshly before starting the experiments. 100 mg/ml, 200 mg/ml and 400 mg/ml dilutions of ethanolic extract were prepared.

Procedure for anthelmintic activity: All dilutions of test, standard, and control were placed in each of the petri-dishes. Six earthworm and round worms were placed in each of the petri-dishes at room temperature. Observations were made for the time taken for paralysis was noted (when no movement of any sort could be observed in normal saline) and death (death was conducted when earthworms lost their motility and followed by their body colours fading away). All the results were expressed as a mean ±SD [19].

RESULTS

Phytochemical Screening: The phytochemical screening of hydroalcoholic extract of Valeriana jatamansi showed the presence of flavanoids, alkaloids, phenols, tannins and terpenoids.

Anthelmintic Activity: In the present study it was observed that the hydroalcoholic extract of leaves of *Valeriana jatamansi* have shown anthelmintic activity at the doses 100, 200, 400 mg/ml. *Valeriana jatamansi* extract shows dose dependent decrease in paralysis and death time. The extract showed anthelmintic activity in dose-dependent manner giving shortest time of paralysis and death with 400 mg/ml concentration, for both the worms. Evaluation of anthelmintic activity was compared with reference standard Albendazole. The results of anthelmintic activity are shown in table 1 and table 2. Fig. 1 illustrates the paralysis time and and Fig. 2 depicts the death time of *Ascaridia gallis*. Fig. 3 shows the paralysis time and Fig. 4 demonstrates the death time of *Pheretima posthuma*.

DISCUSSION AND CONCLUSION

In our study hydroalcoholic extract of *Valeriana jatamansi* at a dose of 100mg/ml, 200mg/ml and 400mg/ml showed Anthelmintic activities. Helminths are worm like parasites. They are mainly divided into three divisions: Nematodes (Round worms), Cestodes (Tapeworms), Trematodes (Flukes) [12]. There are both hermaphroditic and bisexual species [13]. Ascaridia galli is a parasitic roundworm belonging to the phylum nematode. It is the largest nematode in birds. Pheretima posthum are hermaphrodites having both sex organs. Our study revealed for the first time that the hydro-alcoholic extracts of *Valeriana jatamansi* have anthelmintic activity at the doses of 100, 200 and 400 mg/ml. *Valeriana jatamansi* extract has shown dose dependent decrease in paralysis and death time as compared to Albendazole. This activity may be due to presence of polyphenolic compounds [20]. The wormicidal activity of hydroalcoholic extract of leaves of Valeriana jatamansi demonstrated in this paper suggests that it could be effective in parasitic infections in human beings.

Therefore, it is concluded from the above mentioned finding that the *Valeriana jatamansi* exhibits Anthelmintic activitiy. Thus, further studies are warranted to elucidate the mechanisms responsible for the Anthelmintic activitiy at the molecular levels. The plant may be further explored for its phytochemical profile to recognize the active constituent accountable for anthelmintic activity

Table 1. Anthelmintic activity of test compounds and standard (*Ascaridia gallis).*

Test Compound	Conc.(mg/ml)	Mean of Paralysis Time (min)	Mean of Death Time (min)
Valeriana jatamansi	100	12±2.04	26±2.2
	200	8.6±2.22	19.1±3.18
	400	7.4±2.5	14±3.4
Albendazole (standard)	10	7.1±1.5	3.4±1.8

Table 2. Anthelmintic activity of test compounds and standard (*Pheretima posthuma*)

Test Compound	Conc.(mg/ml)	Mean of Paralysis Time (min)	Mean of Death Time (min)
Valeriana jatamansi	100	14±2.4	27.2±2.28
	200	9.1±3.1	18±3.4
	400	6.25±3.6	12±3.55
Albendazole (standard)	10	5.1±3.2	11±3.36

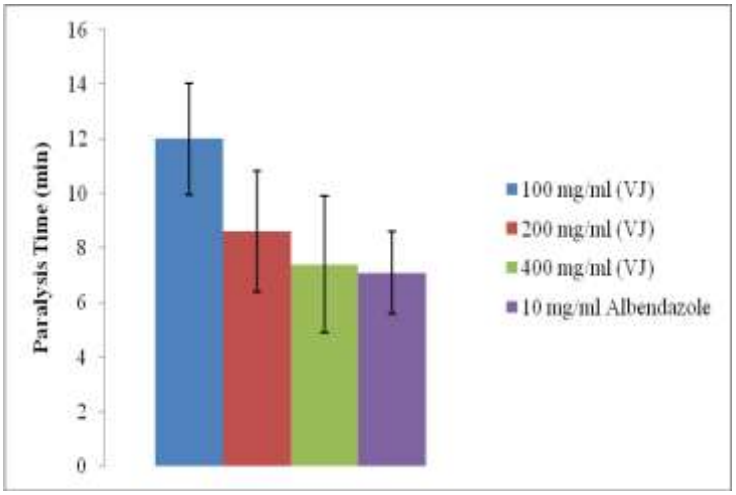

Fig. 1 Paralysis time (min) of crude extract of *Valeriana jatamansi* and Albendazole in *Ascaridia gallis.* Values are expressed as Mean ± Standard derivation. *= p< 0.05 vs Standard.

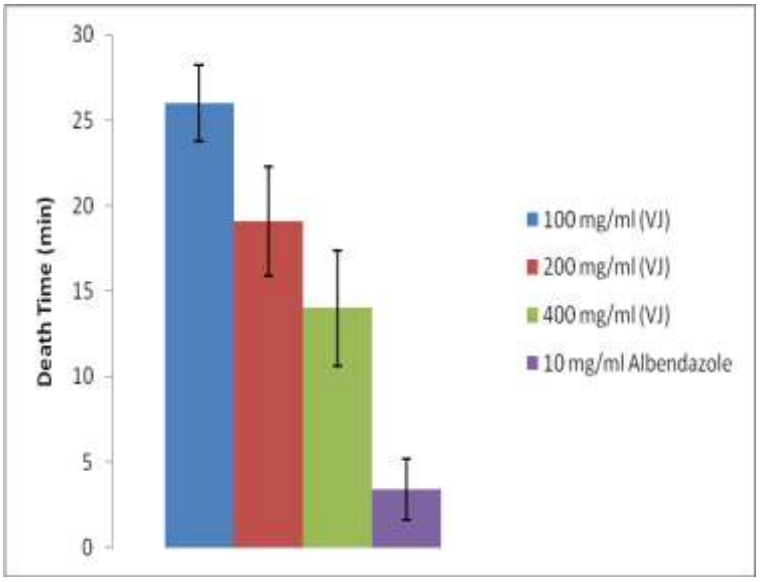

Fig. 2 Death time (min) of crude extract of *Valeriana jatamansi* and Albendazole in *Ascaridia gallis*. Values are expressed as Mean ± Standard derivation

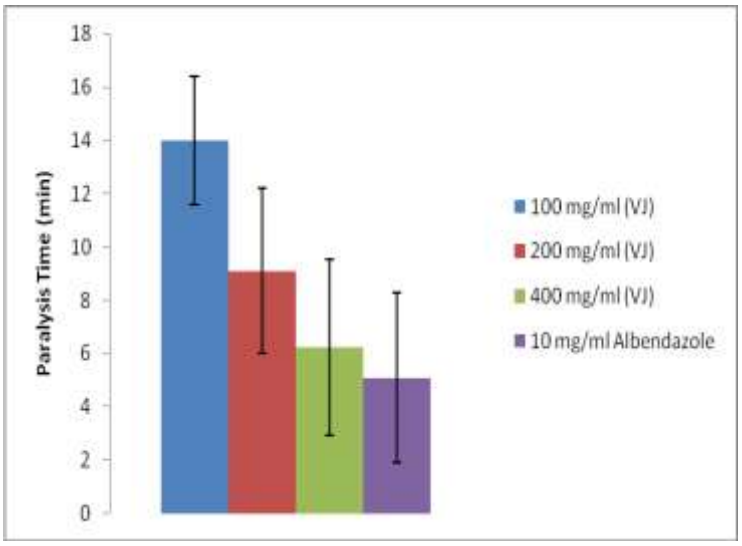

Fig. 3 Paralysis time (min) of crude extract of *Valeriana jatamansi* and Albendazole in *Pheretima posthuma*. Values are expressed as Mean ± Standard derivation. *= p< 0.05 vs Standard.

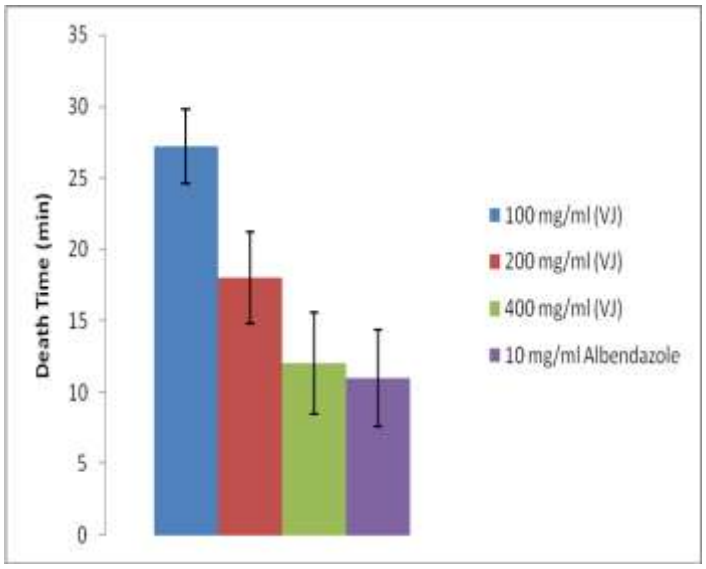

Fig. 4 Death time (min) of crude extract of *Valeriana jatamansi* and Albendazole in *Pheretima posthuma*. Values are expressed as Mean ± Standard derivation. *= p< 0.05 vs Standard.

REFERENCES

1. Qadry, JS. *Pharmacognosy.* BS Shah Prakashan, Ahmedabad, India. 1990.
2. Sonawane A.J et al. Pharmacognostic account of roots of *Valeriana wallichii* DC. Int J Pharmaceut Clin Res. 2012; 4(4):41-3.
3. Ghosh S et al. *Valeriana wallichii* root extracts and fractions with activity against Leishmania spp. Parasitol Res. 2011; 108(4):861-71.
4. Negi J.S et al. Effects of extraction solvents on concentration of valerenic acid and antioxidant property of *Valeriana jatamansi* jones. Int J Pharma Bio Sci. 2012; 3(4):28- 35.
5. Fazal S et al. Anti-inflammatory activity of methanolic and aqueous extracts of *valeriana wallichii* rhizome. Pak J Plant Sci. 2007; 13(2):103-8.
6. Agnihotri S et al. Chemical composition, antimicrobial and topical anti-inflammatory activity of *valeriana jatamansi* jones essential oil. J Essen Oil Bearing Plants. 2011; 14(4):417-22.
7. Khan A, Gilani A. Antidiarrhoeal and bronchodilatory potential of *Valeriana wallichii*. Nat Prod Res. 2012; 26(11):1045-9.
8. Yan Z et al. Anti-anxiety effect of *valeriana jatamansi jones* extract *via* regulation of the hypothalamus-pituitary- adrenal axis. Neural Regen Res. 2010; 5(14):1071-5.
9. You J.S et al. Evaluation of anxiolytic activity of compound *valeriana jatamansi* jones in mice. BMC Comp Alter Med. 2012; 12(223):1-9.
10. Shi S.N et al. The anxiolytic effects of valtrate in rats involve changes of corticosterone levels. Evid-Based Complemen Alter Med. 2014; 1-8.
11. Anthony C.D. An introduction to valerian *Valeriana officinalis* and related species. Thesis, Aintree Avenue, Trowbridge. 1996.
12. Gandhi T.P et al. Elements of Human Anatomy Physiology and Health Education. B.S Shah Prakashan, Ahmedabad. 2005; Chap.21:408-442.
13. Gupte S. The Short Textbook of Medical Microbiology. Jaypee brothers, New Delhi. 2006; Chap 58:413-431.
14. Wakelin D. Medical Microbiology. University of Texas Medical Branch at Galveston, Texas. 1996; Chap. 87.
15. Castro G.A. Medical Microbiology. University of Texas Medical Branch at Galveston, Texas. 1996; Chap. 86.
16. Dandiya P.C. Health Education and Community Pharmacy. Vallabh Prakashan, New Delhi, India. 2006.
17. Trease G.E, Evans W.C. Pharmacognosy, 13 Edition Bailliere Tindall, London. 1989; 176-180.
18. Kokate C.K. Practical Pharmacognosy, 1st Edition Vallabh Prakashan, New Delhi. 1986;111.
19. Haque R, Mondal S. Investigation of in vitro anthelmintic activity of *azadirachta indica* leaves. Int J Drug Develop & Res. 2011; 3(4):94-100.
20. Bate-Smith E.C. The phenolic constituent of plants and their taxonomic significance, dicotylendons. J Linn Soc Bot. 1962; 58:95-103.