

World Inventia Publishers

Journal of Pharma Research

http://www.jprinfo.com/



ISSN: 2319-5622

Research Article

IN-VITRO ANTHELMENTIC ACTIVITY OF HERBAL FORMULATION IN COMPARISION WITH VIDANGASAVA AND ALBENDAZOLE

Vivek Keshri¹*, Dr. K. Rajeshwar Dutt²

* ¹ Ph. D Research Scholar, Shri Jagdish Prasad Jhabarmal Tibrewala University, Jhunjhun, Rajasthan, INDIA. ² Ph.D Research guide, Shri Jagdish Prasad Jhabarmal Tibrewala University, Jhunjhun, Rajasthan, INDIA.

Received on: 09-07-2019; Revised and Accepted on: 24-08-2019

ABSTRACT

Herbal plants received great attention, when the world faces the problems like resistance against the drugs used for the treatment of He1minth and cost of treatment. Novel active compounds and metabolites are reported in various plants, which are now been recognized for its uses in treatment of various diseases. In the past, various plants were used for the treatment of many diseases but because of less data availability not came into the knowledge. In the present study, I developed herbal formulation of various concentration and evaluated for its In- vitro anthelmintic activity. This formulation was developed from two important plants H. indicum and S. indicum. Albendazole and vidangasava was taken as standard drugs (25, 50 and 100mg/ml). My result suggests that formulation at different concentration is having anthelmintic property. The property is because of the presence of a potent phytoconstituent known as tannin. Further I am looking forward to isolate the active constituent and in vivo study of the formulation.

KEYWORDS: Helitropium indicum, Sesamum indicum, Albendazole, Vidangasava, Anthelmintic activity.

INTRODUCTION

Vol. 8, Issue 8, 2019

Global attention toward the herbal medicine is increasing because of its health related benefits and monetary aspect. Herbs are the source of many secondary metabolites. These metabolites are used as potent drugs in traditional and other medicine system from time immemorial. Cases of antibiotic resistance, adverse effect of synthetic medicine and various type of infection has been increased from past few decades. The improvement in phyto-chemistry and detection of novel bioactive components from herbs has changed the reputation of herbal medicines ^[1].

As per WHO, helminth infect more than 1.5 billion of people all around the earth. Anemia, pneumonia, eosinophi1ia, and malnutrition are the most important health issues related to these helminthic infections. There are around 350 species of helminths, of them Ascaris lumbricoides (round worm), pheritima posthuma (intestinal round worm), Ancylostoma duodenale (hookworm), Trichuris trichura (whipworm), Taenia solium (tapeworm), and Strongyloides stercoralis (thread worm) are the main causative means of helminthiases

* Corresponding author: Vivek Keshri Ph. D Research Scholar, Shri Jagdish Prasad Jhabarmal Tibrewala University, Jhunjhun, Rajasthan, INDIA. * E-Mail: <u>vivekkeshri5@gmail.com</u>

DOI: https://doi.org/10.5281/zenodo.3382173

transmitted through soil ^[2]. The largest part of human population is suffering from infection of helminths in developing and less developed countries. This infection creates a key challenge to public health and it is mainly faced by millions of school children. Helminths are worm-like organisms which lives and obtain food from the alive host and upset the absorption mechanism of nutrition. Undeveloped forms of the parasite invade human via the skin or GI tract and enlarge into healthy adult worms. Worms are mostly present in the GI tract but can also affect liver & other major organ. Infected person excrete eggs of heliminth in faeces, which further contaminate soil. When other person are coming in contact with these eggs or larvae, are receiving infection. This infection has severe morbidity like filariasis, schistosomiasis etc ^[3].

Anthelmintics are the anti-parasitic medicines which locally act to eject worms out of gastrointestinal tract or systemically to eradicate adult helminths with no significant harm to the proprietor [4]. Most commonly used drugs are albendazole, mebendazole, livamisol praziquantel, diethyl carbamazine, and invermectin. These drugs are acting by paralysing the worm, hurting the parasite such that our immune can eliminate it, or by altering its metabolic process. As the metabolic requirements vary from species to species, drugs which are highly efficient against one worm are useless against others. Since the prevalence of helminth infections is common, its treatment is of practical therapeutic importance although available synthetic drugs have some potential side effects [5]. The cost and limited accessibility of these medicines call for the explorer of other economical anthelmintic agents. Development of resistance to the majority of the commercially available anthelmintics drugs are turn into a brutal problem worldwide.

These things opened the line for herbal remedies as alternative anthelmintics ^[6]. In sight of this, I made an effort to evaluate the anthelmintic action of herbal plant. During this study I made a comparision of anthelmintic property of vidangasava (a marketed herbal formulation) and albendazole with my herbal formulation. Herbal medicines will be reasonably economical and also have lesser undesired outcomes in contrast to synthetic therapeutic agents. The anthelmintic activity was evaluated on adult Indian earthworm, Pheretima posthuma (P. posthuma) as its anatomical and physiological likeness with all the intestinal round worm parasites of human beings and easy availability ^[7].

Heliotropium indícum (Boraginaceae) - commonly called as Indian Turnsole, is an herb, woody at bottom. Plant is scattered in the tropical and temperate regions of the world and is available throughout india. The whole plant is claimed to hold medicinal importance. In Ayurveda, leave's juice is applied on boils, pimples, ulcers, sores and wounds to heal. In Belize, the plant is employed for the management of diarrhea, malaise or vomiting and nausea in infant. The leaves are employed in the of ophthalmic disorders, management erysipelas, pharyngodynia, and anti-inflammatory, antí-tumor. The roots of the plant are employed as expectorant, astringent and febrifuge. The leave's extract was shown to be effective against Schwart's leukemia, wound healing and anti-inflammatory activities [8]. The root segment of this plant was greatly used in traditional as well as in current era. Presence of phenyl propanoids, phenolic acids, flavonoids, coumarins, sterols and pentacyclic triterpenoids was reported in root [9].

From ancient time seeds of Sesamum indicum is used as spice. Oil of S. Indicum has been employed from thousands of years and till date it is worldwide important. Sesame oil is rich source of protein and is employed in margarine manufacturing and as food preparation oils. Non-culinary uses include its application as a component in lubricants, cosmetics, soap and drug. South Indians used it for anoint the hair and body. Meal containing Sesame is superb feed for livestock and poultry. Sesamolin has insecticidal properties and is employed as an adjuvant of pyrethrum insecticides [10]. Sesamin, myristic acid and sesamolin obtained from sesame have been reported for antioxidant and health supporting activities. Chlorosesamone found in the roots has antifungal property [11]. Sesame oil is employed as a solvent, oleaginous vehicle for medicine, and skin softening agent. Sesame oil is a pharmaceutical abet employed as a solvent for intramuscular injections and has demulcent, nutritive, and emollient quality and has been employed as a laxative. A clinical trial had shown the efficacy of sesame oil for managing nasal mucosal dryness instead of isotonic solution of sodium chloride^[12]. The seed are employed for the prevention of cancer and heart related disease as its consumption amplify plasma gamma-tocopherol and boost up activity of vitamin E. Additionally, sesame oil carry huge quantity of linoleate in triglyceride type which selectively hesitate malignant melanoma extension. Indians have applied sesame oil as an antibacterial mouth wash and for relaxing from anxiety and problem of insomnia^[13].

Vidangasava is formulation prepared from vidang and 17 other herbs. In this formulation there is auto generation of a1cohol. It is indicated for expulsion of warms from intestinal tract, some skin disorder, digestive disorder and during loss of appetite. Its recommended dose is 15–30 m1 of vidangasava mixed in same volume of water for two times in a day. Vidang mainly contain a benzoquinone derived component called embelin. Other than this it also contain embeliaribyl ester, embelinol, Potassium embelate and embeliol. Vidang is recommended for the curing of acne of diverse ailments likefungal infection, Worms, bacterial infection, cancer, Wounds and diabetes ^[14].

From my review I found that both the plants were traditionally applied against the worm, however no exact information has yet reported. So, I carried out my research work to find out the anthelmintic activity of herbal formulation prepared by the selected plant and its comparison with a marketed Ayurvedic and allopathic formulation.

MATERIAL AND METHOD

Collection of plant material and Extraction:

Fresh root was collected from puliarai village of Tirunelveli district Tamilnadu and authenticated by V. Chelladurai, research officer, CC RAS, India. White sesamum indicum seed was purchased from the local market. The root and seed was shade dried and powdered mechanically. Extraction was carried by using soxhlet apparatus and methanol as solvent. The dried extract after evaporation was stored at four degree temperature for further work.

Chemicals and drugs:

Albendazo1e was employed as standard. Methanol and distilled water were used in the experimental procedure. All agents were laboratory and analytical grade.

Experimental worms:

For the experiment Indian adult earth worms (Pheretima posthuma) were employed. Pheritima posthuma are commonly identified earthworm. They were collected from wet logged part of soil. Normal saline was used for the washing of worms and all faecal matter was removed properly. The worms of 7–9 cm in length and thickness of 0.2-0.4 cm were employed in this experimental protocol. Ready accessibility, anatomical and physiological resemb1ance focused to use for in–vitro assessment of anthelmintic activity ^[15].

Development of formulation:

The formulation was developed by using equal quantity of both extract in 1:1 ratio. 5g of each extract was weigh accurately and mixed with measured quantity of K sorbate (0.2 g), sorbitol (5 g) and sucrose (10 g). The mixture then transferred to uncontaminated motor. Tween eighty (0.1 g) and small part of Na CMC (0.5g) were put into the mixture. The mixture was blended systematically to get a silky paste. Residual quantity of Na CMC (1.5 g) next added to get slurry. The slurry was then move to uncontaminated volumetric pot of 100ml. To this lemon oil (0.01 g) added. Volume was brought to 100ml by adding plenty of refine water. The outcome of formulation was a homogeneous suspension. Every one ml of this suspension will contains 100 mg of extract.

Assay for Anthelmentic Activity:

The earthworms were divided into 10 groups of each 6 worm. Worms were kept into 20 ml of the experimental formulation placed in petri dishes. The flrst group was made normal control and is pleased with normal saline. The 2nd, 3rd and 4th group were kept as allopathic standard, and treated with albendazole 25, 50, 100 mg/ml in tween 20 (1 %) diluted with normal saline. The 5th, 6th, and 7th groups were kept as Ayurvedic standard and treated with vidangasava 25, 50 and 100 mg/ml in tween 20 (1 %) diluted with normal saline. The methanolic extracts of plants in formulation at various

Vivek Keshri, et al.

concentrations (25, 50, and 100 mg/ml) comprises the 8th, 9th, and 10th groups. Formu1ation and standard solutions were prepared freshly before starting the experiment. The mean paralysis time was note down by confirming refusal of movement by earthworm and the fatality time was confirmed once worms neither shifted while oscillation nor while external stimuli given by keeping worms in fifty degree hot water ^[1]. Deaths were approved after confirming no movement and the emergence of a colorless discharge and vanishing of body colour. Expression of death time and paralysis time were

RESULTS

represented in mean ± SEM. P < 0.05-0.01 reflect as statistically significant.

Data Analysis:

Mean \pm Standard error of mean was used for presentation of the data. Activity shown by the formulation at different concentration was judge against the activity of albendazole and vidangasava at varying concentration. P <0.05, consider as significant.

S. No.	Groups	Concentration	Paralysis Time (Min)
1 N	ormal saline		
2	ALB I	25 mg/ml	18.33±0.49
3	ALB II	50 mg/ml	14.17±0.60
4	ALB III	100 mg/ml	5±0.37
5	VDS I	25 mg/ml	12.33±0.49
6	VDS II	50 mg/ml	8.33±0.67
7	VDS III	100 mg/ml	3.33±0.42
8	FR I	25 mg/ml	24.33±0.91
9	FR II	50 mg/ml	17.67±0.67
10	FR III	100 mg/ml	13.83±0.65

Table No. 1: Paralysis Time



Graph. 1: Paralysis Time

Table No. 2: Death Time

S. No.	Groups	Concentration	Death Time (Min)
1	Normal saline		
2	ALB I	25 mg/ml	31.50±0.43
3	ALB II	50 mg/ml	25.50±0.85
4	ALB III	100 mg/ml	7.16±0.31
5	VDS I	25 mg/ml	19.50±0.43
6	VDS II	50 mg/ml	10.83±0.48
7	VDS III	100 mg/ml	5.83±0.40
8	FR I	25 mg/ml	35.00±0.89
9	FR II	50 mg/ml	28.67±0.76
10	FR III	100 mg/ml	20.00±0.97



Graph. 2: Death Time

DISCUSSION

Anatomical similarities of Earthworms have been reported in comparison with the intestinal worms like roundworm, tapeworm, pinworms etc. Moreover, physiological resemblance in mode of action have also found between them. The present study exposed that formulation has proven notable anthelmintic activity. Findings were drawn from the time needed to paralysis and cause fatality of individual worms when treated by the standard drug Albendazole and vidangasava. Three different concentration of each were taken for the study. Time required paralysing the worm by albendazole at 25, 50 and 100mg/ml were 18.33±0.49, 14.17±0.60 and 5.00±0.37. For vidangasava it was 12.33±0.49, 8.33±0.67 and 3.33±0.42. With respect to both my formulation was having 24.83± 0.91, 17.67± 0.67 and 13.83± 0.65 respectively. Time required to cause death by albendazo1e were 31.50± 0.43, 25.50± 0.85 and 7.17± 0.31, for vidangasava it was 19.50± 0.43, 10.83± 0.48 and 5.83± 0.40 respectively at 25, 50 and 100mg/ml. So, the result shows that formulation is having anthelmintic activity.

Albendazo1e combined with the free ß-tubulin, restricting its polymerization and thus hindering microtubule based glucose consumption by the worms. Albendazole is having choosy inhibitory action on microtubular function of helminths. In vidangasava, Embeline was found which was acquired from Embelia ribes. It is a cognate of benzoquinone, which impart the anthelmentic activity to vidangasava. The formulation was developed from H. Indicum and S. Indicum. Both the plant had reported the presence of Tannins, alkaloids, steroid etc. The tannins were reported for anthelmintic activities [16]. Tannins are having polyphenolic group in its structure. Some phenolic anthelmentics derived synthetically are Albendazole, Oxyclozanide, Niclosamide, Bithionol etc., shown their activity by interfering with energy creation in helminth due to uncoupling oxidative phosphorylation. It may be possible that tannins in the formulation produced its effect in the similare way. Another mechanism may be due to binding of tannins to free protein present in GIT of host [17] or due to its binding with glycoprotien on cuticle of parasite [18].

CONCLUSION

From my study I came to conclusion that formulation containing root of H. Indicum and seeds of S.Indicum as methanolic extract posse's anthe1mintic activity. Tannins were recognized as an important constituent, which is common in both plants, for the proposed activity. Further investigation is needed for isolation of active constituent responsible for the activity and study on In- Vivo model to ascertain effectiveness of formulation.

ACKNOWLEDGEMENT

I am very much thankful to my Ph.D guide Dr. K rajeshwar Dutt, Principal Nalanda college of Pharmacy. Telangana. for his moral support, direction and guidance to complete this work.

REFERENCES:

- 1. Chandra P, et al. Analysis of Phytochemical constituents and Anthelmintic activity of leaf extract of Mímosa pudica L. AJBPS **2018**;8(65);1-5.
- 2. WHO soiltransmitted helmenth infection. **2014**; http// www.who. Int./media center/ actsheet/ 366.
- 3. Anonymous, The Wealth of india, A Dictionary of raw materials and industrial product. CS1R, **1997**;II:81.
- 4. Aaer M, et al. Cytotoxic effect of albendazole, anti-parasitic drug, on the liver of the rats. Egy J Biol **1999**;1:16-29.
- 5. Udavant PB, et al. In-vitro anthelmintic activity of stems of Cuscuta reflexa. Int J Bioassays **2012**;1(8): 18–19.
- Joshi UP, & Wagh RD. In -vitro anthelmintic activity of Ethritia levis bark on indian adult earthworm. IJPRS 2018;7(4):22-30.
- 7. Gögoi B, et al. "Ín vitro antihelmintic activity of bark extract of Cinnamomum bejolghota in Indian adult earthworm. Asian Pacific J Trop Disease **2014**;S924-27.
- Shenoy A & Shastry. Anti- ulcer activity of H. Indicum leaves extract. 1JPSR 2011;2(10):2651-54.

Vivek Keshri, et al.

- 9. Alexender A & Sharma. Pharmacognostical & phytochemical investigation of root of H. indicum linn. IJPSR **2011**;2(6):1569-71.
- 10. Morris JB. Food, industrial, nutraceutical, and pharmaceutical use of sesame genetical resource. Trend in new crop and new use; ASHS press, Alexandria: **2002**; 153–56.
- 11. Begum S, et al. A new chlorinated red naphtha-quinone from roots of Sesamum Indicum. Biosci Biotech & Biochem **2000**;64;873-74.
- 12. Johnson J, et al. Pure sesame oil verses Isotonic sodium chloride solution as management for dry nasal mucosa. Arch. Otolaryngol Head Neck Surg **2001**;127;1353-56.
- 13. Anil K, et al. In vitro antioxidant activities of sesamum Indicum seed. AJPCR **2012**;5(1);56–60.

- 14. Jain S, et al. Quantitative analysis of Embeline in an Ayurvedic formulation Vidangsava by using UV spectrophotometer. Indo Am J P Sci **2016**;3(9);1009-13.
- 15. B. Lavanya, et al. In-vitro comparat1ve study of anthelmintic activity of Brassica Juncea and Brassica oleracea. J Pharm Res **2011**;4(9):2907.
- 16. Niezen JH, et al. Growth and gastrointestinal nematode parasitism in lambs grazing either lucerne (Medicago sativa) or sulla (Hedysarum coronarium) which contains condensed tannins. JAS **1995**;125(2): 281-89.
- 17. Martin RJ. Mode of action of anthelmintic drug. The Veterin J **1997**;154(1).
- 18. Thompson DP, et al. The structures and functions of helminth surface. Biochemistry and molecular biology of parasites. **1995**;203-232.

How to cite this article:

Vivek Keshri, et al. *IN-VITRO* ANTHELMENTIC ACTIVITY OF HERBAL FORMULATION IN COMPARISION WITH VIDANGASAVA AND ALBENDAZOLE. J Pharm Res 2019;8(8):619-623. **DOI:** <u>https://doi.org/10.5281/zenodo.3382173</u>

Conflict of interest: The authors have declared that no conflict of interest exists. Source of support: Nils