

Anthelmintic Activity of a Polyherbal Preparation

^{1*}Dwivedi A., ²Dwivedi S., ³Sitoke A. K., ³Patel R. and ⁴Jhade D.

¹NRI Institute of Pharmaceutical Sciences, Bhopal, M.P., India

²Chordia Institute of Pharmacy, Indore, M.P., India

³Dept. Of Pharmaceutical Chemistry, SRM College of Pharmacy,
SRM University, Kattankulathur, Chennai, T.N., India

⁴School of Pharmacy, Chauksey Engineering College, Bilaspur, C.G., India

*Corresponding Author: 14/473, Sanjay Nagar, Rewa, M.P.-India (486001)
Mob. No. 09893077870, E-mail: abhiherbal@gmail.com

Issued 30 January 2009

ABSTRACT

The present study was done with the aim to investigate the anthelmintic activity of polyherbal formulation containing herbs *Thespesia populnea* (bark), *Terminalia alata* (bark), *Clematis triloba* (roots) and *Ceratophyllum demersum* (leaves) using adult earthworm *Pheritima posthuma*. The aqueous and ethanolic extract of the crude drug of different concentration were tested which involve determination of paralysis time and time to kill the worms. Piperazine citrate was used as standard and it was found that the PHF ethanolic extract activity is higher than PHF aqueous extract.

KEY-WORDS: Anthelmintic activity, Piperazine citrate, Earthworm, Polyherbal.

INTRODUCTION

Anthelmintics or antihelminthics are drugs that expel parasitic worms (helminths) from the body, by either stunning or killing them. They may also be called vermifuges (stunning) or vermicides (killing).¹ The ability of worms to survive treatments that are generally effective at the recommended dose rate is considered a major threat to the future control of worm parasites of small ruminants and horses.² Helminthes infections are now being recognized as cause of many acute as well as chronic ill healths among the various human beings as well as cattle's. More than half of the population of the world

suffers from infection of one or the other and majority of cattle's suffers from worm infections.⁶ Treatment with an antihelminthic drug kills worms whose genotype renders them susceptible to the drug. Worms that are resistant survive and pass on their "resistance" genes. Resistant worms accumulate and finally treatment failure occurs. Intestinal worm infections in general are more easily treated than those in other locations in the body.³ Because the worms need not be killed by the drug and the drug need not be absorbed when given by mouth, there is usually a wider margin of safety than with drugs for worm infections in other sites. Piperazine, introduced into human medicine about 1950 and shortly thereafter into veterinary medicine, relaxes the large intestinal roundworms (ascarids) and pinworms (oxyurids) of man and domesticated animals so that they are eliminated with the feces. Piperazine, still extensively used for infections of domesticated animals, including poultry, was superseded by the more active pyrvinium pamoate for the treatment of human pinworm infection.^{4,5} Traditional system of medicine reports the efficacy of several natural plants in eliminating worms⁷; the present work was conceived by us to evaluate the anthelmintic activity of polyherbal preparation containing *Thespesia populnea* (bark), *Terminalia alata* (bark), *Clematis triloba* (roots) and *Ceratophyllum demersum* (leaves) using adult earthworm *Pheritima posthuma*.

MATERIAL AND METHODS

Collection of Plant Materials

The plants *Thespesia populnea* (bark), *Terminalia alata* (bark), *Clematis triloba* (roots) and *Ceratophyllum demersum* (leaves) were collected from the Agricultural College and rural peoples of Indore District of Madhya Pradesh, India during Jan-May 2008 and then authenticated and confirmed by Dr. S. N. Dwivedi, Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, Madhya Pradesh, India. The plant parts after collection were shade dried, powdered (40 mesh size) to get a coarse powder.

Preparation of Extract

The dried powder material of *Thespesia populnea* (bark): 50 gm, *Terminalia alata* (bark): 50 gm, *Clematis triloba* (roots): 50 gm and *Ceratophyllum demersum* (leaves): 50 gm were thoroughly mixed, taken in 1 lit. beaker and distill water in sufficient quantity was added, then it was kept for maceration for 72 hours. The aqueous extract obtained was filtered and concentrated on hot plate. The ethanolic extract were obtained by soxhlet extraction process, the extract obtained was filtered and concentrated.

Experimental Model

Adult earthworm *phertima prosthuma* were collected (due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human being) from moist soil, obtained from Agriculture College Indore, M.P.-India. Four groups of approximately equal

size earthworms (8+1 cm) consisting of six earthworms in each group were used for the present study.^{8,9,10} Piperazine citrate is taken as standard drug and the concentration of the standard drug was prepared in 1% normal saline to obtained 0.5, 0.75 and 1.0 gm% concentration. The PHF extract (both aqueous and ethanolic) were prepared in minimum quantity of distill water and diluted to 15 ml with normal saline to obtained 0.5, 0.75 and 1.0 gm% concentration.

Anthelmintic Activity

Four groups of approximately equal size earthworms consisting of six earthworms in each group were used for the present study. Group first serve as control, receive only normal saline; Group second serve as test-1, receive PHFAE; Group third serve as test-2, receive PHFEE and Group four serve as standard, receive standard drug piperazine citrate of different concentration. Observations were made for the time taken to paralysis and death of individual worms. Paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lost their motality followed with fading away of their body color.^{10,11,12} The results were analysed for stastical significance using one-way ANOVA followed by Dunnett’s ‘t’ test and are presented in (Table 1).

RESULTS AND DISCUSSION

The polyherbal prepration of aqueous and ethanol extracts showed significant anthelmintic activity. The result of anthelmintic activity of on earthworm’s phertima prosthuma was given in Table 1. Thus the present study reveals that the ethanolic extract of *Thespesia populnea* (bark), *Terminalia alata* (bark), *Clematis triloba* (roots) and *Ceratophyllum demersum* (leaves) showed marked and potent anthelmintic activity, (though all these plants alone exhibit anthelmintic activity but when combined will give more potent activity) than the aqueous extract of *Thespesia populnea* (bark), *Terminalia alata* (bark), *Clematis triloba* (roots) and *Ceratophyllum demersum* (leaves) as compared to standard drug piperazine citrate and the this preparation will effectively kill the worms.

Table 1: Anthelmintic activity of PHF.

S/N	TREATMENT	CONC. (gm %)	PARALYSIS TIME (min.)	DEATH TIME (min.)

1.	Normal Control	0.5	-	-
		0.75	-	-
		1.0	-	-
2.	Aqueous Extract	0.5	70 $\pm$ 0.68	102 $\pm$ 1.25
		0.75	35 $\pm$ 0.43	80 $\pm$ 0.78
		1.0	27 $\pm$ 0.25	50 $\pm$ 0.67
3.	Ethanolic Extract	0.5	80 $\pm$ 0.47	110 $\pm$ 1.15
		0.75	45 $\pm$ 0.58	90 $\pm$ 0.1.05
		1.0	31 $\pm$ 0.62	75 $\pm$ 0.44
4.	Standard Drug	0.5	43 $\pm$ 0.65	90 $\pm$ 1.42
		0.75	30 $\pm$ 0.59	70 $\pm$ 0.97
		1.0	23 $\pm$ 0.41	50 $\pm$ 1.10

Results expressed as Mean $\pm$ SEM from 6 observations, $p < 0.001$ as compared to standard

ACKNOWLEDGEMENT

Authors are thankful to Dr. S. N. Dwivedi for the identification of plants and also thankful to the Principal, Chordia Institute of Pharmacy, Indore M.P. for providing the facility in the institute.

REFERENCES

1. The Merck Index, 12th Ed., page 1119: entry 6611 Nicotine, Merck & Co. 1996
2. Arnold, M.D., Harry L. (1968). *Poisonous Plants of Hawaii*. Tokyo, Japan: Charles E. Tuttle Co.. pp. 51.
3. Peganum harmala" (2004). Retrieved on 2008-02-02
4. Department of the Army Headquarters (2004). *U.S. Army Survival Manual Fm 21-76*. Barns & Noble Inc
5. Encyclopædia Britannica. 2009. Encyclopædia Britannica Online. 22 Jan. 2009
6. Dwivedi S N, Herbal remedies among the tribals of Sidhi District of Madhya Pradesh, *Jour. of Econ. Tax. Bot.*, 20(3), 2004, 675-687.
7. Dwivedi S, Dwivedi S N, Shrivastava S, Dwivedi A, Dwivedi S and Kaul S, Relevance of

medicinal herbs used in traditional system of medicine, *Farmavita. Net*, 2007, Aug.

8. Blakemore R, Diversity of exotic earthworms in Australia- A status report. Transactions of the Royal Zoological Society of New South Wales, 1999.
9. Gunasekhararan R, Divyakant A, Senthilkumar KL, Anthelmintic activity of bark of *Neolamarckia cadamba* Roxb., *Ind. J. Nat. Prod.*, 22(1), 2006, 11-13.
10. Dwivedi S., Dwivedi A., Kapadia R. and Kaul S.(2008). Anthelmintic activity of alcoholic and aqueous extract of fruits of *Terminalia chebula* Retz., *Ethno. Leaflets*, 12:741-743.
11. Kailashraj R. and Kurup A., *Ind. J. Phar.*, 1962, 74.
12. Jayachandran E., Bhatia K., Naragunda, LVG and Roy A., *Indian Drugs*, 2003, 40 (7), 408.