

IN VITRO ANTHELMINTIC ACTIVITY OF SOME ESSENTIAL OILS

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(Received September 7, 1989; revised January 30, 1991)

The essential oils from the leaves of *Artabotrys odoratissimus*, inflorescence of *Capillipedium foetidum* and the grass of *Cymbopogon martini* possess very good to moderate anthelmintic activity against *Pheretima posthuma* (earth worms), *Taenia solium* (tape worms) and *Ascaris lumbricoides* (round worms). The activity exceeds the efficacy of piperazine phosphate.

Key words: Anthelmintic activity, Essential oils.

Introduction

Helminthiasis, or worm infestation, is one of the most prevalent diseases in the world. The parasites which infest the intestines are hook worms, round worms, thread worms, pin worms and tape worms. Some essential oils and their constituents or related compounds like chenopodium oil, thymol, santonin and thujone etc. are known to possess anthelmintic properties [1-5]. The present communication reports *in vitro* anthelmintic activity of the essential oils from the grass *Cymbopogon martini*, the inflorescences of *Capillipedium foetidum* and the leaves of *Artabotrys odoratissimus* against earth worms (*Pheretima posthuma*), tape worms (*Taenia solium*) and round worms (*Ascaris lumbricoides*).

Experimental

The essential oils from the grass of *C. martini* variety Motia, inflorescences of *C. foetidum* and the leaves of *A. odoratissimus* were extracted by hydro distillation in a Clevenger's apparatus [6] and dried over anhydrous sodium sulphate when yield of 1.2% [7], 1.2% [8], and 0.24% v/w were obtained respectively. The earthworms were collected from the soil in the month of July and the tape worms and round worms were procured from the local hospital. The anthelmintic activity was determined by the procedure described by Gaind *et al.* [9].

Activity against earth-worms (*Pheretima posthuma*). Emulsions of essential oils of *C. martini*, *C. foetidum*, and *A. odoratissimus*, were prepared in 1% Tween 80 emulsifier in distilled water and were diluted to give 0.5%, 1% and 2% concentrations. Solutions of similar concentrations were also prepared by dissolving the reference drug piperazine phosphate in distilled water. Two ml of each essential oil emulsion and standard drug solution were diluted to 10 ml separately with normal saline to make the dilutions of 0.1%, 0.2% and 0.4% and poured into petri plates (6 inches diameter). Two ml of Tween 80 was diluted to 10 ml with normal saline (9 gm of NaCl GR in water and diluted to 100 ml)

and was used in blank (control). Six earth worms of approximately the same size (5 inches) were washed with normal saline and placed in each petri plate, containing different emulsions of the essential oils and the time taken for complete paralysis and death was observed. The time required by the earthworms to become motionless was noted as paralysis time. The death of the worms was ascertained by transferring them to warm water at 40°.

Activity against tape-worms (*Taenia solium*). The same procedure was adopted except that the tape-worms were used instead of the earth-worms. The activity was compared with that of piperazine phosphate.

Activity against round-worms (*Ascaris lumbricoides*). The procedure adopted was essentially the same. All the results are recorded in Table 1.

TABLE 1. *IN VITRO* ANTHELMINTIC ACTIVITY OF SOME ESSENTIAL OILS.

S. No.	Test samples	Time in minutes for paralysis/death					
		Earth worms		Tape worms		Round worms	
		Para-lysis	Death	Para-lysis	Death	Para-lysis	Death
1.	Essential oil of <i>C. martini</i>						
	0.1%	26	50	20	35	24	47
	0.2%	20	35	16	27	19	30
	0.4%	13	25	9	20	12	24
2.	Essential oil of <i>A. odoratissimus</i>						
	0.1%	28	60	20	35	26	50
	0.2%	24	42	16	28	20	40
	0.4%	20	36	7	20	16	32
3.	Essential oil of <i>C. foetidum</i>						
	0.1%	30	65	37	72	50	106
	0.2%	21	45	31	66	35	77
	0.4%	12	29	18	32	20	35
4.	Piperazine phosphate						
	0.1%	59	115	62	128	60	125
	0.2%	44	70	40	90	39	85
	0.4%	22	40	26	44	23	40
5.	Control	—	—	—	—	—	—

Results and Discussion

Table 1 demonstrates that the essential oils from *Cymbopogon martini*, *Artabotrys odoratissimus*, and *Capillipedium foetidum* have shown excellent to good anthelmintic activity against earth worms, tape worms and round worms. The control solution did not show any anthelmintic activity even after 24 hrs.

The three dilutions of the essential oil of *C. martini* have exhibited very good anthelmintic activity against tape worms > round worms > earth worms. The activity against tape worm is three times better than standard piperazine phosphate. The essential oil of *C. martini* is 67% and 53% more active than the standard drug piperazine phosphate against round worms and earth worms.

The three dilutions of the essential oil of *A. odoratissimus* have indicated very strong anthelmintic activity. The activity of this oil is higher than the same dilutions of standard piperazine phosphate. Time required for paralysis and death of tape worms, in the case of this oil, is over three times more rapid than the standard. The oil is 53% more active than piperazine phosphate against round worms.

The essential oil of *C. foetidum* has also revealed good anthelmintic activity against all the three worms, but its activity is lesser than the other two test oils. It is 40% and 30% more active than the standard drug against earth worms and tape worms. The order of activity of the oil is earth worms > tape worms > round worms.

The strong *in vitro* anthelmintic activity of these oils against tape worms, round worms, and earth worms may be

exploited in combatting several helminth oriented diseases after *in vivo* and toxicological studies.

Acknowledgements. The authors are grateful to M.P. Council of Science & Technology, Bhopal to carry-out the present investigations (MP- 16). Sincere thanks are also due to Dr. R.L. Tandon, C.M.O., J.P. Hospital, Bhopal, M.P. for providing tape worms for this study.

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