SCREENING OF SOME INDIGENOUS PLANTS FOR ANTHELMINTIC ACTION AGAINST HUMAN *ASCARIS LUMBRICOIDES*

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Summary: Alcoholic extracts of stem of *Helleborus niger*, rhizomes of *Acorus calamus* and *Zingiber officinale* and seeds of *Carum copticum*, *Agati gratifolia* and *Mangifera indica* showed *in vitro* anthelmintic activity against human *Ascaris lumbricoids*.

Key words: plant extracts anthelmintic activity *ascaris lumbricoides*

INTRODUCTION

Success in the isolation and pharmacological study of palasonin (2, 3), an anthelmintic principle from the seeds of *Butea frondosa* led us to carry out the present work. Twenty one plants which are traditionally reported to be useful as anthelmintics (4) were evaluated for their action against round worms *in vitro*.

MATERIALS AND METHODS

Fresh plant materials (Table I) were obtained with the help of a Botanist. These were airdried and 50 *g* each of the dried and powdered sample was then extracted by keeping in 100 *ml* ethanol at room temperature (25 to 28°C) for 24 *hr*. After filtration, the residue was again kept in 100 *ml* ethanol for 24 *hr* and both the aliquots were pooled. On removal of the solvent from the pooled extract, first under reduced pressure and then in the vacuum, a semisolid or solid mass was obtained. The dried extract was used for the assay.

Anthelmintic activity of the materials was determined *in vitro* by using the human round worms *Ascaris lumbricoids*. They were collected from the local hospitals when untreated patients spontaneously passed them in vomitus or in faeces. These were brought to the laboratory washed with water and maintained at 37°C for 24 *hr* in screw-capped, cylindrical, amber-coloured bottles of 250 *ml* capacity. The bottles contained modified tyrode solution (composition in *g/l*: NaCl 8, KCl 0.2, $CaCl_2$ (anhydrous) 0.2, $MgCl_2$ 0.5, $NaHCO_3$ 0.15, Na_2HPO_4 0.5 and glucose 5.0) to make about 50 *ml* medium per worm. The worms have anaerobic metabolism and do not need oxygen. The pH of the medium was adjusted to 7.5 using Na_2HP0_4 to check the drop in pH of the medium during the incubation, which is probably due to accumulation of acids. After a 24 hr incubation period, the most active worms of both sexes were selected and used for the assay.

The individual plant extract from 50 *g* of the plant material was brought to pH 7.5 using 4% W/V sodium hydroxide in water and then mixed with modified tyrode solution. Extracts

of *Cleoma viscosa* did not dissolve in the medium. They were mixed with about 50 *mg* of Fuller's earth to obtain a fine suspension. The extracts of *Cassia tora* and *Nigella sativum* were only sparingly soluble in the medium necessitating frequent shaking-up of the bottles. In each experiment 100 *ml* of the incubation medium contained 2 worms and 3 experiments were conduced for the extract of every plant. The worms were then incubated at 37°C during which they were observed frequently. In control experiments, modified tyrode solution alone was used.

The movements of the worms in incubation medium increased on exposure to bright light (after removing the screw-cap the bottles were left open followed by switching on of all the tube lights in the laboratory) or when touched with a glass rod. These two stimuli were used to determine paralysis in doubtful cases. Paralysed worms which did not move even after 1 min exposure to light or when they failed to show any sign of movement within 4 hr in a drug-free modified tyrode were taken as dead.

The data on *in vitro* anthelmintic activity of the extracts of 21 plants are given in Table I.

TABLE I: Effects of the extracts of plants on human *Ascaris lumbricoides in vitro*.

No.	*Plant*	*Parts*	*Activity*		
			Stimulation	*Paralysis*	*Death*
1.	*Acorus calamus*	rhizome	—	++	+
2.	*Agati gratifolia*	seeds	—	+++	+
3.	*Benincasa cerifera*	seeds	—	—	—
4.	*Carum copticum*	seeds	—	+++	+
5.	*Cassia tora*	seeds	—	+	—
6.	*Citrus limonum*	seeds	—	+	—
7.	*Caesalpinia bonduc*	seeds	—	+	—
8.	*Curcuma longa*	rhizome	+	+	—
9.	*Cleome viscosa*	seeds	—	+	—
10.	*Cucurbita maxima*	seeds	—	+	—
11.	*Citrullus colocynthis*	seeds	—	+	—
12.	*Clerodendron infortunatum*	leaf	—	—	—
13.	*Erythrina indica*	bark	—	—	—
14.	*Embelia officinalis*	seeds	—	—	—
15.	*Helleborus niger*	stem	—	+++	++
16.	*Holarrhena antidysenterica*	bark	—	—	—
17.	*Mangifera indica*	seed kernel	+	+++	+
18.	*Melia azadirachta*	bark	—	—	—
19.	*Nigella sativum*	seeds	—	—	—
20.	*Terminalia belerica*	seeds	—	—	—
21.	*Zingiber officinale*	rhizome	++	+++	++
22.	Control (modified tyrode solution)	No drug	—	—	—

It has been found earlier (Kaleysa Raj and Kurup, 1968) that piperazine at a concentration of 2.5 *mg/ml* of external medium caused paralysis of *Ascaris lumbricoides*.

Stimulation + initial increased movements.
Paralysis + both paralysed in 24 hr; ++ both paralysed < 18 hr
+++ both paralysed < 12 hr.
Mortality + both dead 24 hr, ++ both dead < 18 hr
(—) indicates lack of any effect.

Fuller's earth itself had no effect on roundworms under the present experimental conditions. Alcohol extracts of *Acorus calamus, Agati gratifolia, Carum copticum, Helleborus niger, Mangifera indica* and *Zingiber officinale* paralysed or killed the worms within the 24 hr duration of the experiment (Table I). However, when transferred to a drug-free modified tyrode only the paralysed ones regained normal movements within 2 to 4 hours. This suggests that the paralysis is reversible.

It is interesting to note that a local Ayurvedic Physician successfully treats cases of *Ascaris* infestation in men by using decoction of 50 g of *Mangifera indica* seed kernal. In this work its anthelmintic action could be confirmed in extracts in alcohol, ether but not in petroleum ether.

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