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NEMATICIDAL PROPERTIES OF CRUDE EXTRACTS OF SOME INDIGENOUS PLANTS. *Part I*

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1% crude extracts of thirty plants were assayed for their nematicidal properties using *Cephalobus litoralis* as test nematode. After 96 hours the number of active nematodes was reduced by 100%, in *Nicotiana tabacum* 95%, in *Trachyspermum capticum* 90%, in *Ricinus communis* and in *Azadirachta indica* 56%. Initial number of nematodes was 100. *Cephalobus litoralis* is considered a good test nematode because it is inexpensive to maintenance and easy in culturing.

Key words: Nematode *Cephalobus litoralis,* Plant extracts.

Introduction

Leaf extracts of various indigenous medicinal plants are known to possess anthelminthic properties Singh and Kohli [1], Triffit [2] found an inhibiting effect of *Sinapis alba* L. (white mustard) on the emergence of larvae of *Heterodera rostochiensis* (= *Globodera rostochiensis*). This effect is considered to be due to the presence of isothiocyanates in root diffusate of these plants. Steiner [3] recorded resistance of Tagetes species against root-knot nematodes. In 1956, Tagetes reappeared in the literature because of its suppressing effect on population of the lesion nematode *Pratylenchus penetrans*. Taylor and Murrant [4] found a poisoning effect of aqueous extract of Raspberry roots and Canes on *Longidorus elongatus*. Extracts of decomposing plant residues demonstrate a selective nematicidal action against *Meloidogyne incognita* and *Pratylenchus penetrans* Sayre *et. al.* [5]. Inhibition of *Meloidogyne incognita* juvenile hatch is reported to be caused by root exudates of *Euphorbia hitra* Yadav [6]. Egunjobi and Afolani [7]. Tested leaf extract of Neem (*Azadirachta indica*) on the population of *Pratylenchus brachyurus* on the growth and yield of maize. Kali Ram and Gupta [8] tested Neem (*Azadirachta indica*) leaves nematicides and fertilizers against root knot nematodes. Jain and Bhatti [9] tested the effect of degradation of Neem leaves on influence of root knot nematode in tomato. Parwez *et. al.* [10] worked on the effect of *Tagetes erecta* on *Meloidogyne javanica* infecting tomato. A. Mani [11] also tested the effect of interculture of marigold and mustard with acid lime on citrus nematode *Tylenchulus semipenetrans*.

There are many other references of this kind which underline the potential of botanical control of nematodes. Keeping this in view, several plants were tested for their nematicidal activity.

Cephalobus litoralis (Akhtar, 1962) Andrassy (1984) was used as test nematode. This nematode provides many advantages of culturing, handling and bioassays. Platzer *et. al.* [12], Jenkins *et. al.* [13], Samoiloff *et. al.* [14], Simpkin and Coles [15] have already established the usefulness of free-living nematodes as test animals for nematicidal bioassays.

Materials and Methods

1. Preparation of nematode culture. Culture of *Cephalobus litoralis* which reproduces parthogenetically was prepared by using a single egg. Green peas (*Pisum sativum*) were mashed in small petri dishes. A single egg was carefully picked under stereoscopic binocular and placed beside pea meal paste (PMP) in a petri dish. Nematode eggs hatched within 72 hours and after 10 days, large number of nematodes in various stages of life cycle were obtained.

2. Preparation of plant extracts. Plants selected for this study were botanicals used by the local people in Greeko-Indian System of Medicine. They were air dried, ground to a coarse powder and then extracted three time with ethanol at room temperature. The filtrate was concentrated under vacuum to remove ethanol.

3. Preparation of substrate for bioassay. Glass tubes 15cm long and 8 cm diameter were taken for bioassy. Two percent solution of plant extracts was prepared in water from stock solution. This solution was passed through Whatman filter paper No. 1, and 3 ml of it was taken in each tube. Four tubes were taken for each treatment whereas another four served as control set.

4. Inoculation. Nematode larvae were isolated through modified Baermann funnel technique using Whatman filter paper No. 41, and these larvae were counted in a dish with 0.5 cm squares at the outer surface to determine their concentration. The required amount of nematode suspension was poured into the tubes to each of which equal amount of plant

extract (2 %) had already been poured. This brought down the strength of the extract to half. In another four tubes, distilled water with nematode larvae was taken as control. The experiment was run on benches under room temperature.

5. Counting of nematode. After 48 hours one tube was taken from each treatment and its contents were transfered into counting dish. The number of active nematodes was counted under stereoscopic binocular microscope. The observations were repeated after 72 and 96 hours. Death of nematodes was conformed by keeping them in distilled water for 24 hours. Percent mortality was calculated and data analysed by applying Complete Randomized Design (CRD).

Results and Discussion

One percent ethanolic leaf extracts of 30 plant species were tested for their effect on mortality against *Cephalobus litoralis*. Results show that *Nicotiana tabacum, Trachyspermum capticum, Ricinus communis, Azadirachta indica, Calotropis procera* and *Melia azadirach* showed significantly higher mortality against *Cephalobus litoralis*. Other plants showed 5, 10, 20 and 30% mortality. *Hibiscus rosasinensis* and *Vitis venifera* were found to have no effect (Table 1.).

Natural product chemistry holds a strong challenging position academically as well as it stimulates further deeper

TABLE 1.

S.No.	Plant species	Number of active nematodes recovered (initial number = 100)					F-value
		Control 0.0 min	After 48 hrs.	After 72 hrs.	After 96 hrs.	% Reduction	
1	*Aqeratum houstonianum* Mill	100	100	90	90	10	16.00
2	*Artemisia elegantissima* Ramp	100	100	95	95	5	6086.53
3	*Azadirachta indica* L.	100	80	70	44	56	30826.25
4	*Calotropis procera* Will	100	60	50	50	50	1982.26
5	*Capparis aphylla* Roth.	100	100	90	90	10	16.00
6	*Chrysanthemum indicum* L.	100	100	85	80	20	5378.50
7	*Cymbopogon citratus* D.C.	100	100	95	95	5	6086.53
8	*Eucalyptus horsfieldii*	100	90	95	95	5	6086.53
9	*Hibiscus rosasinensis* L.	100	100	100	100	0	n.s
10	*Lantana camera* L.	100	98	95	90	10	48197.00
11	*Lawsonia inermis* L.	100	100	95	95	5	6086.53
12	*Melia azadirach* L.	100	98	60	50	50	75.06
13	*Memordica charatia* L.	100	95	95	95	5	6086.53
14	*Mentha piperita* L.	100	100	95	90	10	5938.52
15	*Nannorrhops ritchieana* H. Wendl.	100	100	90	90	10	16.00
16	*Nerium indicum* Mill	100	100	100	98	2	7.32
17	*Nicotiana tabacum* L.	100	90	10	0	100	2911.16
18	*Nycanthes arbor* L.	100	95	95	90	10	963.36
19	*Rhazya stricta* Dcne	100	80	80	70	30	2952.46
20	*Ricinus communis* L.	100	50	20	10	90	1385.46
21	*Salsola foetida* Del.	100	100	100	95	5	6086.53
22	*Salvia aegyptiaca* L.	100	100	95	90	10	5938.52
23	*Salvia splendens* Ker-Gawl.	100	96	90	90	10	4800.61
24	*Swertia alata* D. Don	100	98	95	95	5	6086.53
25	*Taetes erecta* L.	100	80	75	75	25	2947.13
26	*Tabernaemontana divaricata* L.	100	100	95	90	10	5938.52
27	*Thevetia verifolia* Juss	100	100	95	95	5	6086.53
28	*Trachyspermum capticum* L.	100	60	50	5	95	1513.81
29	*Vitis venifera* L.	100	100	100	100	0	n.s.
30	*Zizyphus jujuba* Lan.	100	100	100	98	2	7.32

knowledge of many biological processes. Considering various plants having wild growth in Karachi region and also keeping in mind their folklore repute as remedies for various ailments, it was worthwhile studying their nematicidal activity too. As this area is considered to be a modern trend as well as most important to study for an agricultural land like Pakistan. The target plants under study have already been structurally elucidated and this further stimulates their biological study on account of their constituents which may be responsible for biological/nematicidal activiy. It should also be considered as the need of today to establish a close inter-link between the researches of active constituents of plants and their industrial or agricultural utilization.

Many chemicals like Nicotine, Choline and Azabasine in *Nicotiana tabacum*, Recine, Antigenin and Allergenin in *Ricinus communis*. Kaempterol and Myricetin in *Azadirachta indica*. Azadrine and Meliotannic acid in *Melia azadirach*. Ascle in, Calotropagenin and Voacangine in *C. procera* might have been responsible for causing mortality in the larvae of *Cephalobus litoralis*. These results document that ethanolic extracts of leaves contain nematicidal compounds and can be used in controlling nematodes. However, further investigations are needed to ascertain the mortality of nematodes with isolated active ingredients.

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