



POTENCY OF ECO-FRIENDLY NEEM BASED PESTICIDES ON EGG HATCHING OF *Meloidogyne incognita*

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ABSTRACT

Root-knot nematode *Meloidogyne incognita* is one of the most widespread and destructive pest for the vegetable production area. Eco-friendly neem based pesticides are the alternative approaches to control root knot nematodes. An experiment was carried out in vitro to test the neem based pesticides Neem Baan and Neem Raj. Different concentrations of neem based pesticides Neem Baan and Neem Raj were tested on egg hatching of *Meloidogyne incognita*. Increase in concentration and exposure period resulted in decreased egg hatching rate of *M. incognita*.

Key words: - Eco-friendly, Neem based pesticides, Egg hatching, *Meloidogyne incognita*,

Introduction

Brinjal cultivation in India is estimated to cover about 8.14% vegetable area with a contribution of 9% to total vegetable production. The crop is largely grown in small plots or as inter crop both for cash and domestic consumption by farmers all over India. The root-knot nematode *Meloidogyne incognita* is recognized as one of the serious nematode pest of brinjal that cause root knot disease. It is widely distributed in India and most economically damaging genera in vegetable crops. Root-knot nematode, *Meloidogyne* spp. causes yield losses in several crops (Perry and Moens, 2013). Brinjal is everly infected by root-knot nematodes. Management of this dreadful nematode through chemicals is not only expensive but also has adverse effects on the environment and hazardous to all living entities on the earth. However toxic residue deposition, its biomagnifications and detrimental effect on the ecological balance as a result of the repeated exposure to the broad spectrum synthetic pesticides have come up as a persistent threat. Chemical controls of nematodes are very expensive as well as developed problem of residual toxicity environmental pollution public health hazard even depletion of stratospheric zone (Wheeler et al., 1979). As an alternative to chemical pesticides specially for the purpose of protecting crops against nematodes and also for the conservation of biodiversity, botanicals may stand as the most promising source of bioactive products of plant origin. Extract of plant products contain nematicidal and

antifeedant compounds. Thousands of plants possessing insecticidal properties are known today (Banerji et al. 1985). Use of neem and neem products has been advocated for the management of root-knot nematodes by many workers (Dekha & Rehman, 1998; Jain & Gupta, 1998). Plant extracts having the nematicidal properties and they not only reduce the nematode population but also enhance the plant growth (Hussain et al., 2011). The present investigation to study the nematicidal effect of different Neem based pesticides viz. Neem Baan and Neem Raj on egg hatching of *M. incognita*.

Materials and Methods –

Preparation of Extracts – Neem based pesticide namely Neem Baan and Neem Raj were also used for making different con. Firstly 5 ml of each neem based pesticide (NBP) were dissolved in 100 ml of distilled water and it was served as stock solution and further successive dilution of 5ml stock, 2.5 ml, 2ml, 1.5ml, 1ml, 0.50ml and 0.25ml, con were prepared by adding required amount of distilled water to the stock. The sterilized distilled water served as control.

Effect of acetone extracts on egg hatching of *M. incognita* – For hatching experiment special PVC tubing were cut in small pieces about (1.5 cm diam. and 1.5 cm high). Four or three plastic legs were attached to elevate each ring which allowed the juveniles to pass through and it also made possible transfer to eggs to fresh test solution every 24 hours. About 5 uniform sized egg masses with an average 250 eggs per egg mass of *M. incognita* were picked from the prepared inoculums. They were transferred to a 50ml beaker on a PVC tube stand. Seven dilutions viz. (5 ml, 2.5ml, 2 ml, 1.5 ml, 1 ml, 0.50 ml, 0.25 ml) were prepared from neem based pesticides viz. Neem Baan and Neem Raj. Five ml of plant parts extracts were prepared by adding the required amount of distilled water that was taken in a sterile beaker of 50 ml capacity. Equal numbers of egg mass were transferred to separate beakers containing sterilized water to serve as control. Three replicas were taken with completely randomized design (CRD). Mean egg hatching was counted at the intervals of 24, 48, 72, 96, 120 hours after inoculation.

Results and discussion:-

Result exhibited that inhibition of hatching of egg was reduced with the increase in concentration of stock solution of used Neem Baan and Neem Raj and increased exposure period presented in (Table 1&2)

Neem Baan treatment also showed complete inhibition of hatching having 5ml con. at exposure just 24 hrs to 120 hrs.(Table 1, Fig. 1). Neem Raj treatment showed maximum cent percent inhibition of hatching percent was obtained in 5ml con. at exposure just 24 hrs. over untreated control 89.60%.(Table 2, Fig. 2)

Result revealed that lowest con. 0.25 ml. was found least effective 59 and 54 per cent hatching was recorded in used treatment of Neem Baan and Neem Raj in 120 hrs exposure respectively. Neem Baan and Neem Raj having more concentrated nematicidal / nematostatic properties. The present investigation is in confirmation with the finding of Paruthi et al., (1993) observed minimum hatching in 1% con. of Achook, as neem based pesticide. They also observed that hatching continued up to two week in lower concentration (0.06 and 0.125%) where as no hatching was observed on 4th day at above 0.25% con. of Achook. Pannu (1994) also tested the effectiveness of four neem formulations (Achook,

Margocide, Neemguard and Neemark) against *M. Javanica* under lab condition. He also observed higher juvenile mortality (more than 50%) at and above 0.5% concentration in all the neem pesticides at all the timings tested. Javed et al., (2005) carried out a trial to study the effect of neem products (leaves, Bark and seeds) and refined extract (azadirachtin) against root-knot nematode. They found this the neem products significantly reduced the vigor and mobility of root-knot juveniles in the treated soil as compared to untreated soil. Gowda and Setty (1979) who observed that hatching of larvae from fresh eggs of *M.incognita* soaked for 24 hrs. in water extract of *A. indica* cake was significantly reduced with 1 : 1 dilution of extract. Neem products (Neem Kernel, Neem leaf, Neem bark extract) are known to possess nematicidal activity against nematode populations (Zaki & Bhatti, 1989, Derkar et. al., 1990). In general with the increase in con. and exposure period, there was reduced egg hatching.

Conclusion-

Azadirachtin is the principal active ingredient from neem seed kernel and a well known nematicidal action. The neem bitters (Triterpenoid) such as epinimbin, salannin, deacetyl salannin, azadirachtin, and many active principle like nimbidin, thionemone and limonoide from leaves have been reported that be highly nematicidal and nematostatics these neem chemicals are known to act against plant parasitic nematode (Mojumder, 2002). In view of general awareness about the hazardous effect of chemical pesticides, there is now an emphasis on the non chemical nematode management technologies.

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Table : 1

Effect of Neem Baan on egg hatching of *Meloidogyne incognita* at different time intervals
(Observations are mean of three replicates)

Extract Con.	% Hatching at different exposure period				
	24 hrs.	48 hrs.	72 hrs.	96 hrs.	120 hrs.
0.25 ml	24.333	31.667	39.000	43.667	59.000
0.50 ml	21.000	28.667	35.000	40.333	52.667
1 ml	18.000	22.667	30.000	38.667	49.000
1.5 ml	17.333	20.333	24.333	28.667	32.000
2 ml	11.667	17.333	22.000	25.000	27.000
2.5 ml	8.533	13.333	14.667	17.067	22.667
5 ml	0.000	0.000	0.000	0.000	0.000
Control	64.000	69.333	76.333	88.000	89.333
SEM ±	1.093	1.117	1.080	1.852	1.528
C.D. at 5%	2.519	2.576	2.491	4.270	3.522
C.D. at 1%	3.665	3.748	3.624	6.213	5.125

Figure : 1

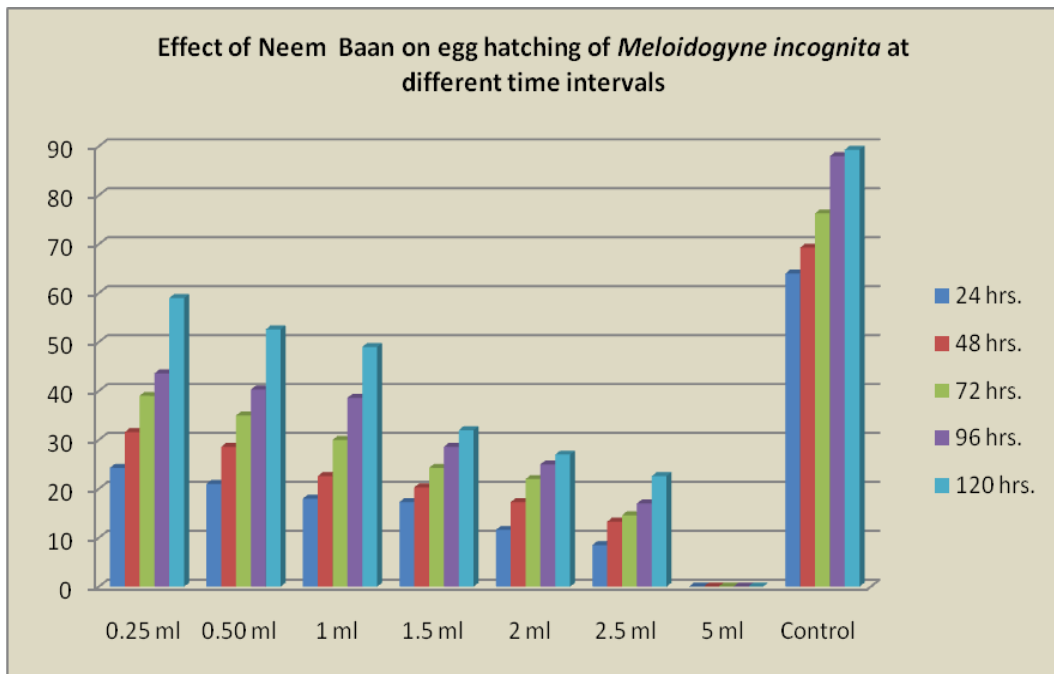


Figure : 2

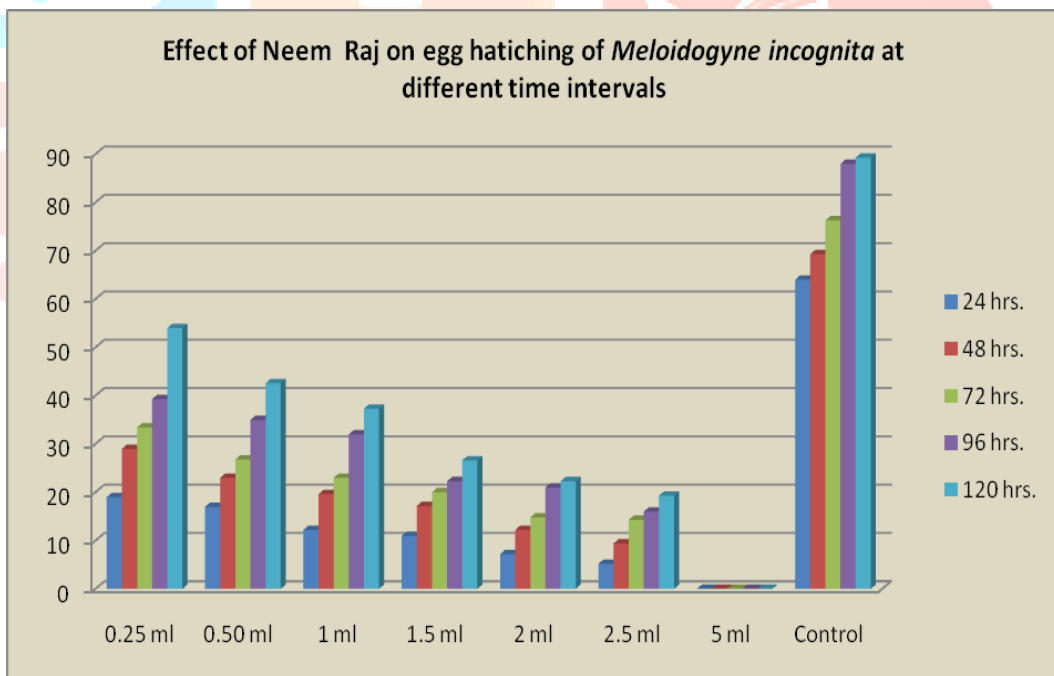


Table : 2**Effect of Neem Raaj on egg hatching of *Meloidogyne incognita* at different time intervals**

(Observations are mean of three replicates)

Extract Con.	% Hatching at different exposure period				
	24 hrs.	48 hrs.	72 hrs.	96 hrs.	120 hrs.
0.25 ml	19.000	29.000	33.467	39.333	54.000
0.50 ml	17.000	23.000	26.833	35.000	42.667
1 ml	12.200	19.667	23.000	32.000	37.333
1.5 ml	11.000	17.200	20.000	22.333	26.667
2 ml	7.200	12.200	14.867	21.000	22.333
2.5 ml	5.200	9.400	14.333	16.000	19.333
5 ml	0.000	0.000	0.000	0.000	0.000
Control	64.000	69.333	76.333	88.000	89.333
SEM ±	1.136	0.901	0.613	1.067	1.118
C.D. at 5%	2.619	2.077	1.413	2.461	2.578
C.D. at 1%	3.811	3.022	2.056	3.580	3.751

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