

Antifeeding Effect of Neem Based Formulation Against *Earias vitella*

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Abstract - The antifeedant effect of neemazal and neemarine on the okra pest, *Earias vitella* was evaluated under vitro condition. The okra plants fruits were treated with five different doses of neemazal and neemarine. Ten to twelve hours starved larva were released in each replication. The maximum antifeedant activity was noted in neemazal 71.99 and 61.99% protection was recorded by the use of 2.5 and 2.0% concentration respectively and the percentage fruit consumed at 0.25% conc. Of neemarine was the lowest (20.99). A significant decrease in percent protection on of fruit up to 71.99 and 20.99% in neemazal. Neemarin against *E. vitella* were observed. The result also shows that both the pesticides may have significant effect on the okra fruits protection of pest *E. vitella*. Therefore less expensive natural pesticides could be an alternative for chemical pesticides.

Index Term - Antifeeding, *Earias vitella*, Neem, okra, pesticides

alternatives are claimed to be as effective as chemical pesticides^[3]. Chemical pesticides have been used for several descend in controlling pests as they have a quick knock down effect. However, their indiscriminate use resulted in several problem such as resistance to pesticides, resurgence of pests, eliminate of natural enemies, toxic residues in food, water, air and soil which affect human health and diestrum ecosystem, lending to the threat that their continued use many further harm the environment. Under such alarming situation, plant and plant derived product offered a tremendous advantage over synthetic pesticides in use as control agent for the pest agriculture, veterinary and public health since plant kingdom is most efficient producer of chemical compound, synthesizing many products that are used in defense against insects.

INTRODUCTION

Man suffer extensively due to nuisance of insect population both agriculture and health. In agriculture, insect effect directly the growing part of crop and cause several damage, resulting increase loss. Crop loss due to insect pest estimated between 10% to 30% of major crop^[1]. In tropical country like India, owing to climatic conditions and its particular environment, agriculture suffering from severe losses due to pest^[2]. Considering the agro-ecosystems with an increase in population and dwindling land resource there is worldwide demand for natural insecticides to increase the agriculture production. Realizing these threats, the scientific community has been proactive and developed safer alternatives using plant and crop as substitutes for chemical pesticides. These

MATERIAL AND METHODS

Five pieces of okra fruits dipped in each concentration of all the six tested botanicals for few minutes. The okra pieces were fastened under electric fan for about half an hour, so as to completely dry up the extract. In each set of botanical one control was kept. Last instar larvae of *Earias vitella* starved for 10-12 hours were released in each replication. Observation on feeding activity of *E. vitella* was taken after 24 hours. Later on, the area consumed by larvae in each replication. The comparison was made with control. There were three replication for each treatment. Percentage feeding and okra fruit area protected over control . Formulae adopted by Singh and Pant (1980)^[4].

$$\text{Percentage feeding} = \frac{\text{Area given for feeding} - \text{Correct Area}}{\text{Area given feeding}} \times 100$$

$$\text{Percentage protection Due to treatment} = \frac{\text{Percentage protection in treatments} - \text{Percentage protection in control}}{100 - \text{Percentage protection in control}} \times 100$$

Different concentrations of neem products viz., neemazal, neemarine, bioneem, neemagold, nimbidicine and ahook were prepared by adding

desired quantity of distilled water. The amounts of water and neem products were calculated as per formula given below:

$$\text{Amount or test compound} = \frac{\text{Quantity of solution required} - \text{Percent of solution desired}}{\text{Strength of formulation available}} \times 100$$

The desired concentration of nimbidicin, ahook, neemazal, neemarine, bioneem and neemgold were prepared at 2.50, 2.00, 1.00, 0.5 and 0.25 % from stock solution by diluting with desired amount of distilled water.

RESULTS

Antifeedants may prove effective as insect controlling agents if they are judously in the present study six registered commercial neem based formulations neemazal, neemarine , bioneem , neemgold ,nimbidicine and ahook were used for evaluating their effectiveness as antifeedant against okra pest *E.vitella* the results of the experience revealed that neemazal has shown best performance against the test insect *E.vitella* and manifested 74.24 At higher conc.2.5 It was closed followed by neemarine (70.86), neemgold (63.5),

bioneem(66.22) and nimbidicine (61.29) which were intermodiary in efficacy (table1).Besides ahook was found to exhibit antifeeding efficacy in terms of protection to the 55.60% (table2).Neemazal ,the antifeeding effect of neemazal are dipected in table 2. It is clear from table that 71.99 and 61.99 % protection was recarded by the use of 2.5 and 2% conc. The lower conc. Of 1% resulted in 54.20 protection . While 34.39 and 23.40% have observed in case of 0.5 and 0.25 % respectively. The percentage fruit area consumed at 2.58% conc. Was 25.65 % and it was followed by 34.20%. In case 2. 00 % conc. The lowest conc. of neemazal (0.25%)showed (70.39%) consumption and interest of the concentrations there were intermediary results . All the conc. Tested proved superior to the control table 1.

Table 1: Antifeeding effect of Neem based pesticides against *E. vitella*.

| Conc. Used. in % | Neemazal | | Neemarine | | Bioneem | | Neemgold | | Nimbidicine | | Ahook | |
|------------------|----------|-------|-----------|-------|---------|-------|----------|-------|-------------|-------|-------|-------|
| | * | ** | * | ** | * | ** | * | ** | * | ** | * | ** |
| 2.50 | 25.65 | 74.24 | 29.02 | 70.86 | 33.17 | 66.22 | 36.33 | 63.56 | 38.58 | 61.29 | 40.92 | 59.06 |
| 2.00 | 34.20 | 65.16 | 38.10 | 61.79 | 41.50 | 58.37 | 42.86 | 57.01 | 45.13 | 54.75 | 46.44 | 54.44 |
| 1.00 | 41.91 | 57.95 | 44.01 | 55.66 | 47.52 | 52.37 | 49.51 | 50.34 | 51.77 | 48.7 | 54.00 | 46.25 |
| 0.5 | 59.61 | 39.50 | 62.62 | 37.27 | 64.93 | 34.98 | 66.06 | 33.83 | 68.26 | 31.62 | 70.49 | 29.37 |
| 0.25 | 70.49 | 29.39 | 73.67 | 27.22 | 74.13 | 25.75 | 76.39 | 23.50 | 78.62 | 17.15 | 79.74 | 20.14 |
| Control | 92.26 | 7.61 | 92.26 | 7.61 | 92.26 | 7.61 | 92.26 | 7.61 | 92.26 | 7.61 | 92.26 | 7.61 |
| S.E (m)± | 3.27 | 3.36 | 3.20 | 3.11 | 2.82 | 2.85 | 2.57 | 2.58 | 2.45 | 2.45 | 2.35 | 2.19 |
| C.D.at 5% | 7.13 | 7.37 | 6.98 | 6.78 | 6.14 | 6.22 | 5.61 | 5.63 | 5.35 | 5.35 | 5.13 | 4.77 |

Figures in paraentheses are in angular transformed values.

*Mean feeding %

**Mean protection %

Table 2: Percent protection antifeeding effect of Neem based pesticides against *E. vitella* on okra fruits.

| Conc. Used. in % | Neemazal | Neemarine | Bioneem | Neemgold | Nimbidicine | Ahook |
|------------------|----------|-----------|---------|----------|-------------|-------|
| 2.50 | 71.99 | 68.29 | 63.79 | 60.39 | 57.99 | 55.60 |
| 2.00 | 61.99 | 58.40 | 54.70 | 52.29 | 50.90 | 50.50 |

| | | | | | | |
|-----------|-------|-------|-------|-------|-------|-------|
| 1.00 | 54.20 | 51.79 | 48.20 | 46.09 | 43.69 | 41.19 |
| 0.5 | 34.49 | 32.00 | 29.39 | 28.20 | 25.80 | 23.30 |
| 0.25 | 23.40 | 20.99 | 19.39 | 16.99 | 14.59 | 13.39 |
| Control | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| S.E(m)± | 1.66 | 3.29 | 1.94 | 1.99 | 1.66 | 1.66 |
| C.D.at 5% | 3.63 | 7.15 | 4.23 | 4.35 | 3.63 | 3.63 |

Figures in parentheses are in angular transformed values.

Neemarine: Table 2 that the neemarine formulation of Neem has infested the best performance as antifeedant and gave 68.29 and 58.40 percent protection against larvae *E.vitella* at 2.50 and 2.00 % concentration, whereas its other lower concentrations i.e. 0.5 and 0.25 % elicited 32.00 and 20.99 percent protection. The percentage fruit area consumed at 2.50 % concentration of neemarine was lowest (29.02%), followed by 38.10 % in cas of 2.00% concentration. The lowest concentration of neemarine (0.25%) has shown 73.67% consumption and the rest of the concentrations behaved intermediary (Table 1).

Bioneem: The three higher concentration i.e. 2.50, 2.00 and 1.00% proved effective and resulted in protection of 63.79, 54.70 and 48.20 % leaf area from consumption of larvae of *E. vitella*.

Neemgold: Table 2 revealed that neemgold at 2.50, 2.0 and 1.00 % conc. gave 60.39, 52.29 and 46.09 percent protection of fruit area against *E. vitella* respectively. The rest of the conc. (0.5 and 0.25%) protect 28.20 and 16.99 percent fruit area. The conc. of 2.50% resulted in 36.3% feeding of fruits, whereas the lowest conc. (0.25%) elicited 76.39% consumption of fruit area. **Nimbicidine:** As per table 2. It is apparent that 57.99 and 50.90% protection of fruits was observed against *E. vitella*. When they were treated with 2.50 and 2.00% . The minimum consumption of okra fruits to the extent of 38.58% was noted at 2.50% conc. of the nimbicidine . **Achok:** It is evident from the table 2 that 2.50% dose of ahook resulted in 55.60% followed by 50.50% protection of fruits at 2.00% conc. The percent area consumed at 2.50% conc. was lowest (40.92%) followed by 46.44% consumption at 2.00% conc..

DISCUSSION

The result of present experimentation of antifeedants may be compared with the work of Raman et.al. (1992) who have obtained antifeedant indices of 73.3, 60.0, 86.7 and 63.6% by using three day old larvae of *E. vitella* at respective concentration of 0.5, 1.0, 2.0 and 3.0% of ahook. Similarly we also got promising antifeedant effectiveness of neemazal at 2.5 and 2.0 % concentration which registered mean % protection to the value of 74.24 and 65.16 % against *E. vitella*. The highest concentration of 2.5% neemazal exhibit 71.9% where as just double concentration to the level of 5% concentration of neemark gave 86% antifeedant activity in case of *Spilosoma oblique* as reported by Bathal and Singh (1994) Thus , it focuses the antifeedant activity of the neem based formulation and both outcome are similar and same line of action. Mahapatra et. al. (1995) also reported similar antifeeding result by use of solvent extract of neem seed kernel against *Spodoptera litura*. 0.1 % conc.of solvent resulted prevention more than 70% in cauliflower damage by *S. litura*. Chandel and segar (2018) attributed the antifeedant effect of their experimental neem based insecticides viz. azadirachtin, bioneem, econeem, neemazal, neemarine, nimbicidine, azadirone and nemgold. Neemazal(Azadirachtin 1%) was effective against *Tetranychus urticae* on okra (Kumaran and Douressamy 2007). Among neem formulation, nimbicidine produced highest fruit yield with less pod damage. Kareem and Khalid(2017) the antifeedant activity of nimbicidine (0.03%) against 4th instar larvae *S. littoralis*. The view that antifeedant activity was dose dependent against *E. vitella* when they were fed neem formulation treated fruits at the conc. of 2.5-0.25%. Dubey et. al.(2010) have been reported as insect , neem based pesticides, repellants, antifeedant, ovicides, oviposition deterrent.The neem based pesticides (achook ,nimbicidine, bioneem, neemgold, neemark, nimbitor 0.5%) is suppressing the infestation of fruit and shoot borer in okra.

CONCLUSION

The antifeeding effects of different neem based pesticides were evaluated against *E. vitella* by feeding them okra fruits. Antifeeding effect was evaluated on the basis of antifeeding index and percent protection of fruits of okra. Among all these compounds, achool was the least effective antifeedant. The sequence of antifeeding effectiveness of different compounds, against *E. vitella* is given as follows: neemazal > neemarine > bionem > neemgold > nimbecidine > achool.

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