



## Effects Of Botanicals Extract Against Shoot And Fruit Borer, *Earias vittella* (Fab.) On Bhendi Under *In Vitro* Condition

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### ABSTRACT

The per cent antifeedent activity and mortality effects of neem leaf extract 5%, *Calotropis* leaf extract 5%, neem seed kernel extract 5%, *Datura* leaf extract 5%, oleander seed extract 5%, garlic bulb extract 5%, garlic + chilli + kerosene extracts) 5% against *Earias vittella* was evaluated under the laboratory condition. The results of in vitro studies showed that the maximum antifeedent activity was recorded in neem leaf extract and neem seed kernel extract after 24 hours after treatment and the highest per cent mortality was observed in neem seed kernel extract 5% followed by garlic + chilli (kerosene extracts), neem leaf extract and oleander seed extract in 72 hours after the treatment. The data demonstrated that these botanicals extract gives good results for the management of *Earias vittella* on bhendi.

Key word: Botanicals extract- in vitro studies- Shoot and fruit borer- *Earias vittella*- bhendi.

### INTRODUCTION

Vegetables constitute an important item of our food, supplying vitamins, carbohydrates and minerals needed for a balanced diet. Their value is important specially in under developed and developing countries like India, where malnutrition abounds [2]. Among them vegetable crops grown in India, Bhendi *Abelmoschus esculentus* (L.) Moench or okra or lady's finger belongs to the family Malvaceae and the origin of bhendi is Africa.

Among the various biotic and abiotic stresses that constrained the successful cultivation of bhendi crop, one of the important limiting factors in the cultivation of okra is insect pests. More than one hundred insect species have been reported as pests of bhendi [9]. There are a few insect pests such as leaf hopper, aphid, white fly, shoot & fruit borer and spider mite, which are importance in bhendi. Among them, shoot and fruit borer, *Earias vittella* Fab. considered major pest which cause severe damage to crop [11] and notorious noctuid pest causing more than 50% loss in cotton and bhendi crops [1] and 69% on bhendi alone [8] in various parts of India. *E. vittella* alone is reported to cause 13.8 to 41.6 per cent net yield loss in bhendi [6].

Besides, the use of chemical insecticides is not advisable in bhendi crops which might lead to serious problems of residue deposition in fruits. It has now become necessary locally available botanicals extract for the management of *E. vittella*. Therefore some botanicals extract were tested against Shoot and fruit borer on bhendi to find out antifeedent activity and per cent mortality.

### MATERIALS AND METHODS

The collection and preparation of botanical extract using the aqueous method [4]. The laboratory experiment was conducted during January 2017, to evaluate the efficacy of botanical insecticides against mass cultured third instars larvae of *E. vittella*. The following were the treatments.

Neem leaf extract (NLE)	:	5%
<i>Calotropis</i> leaf extract (CLE)	:	5%
Neem seed kernel extract (NSKE)	:	5%
<i>Datura</i> leaf extract (DLE)	:	5%
Oleander seed extract (OSE)	:	5%

Garlic bulb extract (GBE)	:	5%
Chilli + garlic (kerosene) extract (GCKE)	:	5%
Untreated check	:	-

The experiment was conducted by following the fruit disc no-choice method of Muthu *et al.* [3]. In each plastic petri dish, a wet filter paper was placed to avoid early drying of the test materials. There were 10 number of 3<sup>rd</sup> instar larvae (pre starved in 12 hours) were introduced into each petri dish containing five discs of bhendi fruit treated with botanical insecticides. Three replications were maintained for each treatment. Observations and workout the per cent antifeedent activity and per cent mortality given below the formula using calculated

$$\text{Antifeedent activity} = \frac{\text{Consumption in Control} - \text{Consumption in treated}}{\text{Consumption in control}} \times 100$$

$$\text{Per cent morality} = \frac{\text{Observed mortality in treatment}}{\text{Total number of larvae released per treatment}} \times 100$$

## RESULTS

Bio-efficacy of plant extracts against *E. vittella* under laboratory conditions revealed that all botanicals extracts caused substantial reductions in *E. vittella* population (Table 1). The higher per cent antifeedant activity was recorded in neem seed kernel extract (NSKE) 5% (61.23%) followed by neem leaf extract (NLE) 5% (59.09%) and oleander seed extract (OSE) 5% (51.15%) compare to control (3.84%) at the 24 HAT after the treatment. The least antifeedant activity was recorded on *Datura* leaf extract 5% (35.65%) followed by *Calotropis* leaf extract 5% (37.18%) (Plate 1).

**Table 1. Bio- efficacy of botanicals extract against *E. vittella* under lab condition**

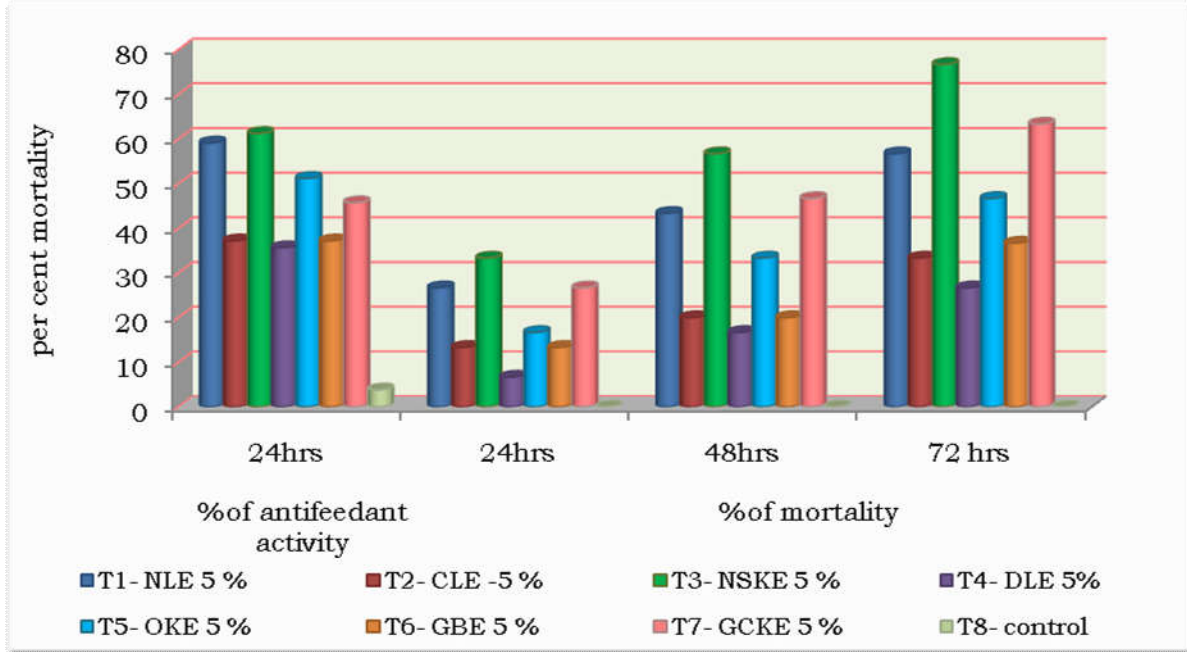
	Per cent of Antifeedant activity*	Per cent of Mortality*		
	24 HAT	24 HAT	48 HAT	72 HAT
T1- Neem leaf extract 5%	59.09 (50.25) <sup>ab</sup>	26.67 (30.99) <sup>a</sup>	43.33 (41.16) <sup>b</sup>	56.67 (48.85) <sup>c</sup>
T2- <i>Calotropis</i> leaf extract 5%	37.18 (37.55) <sup>e</sup>	13.33 (21.15) <sup>bc</sup>	20.00 (26.57) <sup>cd</sup>	33.33 (35.84) <sup>d</sup>
T3- Neem seed kernel extract 5%	61.23 (51.51) <sup>a</sup>	33.33 (35.22) <sup>a</sup>	56.67 (48.85) <sup>a</sup>	76.67 (61.22) <sup>a</sup>
T4- <i>Datura</i> leaf extract 5%	35.65 (36.65) <sup>e</sup>	6.67 (12.39) <sup>cd</sup>	16.67 (23.86) <sup>d</sup>	26.67 (30.99) <sup>e</sup>
T5- Oleander seed extract 5%	51.15 (45.67) <sup>bc</sup>	16.67 (23.86) <sup>b</sup>	33.33 (35.22) <sup>c</sup>	46.67 (43.08) <sup>c</sup>
T6- Garlic extract 5%	37.18 (37.55) <sup>e</sup>	13.33 (21.15) <sup>bc</sup>	20.00 (26.57) <sup>cd</sup>	36.67 (37.23) <sup>cd</sup>
T7- Garlic + Chilli + kerosene extract 5%	45.73 (42.55) <sup>cd</sup>	26.67 (30.99) <sup>a</sup>	46.67 (43.07) <sup>ab</sup>	63.33 (52.78) <sup>b</sup>
T8- control	3.84 (11.27) <sup>f</sup>	0.00 (2.9) <sup>d</sup>	00.00 (0.29) <sup>e</sup>	00.00 (0.29) <sup>f</sup>
SED	2.202	4.415	4.313	2.260
CD (0.05%)	4.723	9.450	9.265	4.849

\*Mean of three replications

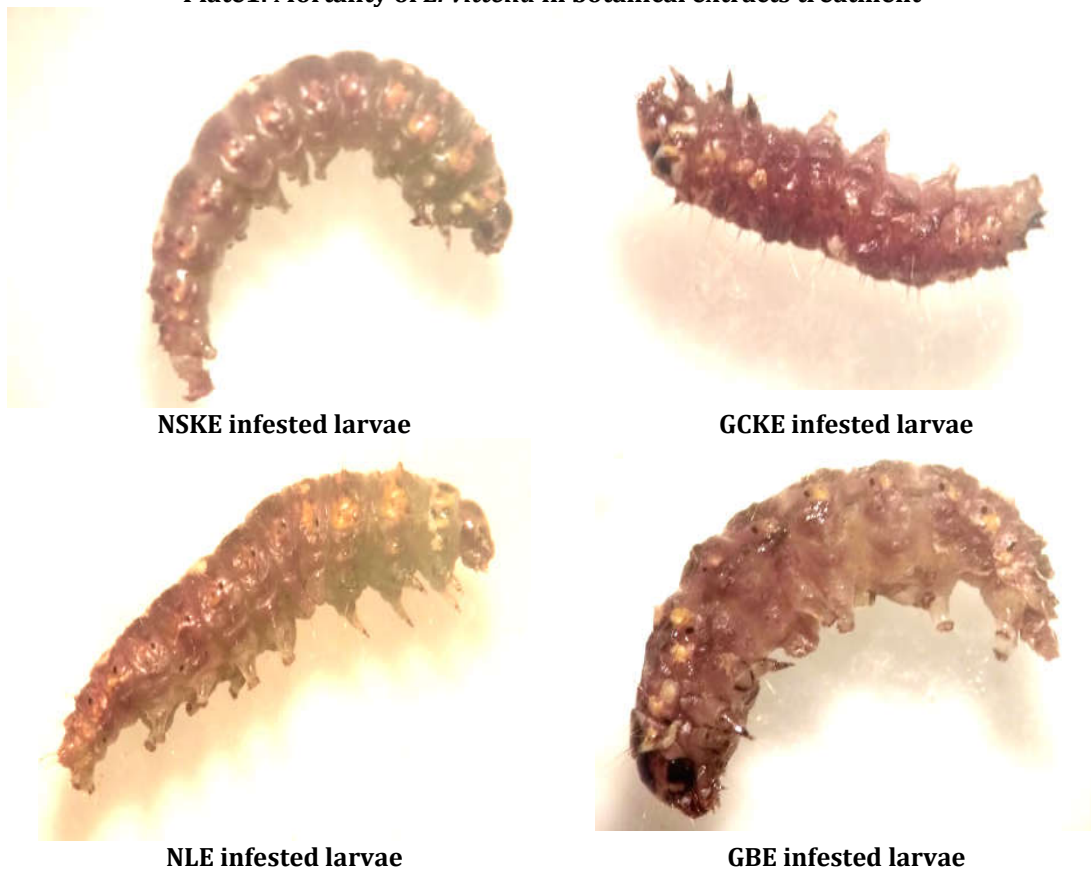
Figures in parentheses are arcsine (x + 0.5) transformed values, mean in column followed by common letter are not significantly different at the 5 per cent level (DMRT), HAT- Hour after treatment.

The highest per cent mortality was recorded in NSKE 5% (33.33%) on par with garlic + chilli + kerosene extract (GCKE) 5% (26.67%) on par with NLE 5% (26.67%) followed by OSE (16.67%) at after 24 HAT. The similar trends were followed in 48 HAT (Plate 13). At 72 HAT, the highest per cent mortality was NSKE 5%, GCKE 5% and NLE 5% were 76.67%, 63.33% and 56.67% respectively. The least mortality was recorded on *Datura* leaf extract (DLE) 5% (33.33%). Thus it was evident that there was significant difference in between the botanical extract treatments but individually NSKE showed highest mortality followed by GCKE and NLE.

**Fig.1. Studies on the efficacy of botanical extracts against *E. vittella* under lab conditions**



**Plate1. Mortality of *E. vittella* in botanical extracts treatment**



**DISCUSSION**

The results of *in vitro* studies on *E. vittella* revealed that the maximum antifeedant activity was observed in NSKE 5% followed by NLE 5% and OSE 5% when compared to control (3.84%) at the 24 HAT. The results are conformity with Rao *et al.* [7] who reported that higher antifeedancy activity was recorded in neem seed extract. Similarly, Sharma *et al.* [10] was confirmed that maximum antifeedant activity in neem seed (40.06%).

The maximum per cent of mortality was recorded in NSKE @ 5%, GCKE @ 5% and NLE @ 5% were 76.67%, 63.33% and 56.67% at 72 HAT, respectively. These botanical extracts were slow in action and long lasting. The present findings are in accordance with Sumathi and Balasubramanian [12] highlighted the effectiveness of NSKE @ 5% in controlling the shoot and fruit borer on bhendi. Umamageswari *et al.* [13] reported the neem (*A. indica*) as deterring and repelling activities against *E. vittella* on bhendi. In present study OSE @ 5% and GBE @ 5% was moderate by effective against *E. vittella* on bhendi. Similarly, Pratibha and Singh [5] observed the maximum toxic effect after treatment with neemgold in all exposure periods followed by garlic bulb extract.

## CONCLUSION

The result concluded that application of NSKE 5% effectively suppression of *E. vittella* on bhendi.

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