

Evaluation of indigenous products with insecticide against tobacco caterpillar (*Spodoptera litura*) infesting cabbage

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The evaluation of treatments in the control of *Spodoptera litura* (Fab.) was done under leaf dip method (poisoned food technique). All the treatments were found significantly superior over control. Among treatments the highest larval reduction of 90.00% to 100.00% was recorded with the treatment comprising of DDVP (0.05%) and DDVP (.025%)+NSKE+cow urine 2% and minimum larval reduction 20.00% to 23.333 was recorded after 24, 48 and 72 hours, and mortality at 72 hours was highest over 48 hours and 24 hours.

Key words : Indigenous products, Inesticide, *Spodoptera litura*, Cabbage

INTRODUCTION

Tobacco caterpillar, *Spodoptera litura* (Fab.), is one of the important polyphagous crop pests of many crops including cotton, rice, tomato, citrus, cocoa, sweet potato, groundnut, maize, chillies, cabbage, cauliflower and many other vegetables, *Spodoptera litura* infesting 112 species of plant belonging to 44 families, of which 40 species are known from India. (Chari and Patel, 1983) Among the pest of cabbage, *Spodoptera litura* (Fab.) is the most destructive and dreaded pest. Farmers depend on intensive pesticides application to minimize the crop damage and chemical farming is resulting in environmental pollution toxicity and residual effects, at the same time pests become resistant to chemicals which are banned by the government. Increased consumer awareness towards indigenous products (Neem products, animal excreta etc.) is minimize the hazardous chemical usage in agro-eco-system and farmers should be awarded for the use biopesticides and Indigenous products usage. Indigenous or neem products are not only effective against the crop pests but also are ecologically safe and free from residual problems. Neem oil (1%), water extract of neem leaves (40%) and neem seed kernel extract (2%) have been found effective against budfly in linseed (Gupta *et al.*, 2000).

Keeping these facts in view, present study was conducted on the efficacy of indigenous products with insecticide against *Spodoptera litura* on cabbage. Indigenous products have emerged as an alternative to the chemicals pesticides in recent times. These are non pollutant, eco-friendly and cost – effective.

MATERIALS AND METHODS

The trial was carried out for the management on

Spodoptera litura in the Department of Biological Sciences, Allahabad Agricultural Institute – Deemed University, Allahabad for determining efficacy of different indigenous product against 1st, 3rd and 5th instar larvae of *Spodoptera litura* on cabbage. There were nine treatments including control and each treatment was replicated thrice and were done by dipping the green leaf of cauliflower (*i.e.* leaf dip method) at different durations. (24, 48 and 72 hours).

Details of treatments were as follows: T₁ - Neem leaf + Cow butter milk 4%, T₂ - NSKE + Cow butter milk 4%, T₃ - NSKE + Cow urine 4%, T₄ -Neem leaf + Buffalo butter milk 4%, T₅ - NSKE + Buffalo urine 4%, T₆ - DDVP 0.05%, T₇ - DDVP 0.025% + Neem leaf + Cow butter milk 2%, T₈ - DDVP 0.025% + NSKE + Cow urine 2%, T₉ - DDVP 0.025% + Neem leaf + Buffalo urine 2%, T₁₀ -Control D.W.

In the experiment the green leaves were used. The green leaf was sterilized with 0.1% formaline and washed with sterilized water, then the sterilized leaf of cabbage was dipped into above given extract *i.e.* treatment T₁ to T₁₀ prepared by the poison food technique, then 10 larvae were transferred into a small beaker and treated leaves were provided to feed the larvae. The experiment was replicated 3 times along with untreated control in which only distilled water was used and each treatment had 10 larval applied for the 1st, 3rd and 5th instar of test insect. The post observations were made after 24 hrs, 48 hrs and 72 hours and efficacy was dependent on the basis of larval percentage mortality and larval percentage. Net mortality was recorded separately. The data thus obtained were transferred into angular values and subjected to statistical analysis. For the assessment of toxic effects, mortality counts were taken 24 hrs, 48 hrs and 72 hrs.

RESULTS AND DISCUSSION

The data on efficacy of Indigenous products applied in combination with insecticide in the control of *Spodoptera litura* larvae are presented in Table 1, 2 and 3. The

mortality of *Spodoptera litura* was significantly more by T₆ (DDVP 0.05%) and it was found to be superior in larval population reduction followed by T₈ > T₉ > T₇ > T₅ > T₃ > T₂ > T₄ > T₁ > T₀ (Table 1). The mortality in 1st instar larvae was significantly more over 3rd and 5th instar larvae

Table 1 : Effect of different treatments on 1st, 3rd, 5th instar larvae of *Spodoptera litura* when treated for 24 hours through the leaf dip method

Treatments	1 st instar		3 rd instar		5 th instar	
	% Mortality	%Net mortality	% Mortality	%Net mortality	% Mortality	%Net mortality
T1	23.333	17.857	20.000	14.286	20.000	14.286
T2	43.333	39.286	43.333	39.286	43.333	39.286
T3	50.000	46.429	46.666	42.857	43.333	39.286
T4	36.333	32.143	33.333	28.571	33.333	28.571
T5	53.333	50.000	50.000	46.429	50.000	48.429
T6	100.000	100.000	100.000	100.000	100.000	100.000
T7	70.000	67.857	66.666	64.286	66.666	64.286
T8	83.333	82.143	80.000	78.571	80.000	78.571
T9	80.000	78.571	76.666	75.000	73.333	71.429
T10	6.666	0.000	6.666	0.000	6.666	0.000
Mean	54.633	51.428	52.333	48.928	51.666	48.414

Table 2 : Effect of different treatments on 1st, 3rd, 5th instar larvae of *Spodoptera litura* treated for 48 hours through the leaf dip method

Treatments	1 st instar		3 rd instar		5 th instar	
	% Mortality	%Net mortality	% Mortality	%Net mortality	% Mortality	%Net mortality
T1	26.667	21.429	23.333	17.857	20.000	14.286
T2	46.666	42.857	43.333	39.286	43.333	39.286
T3	50.000	46.429	46.666	42.857	43.333	39.286
T4	36.666	32.143	33.333	28.571	33.333	28.571
T5	53.333	50.000	50.000	46.429	50.000	46.429
T6	100.000	100.000	100.000	100.000	100.000	100.000
T7	70.000	67.857	66.666	64.286	66.666	64.286
T8	86.666	85.714	80.000	78.571	80.000	78.571
T9	83.333	82.143	76.666	75.000	76.666	75.000
T10	6.666	0	6.666	0	6.666	0
Mean	55.997	52.857	52.666	49.285	51.999	48.571

Table 3 : Effect of different treatments on 1st, 3rd, 5th instar larvae of *Spodoptera litura* treated for 72 hours through the leaf dip method

Treatment	1 st instar		3 rd instar		5 th instar	
	% Mortality	%Net mortality	% Mortality	%Net mortality	% Mortality	%Net mortality
T1	30.000	25.000	23.333	17.857	20.000	14.286
T2	46.666	42.857	46.666	42.857	43.333	39.286
T3	53.333	50.000	50.000	46.429	50.000	46.429
T4	40.000	35.714	36.666	32.143	33.333	28.571
T5	56.666	53.571	53.333	50.000	53.333	50.000
T6	100.000	100.000	100.000	100.000	100.000	100.000
T7	73.333	71.429	70.000	67.857	63.333	60.714
T8	90.000	89.286	86.666	85.714	86.000	85.714
T9	86.666	85.714	83.333	82.143	80.000	78.571
T10	6.666	0	6.666	0	6.666	0
Mean	58.333	55.357	55.666	52.598	53.599	50.357

and mortality at 72 hours (Table 3) was highest over 48 hrs (Table 2) and 24 hrs (Table 1). The results of the present study corroborate with the findings of Kaur *et al.* (2001). They reported that younger instars were more susceptible to HNSKE than older one of *S. litura*. Combined effect of BTK and SINPV with insecticides was found significantly superior over control to the larvae of *S. litura* on cauliflower (Jat and Bhardwaj, 2005). Dhingra *et al.* (2003) also reported the efficacy of mixture of insecticides. The treatment of DDVP solution recorded highest mortality (100%) on I, III, V instar larvae at 72 hrs (Table 3), but among the indigenous combined with insecticide (DDVP .025% + NSKE + Cow urine 2%) solution.

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