

Relative efficacy of neem based pesticides against diamond back moth, *Plutella xylostella* Linn

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SUMMARY

The efficacy of different neem based pesticides viz., Neemazal, Bioneem, Neemgold, Nimbicidine and Achook was studied against diamond back moth, *Plutella xylostella* Linn. infesting cruciferous crops. Neemazal was the most toxic phytochemical amongst all the tested pesticides. Their relative efficacy on the basis of LC₅₀ against diamond back moth, *P. xylostella* Linn. may be arranged in following descending order: Neemazal > Neemgold > Bioneem > Nimbicidine > Achook. The relative efficacy of the different pesticides based on LC₅₀ and LC₉₀ values was computed.

Despite the voluminous work on the control of diamond back moth, *P. xylostella* still it remains an unabated problem. The use of insecticides in pest control programmes around the world resulted in the disturbance of eco-balance. Diamond back moth is the most important pest which causes direct yield loss and economic damage on cruciferous crops. Management of this pest is becoming a problem because it develops multiple resistance to a synthetic insecticides with short life cycle.

Neem products are not only effective against the crop pests but also ecologically safe and free from residual problems. Several botanical pesticides have been tested by different workers (Singh and Srivastava, 1985; Purohit *et al.*, 1989; Lowery and Isman, 1995).

MATERIALS AND METHODS

Neemazal, Bioneem, Neemgold, Nimbicidine and Achook obtained from E.I.D. Parry (India) Ltd., Madras; Balaji Chemical, Calcutta; SPIC India Ltd., Madras; M/S T Stanes and Company Ltd., Coimbatore; and M/S. Bahar Agro Chemical Feeds Pvt. Ltd., Bombay, respectively used in the present investigation. All these neem products were prepared by adding desired quantity of distilled water. For this purpose, 10% stock solution was prepared for each test compound by the formula given below:

$$\text{Amount of test compound} = \frac{\text{Quantity of solution required} \times \text{\% of solution desired}}{\text{Strength of pesticide available}}$$

The desired concentration of Neemazal, Bioneem, Neemgold, Nimbicidine and Achook were prepared from the stock solution by diluting with desired amount of distilled water. The toxicity of neem based pesticides against 3rd instar larvae of diamond back moth, *Plutella xylostella* by bio-assay (film technique) method. The corrected mortality percentage was calculated from the observed mortality values by the following formula as given below:

$$\text{Corrected per cent mortality} = \frac{T - C}{100 - C} \times 100$$

where,

T = Observed mortality

C = Mortality in control

The LC₅₀ and LC₉₀ values of different neem based pesticides were determined by taking it to find out its toxicity against the larvae of diamond back moth, *Plutella xylostella* Linn.

RESULTS AND DISCUSSION

The studies on toxicity of various neem based pesticides made against *Plutella xylostella* revealed that Neemazal was the most toxic among all the tested pesticides and next in order were Bioneem, Neemgold, Nimbicidine and Achook was to be least effective (Table 1). The insecticidal activity of different neem based pesticides was

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Table 1 : Efficacy of different neem based pesticides on 3rd instar larvae of *Plutella xylostella* Linn

Sr. No.	Formulations/ Treatments	Concentration (%)	Subject (n)	Effectuated (%)	Emp. probit	Expected probit	Chi-square χ^2	$\eta^*\omega$	Working probit
1.	Neemazal	4.0%	30	28.97	6.81	90.48	1.28	9.97	6.67
2.	Bioneem	4.0%	30	26.89	6.26	75.57	1.87	14.83	6.18
3.	Neemgold	4.0%	30	25.86	6.09	72.08	2.97	16.84	6.00
4.	Nimbecidine	4.0%	30	24.83	5.95	67.49	3.19	17.72	5.88
5.	Achook	4.0%	30	23.79	5.82	60.29	4.53	18.63	5.75

Table 2 : LC₅₀ and LC₉₀ values of various neem based pesticides against *Plutella xylostella* Linn

Pesticides	LC ₅₀	LC ₉₀	Relative toxicity	
			LC ₅₀	LC ₉₀
Neemazal	1.0354	4.7400	2.2699	2.2800
Bioneem	1.3599	8.0658	1.7283	1.3385
Neemgold	1.8357	11.4107	1.2803	0.9462
Nimbecidine	2.3503	10.7680	1.0000	1.0000
Achook	2.8960	13.1566	0.81139	0.82063

LC₅₀ = Concentration calculated to give 50 per cent mortality.

LC₉₀ = Concentration calculated to give 90 per cent mortality

determined by working out the probit analysis so as to find out LC₅₀ and LC₉₀ values for the experimental pest. The values of relative toxicity of different experimental neem based pesticides have been calculated by taking LC₅₀ of Nimbecidine as unity (Table 2). These neem based pesticides showed their toxicity as 2.2699, 1.7283 and 1.2803 times, respectively more than Nimbecidine, whereas the toxicity of Achook was 0.81139 time less when compared with Nimbecidine. The LC₉₀ values have also been calculated which resulted 4.7400, 8.0658, 11.4107, 10.7968 and 13.1566 for Neemazal, Bioneem, Neemgold, Nimbecidine and Achook, respectively. The efficacy of various neem products from different parts of the world has been reviewed by Pal (2004), Isman (1999) and Akol *et al.* (2003).

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