

Research Paper :

## Effect of non-synthetic pesticides as antifeedant on *Papilio demoleus*

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### ABSTRACT

Three neem based pesticides viz., Neem Plus, Neemark and Nimba at all the concentrations tested (0.5-2.5%) exhibited feeding effect on lemon butterfly, *Papilio demoleus* Linn., Feeding deterency of neem based pesticides increased with increase in the concentration. Among the neem based pesticides tested, azadirachtin rich Neemark exhibited maximum efficacy followed by Nimba and Neem Plus.

**KEY WORDS :** *Papilio demoleus* larvae, pesticides, Neem, Antifeeding, Azadirachtin

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The use of plant products as pesticides against crop pests is gaining importance in recent years in view of environmental and health hazards posed by synthetic organic pesticides. In the last decade, neem has become a source of natural insecticide by replacing synthetic pesticides due to its non-toxicity, environmental safety etc. Neemark is a natural neem based botanical pesticide with Azadirachtin. Azadirachtin is a highly oxidized tetranortriterpenoid belonging to the Limnoids which boasts a plethora of oxygen functionality, comprising an enol ether, acetal, hemiacetal and tetra substituted oxirane. Geema *et al.* (2007) synthesised that azadirachtin is biodegradable (it degrades within 100 hours when exposed to light and water) and shows very low toxicity to mammals. Similarly, Bilton *et al.* (1988) reported about Azadirachtin.

### EXPERIMENTAL METHODOLOGY

Present experiment was carried out in the Faculty for Ecological and Analytical Testing (FEAT) Laboratory IIT, Kanpur. Test insect (*Papilio demoleus*) were collected from Departmental Insectory of Entomology, Chandra Shekhar Azad, University of Agriculture and Technology, Kanpur and reared in FEAT Lab IIT. Various registered pesticides of neem viz., Neemark, Nimba and Neem Plus were obtained from Department of Agri.

Chemistry, C.S.A.U. Agri and Tech., Kanpur. The desired concentration of neem based pesticides were prepared as from the stock solution by diluting with desired amount of distilled water. Leaf pieces of lemon leaves were directly calculated by putting it on graph. Measured leaves pieces were dipped in neem based pesticides solution and kept under fan for ½ hour.

### Recording data :

Observations were recorded after 48 hours and area of leaf pieces left over were measured. The percentage antifeedant activity was calculated by the formula of Singh and Pant (1980).

$$\% \text{ leaf protection} = \frac{\text{PAT} - \text{PAC}}{100 - \text{APC}} \times 100$$

where

PAC = % Protected leaf area in control lemon leaf discs

PAT = % Protected leaf area in treated lemon leaf discs

### EXPERIMENTAL FINDINGS AND ANALYSIS

Results were tabulated in Table 1. Based on results, among the pesticides used, Neemark was found to be the best antifeedant against the test insect larvae by less feeding on the treated leaves at 2.5 per cent concentration

**Table 1: Antifeeding effect of neem based pesticides on lemon butterfly, *Papilio demoleus* Linn**

Treatments	Mean feeding per cent	Mean per cent protection	Corrected per cent protection due to treatment	
Neemark 2.5%	14.88	85.12	83.86	(66.41)
Neemark 2.0%	19.77	80.23	78.55	(62.49)
Neemark 1.5%	22.33	77.67	75.78	(60.51)
Neemark 1.0%	26.00	74.00	71.80	(57.57)
Neemark 0.5%	28.44	71.56	69.15	(56.27)
Control	92.20	7.80	-	
S.E.±				1.24
C.D. (P=0.05)				3.9
CV%				3.5
Nimba 2.5%	17.33	82.67	80.47	(63.91)
Nimba 2.0%	20.88	79.12	77.35	(61.68)
Nimba 1.5%	27.22	72.78	70.47	(57.08)
Nimba 1.0%	29.66	70.34	67.83	(55.45)
Nimba 0.5%	32.00	68.00	65.29	(53.93)
Control	92.20	7.80	-	
S.E.±				1.55
C.D. (P=0.05)				4.89
CV%				4.60
Neem Plus 2.5%	19.44	80.56	78.91	(62.76)
Neem Plus 2.0%	25.00	75.00	72.89	(59.69)
Neem Plus 1.5%	28.44	71.56	69.15	(56.26)
Neem Plus 1.0%	30.88	69.12	66.50	(54.63)
Neem Plus 0.5%	33.33	66.67	63.85	(53.05)
Control	92.20	7.80	-	
S.E.±				1.35
C.D. (P=0.05)				4.25
CV%				4.09

Figure in parantheses are original values

at which the mean feeding per cent was 14.88, 19.77, 22.33, 26.00, 28.44 at concentration of 2.5, 2.0, 1.5, 1.0, 0.5 per cent, respectively. Neem plus was the least effective antifeedant among all pesticides tested and nimba was followed to this pesticides. The results obtained from laboratory studies on feeding of *Papilio demoleus* are in conformity with the antifeedant effects of neem based pesticide, neemark against *Papilio demoleus* (Table 1). Azadirachtin had an antifeedant activity against *S. frugiperda* (Raffa, 1987) and *S. littoralis* (Meisner *et al.* 1981). The antifeedant and growth inhibiting effect of azadirachtin rich neem fraction on *Sogatella frucifera*, *Spodoptera litura* and *Helicoverpa armigera* were reported by Nelson *et al.* (1993). Ley *et al.* (1992) worked on several antifeedants from neem oil, *Aadirachta indica*

rich fractions on *Spodoptera litura* Fab. Many worker have proved the antifeedant activity of neem against wide range of insect pests.

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