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EFFICIENCY AND RESIDUE DISSIPATION PATTERN OF FENVALERATE IN/ON BRINJAL (*Solanum melongena L.*) FRUITS

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In order to find out the most suitable spray concentration of fenvalerate for the pests of brinjal, a field experiment was conducted with four levels of spray concentrations namely 0.005, 0.01, 0.015 and 0.02 percent and giving four sprays at 20 days interval. The most effective concentration was found to be 0.02 percent and in the washed and cooked fruits the residue level has come down to below the tolerance limit by 1.7 days, whereas waiting period for raw fruits was found to be 12.99 days.

Brinjal (*Solanum melongena* L.) is native of India, and is one of the most common vegetables grown through out the country. Though, mainly a hot weather crop, this is grown throughout the year. The pest problem in this crop is of such a serious dimension that, in the successful commercial cultivation of this crop. the use of insecticides become indispensable. Many insecticides like carbaryl and quinalphos were reported to control the insects effectively for this crop, With the introduction of synthetic pyrithroid, fenvalerate (-cyano-m-phenoxy benzyl - isopropyl - p - chlorophenyl acetate) was reported by many workers to be effective in controlling aphids in chilli, bendi, citrus etc. The present investigation was aimed at evaluating the efficiency of fenvalerate for brinjal in Karnataka and also to evaluate the residue levels in the fruits after the harvest.

MATERIALS AND METHODS

A field experiment was laid o in the red sandy soils of agricultu college farm, Hebbal, Bangalore duri the summer 1983 - 84. Fenvalera was tried at 0.005, 0.01, 0.015 a 0.02 percent concentration as spr First spray was given 20 days af transplanting and subsequent spra were given at an interval of 20 da Randomly 10 plants in each plot we selected and tagged for observatio on the population of jassid nymphs. assess the incidence of fruit bore the fruits were harvested on 0, 1, 5, 10, 15, and 20 days after 4th sp and the weights of healthy and damag fruits were recorded. The residue leve were estimated in the raw fruit as w as in washed and cooked fruits per the method of Young *et* (1978) using acetonitrile as the e tractant. The combined filtrates w transferred to a 500 ml separati funnel. The acetonitrile solution w

extracted four times with 50 ml portions of n-hexane and hexane washings discarded. To acetonitrile solution 100 ml methane was added and volume was reduced to 50 ml on a hot water bath with a jet of hot air. Further, 100 ml hexane was added and evaporated to 50 ml. Repeated this process twice. The hexane solution was then transferred to separating funnel quantitatively using about 100 ml water. Shaken the mixture and allowed the phases to separate. Collected the hexane phase and aqueous phase was discarded. To hexane phase 2g of anhydrous sodium sulphate added and the filtered hexane sc tion was evaporated to almost dryn and the residue was redissolved 10 ml hexane. This was transf to the florisil (60-80 mesh) colu washed with 50 ml hexane and elute discarded. Fenvalerate was el with 100 ml of 5 per cent ethylace and evaporated. The residue was solved in 15 ml chloroform absorbance was measured at 27 (Jain *et al.*, 1979). An average re very value of 87.32 per cent obtained.

Table 1. Efficacy of fenvalerate at different concentrations against the jassids in brinjal p

Concentration (ai) (%)	Average number of jassid nymphs per 10 plants before			
	I Spray	II Spray	III Spray	IV Spray
0.0	13.75	37.75	34.50	25.75
	(1.0178)+	(1.5773)	(1.5444)	(1.4311)
0.005	10.50	30.75	26.50	14.25
	(0.9811)	(1.5141)	(1.4313)	(1.1971)
0.01	9.72	20.00	14.00	1.50
	(1.0171)	(1.3333)	(1.1890)	(1.1226)
0.015	8.00	10.75	9.75	8.00
	(1.0171)	(1.1002)	(1.0650)	(0.9945)
0.02	8.25	6.50	4.75	3.25
	(0.7775)	(0.9192)	(0.8191)	(0.6999)
S.Em±	(0.184)	(0.178)	(0.05)	(0.063)
C. D. @ 5%	(0.567)^{ns}	(0.548)*	(0.154)*	(0.049)*

*Figures in parentheses are long (X+2) transformed values.

RESULTS AND DISCUSSION

Fenvalerate sprayed at all levels was effective in controlling jassids significantly over control (Table 1), though 0.02 per cent spray concentration recorded the lowest population. The mean per cent of damaged fruits both on number basis and weight basis pooled over all the harvests are presented in Table 2. The data show marked differences among treatments in both the cases. The control plots recorded a value of 19.2 per cent and 23.48 per cent of infested fruits on number basis and weight basis respectively, as against 1.82 and 1.85 per cent with 0.02 per cent fenvalerate spray. The damage was significantly more when the spray concentration was less than 0.02 per cent as compared to the extent of damage when spray concentration was 0.02 per cent. The effective control of both jassids and fruit borer was reflected in the ultimate yield of the crop. The data furnished in Table 3. indicate that more than 80 per cent increase in yield could be achieved by giving four sprays with 0.02 per cent fenvalerate. Though, there was significant increase in yield by 0.005 per cent spray as compared to control, the yield registered was only 107.05 q ha as against 155.93 q/ha when concentration of spray solution was increased four times.

Table 2. Efficacy of fenvalerate at different centrations against fruit borer brinjal both on number and w basis (for the entire season).

Concentration (ai) (%)	Mean percent of damaged fru Number basis	Weight
0.0	19.20	23.1
	(25.97)+	(29.(
0.005	4.03	7.(
	(11.57)	(16.1
0.01	3.13	4.
	(10.22)	(12.:
0.015	2.35	2.
	(0.75)	(9.(
0.02	1.83	1
	(7.82)	(7.8
S.Em±	(0.12)	(0.1
C. D. at 5%	(0.30)*	(0.3

+ Figures in parentheses are angular tran med values.

* Significant at 0.05% level.

RESIDUE DISSIPATION PATTERN :

The pattern of fenvalerate dissi- ppm corresponding to the spray c centration 0.005 to 0.02 per respectively. After a day the resi levels in the fruits was reduced the extent of 58.2 per cent with lowest level of fenvalerate and fifth day, there was no detecta amount of residue. There was a ste decline of residue in the proces fruits and on the next day of spray itself, no residues could be detec in the cooked fruits. When the sp concentration was increased to 0

There was no detectable residues on 3rd day, when the fruits were washed and cooked. A similar trend was noticed when the concentration of spray solution was increased further. On third day after the fourth spray with 0.02 per cent fenvalerate, the residue level in raw fruits was 10.66 ppm and there was no detectable residues in cooked fruits.

An appreciable loss of residues resulted when the fruits were subjected to washing and cooking. The rapid disappearance of residues below the tolerance limit of 1 ppm is ideal for fruit and vegetable crops which are for immediate consumption. In this trial, though all concentrations of fenvalerate tried resulted in significantly higher yield, a concentration of 0.02 per cent was found more ideal in terms of yield. Taking into account the residue levels in raw fruits, the calculated waiting period works out to 12.99 days if fenvalerate at 0.02 per cent concentration is used for spraying. The requirement of approximately 15 days waiting period was reported by earlier workers also (Manjunath *et al.*, 1985). The longer persistence of fenvalerate residues was also reported in Okra and Cauliflower (Jain *et al.*, 1979).

Since, brinjal fruits are not ideal to be consumed as raw fruits in salad or in any other preparations, it is either cooked in water or oil before consumption. The waiting period for washed and cooked fruits worked on to be only 1.7 days If fenvalerate is

Table 3. Effect of fenvalerate treatments on the total yield of brinjal fruits (mean of four replications)

Concentration (ai) (%)	Yield (q/ha)	Percent increase over control
0.0	85.47	—
0.005	107.05	25.24
0.01	121.49	42.14
0.015	138.45	61.96
0.02	155.93	82.43
S.Em±	8.82	
C. D. at 5%	21.93	

The half lives of fenvalerate residu in raw and cooked fruits were found to be 2.66 and 0.6 days respectively. There found to be no reduction in the duration of the waiting period, even if the spray concentration is reduced. Hence, it is ideal to use a spray concentration of 0.02 per cent which could help to realise more than 80 per cent increase in yield.

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