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Aldicarb Residues in Pointed Gourd (*Trichosanthes dioica* Roxberg) and its Soil

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ABSTRACT

Application of aldicarb 10 G in soil under pointed gourd (*Trichosanthes dioica* Roxberg) during fruiting period resulted in its residues of 0.09 ppm, 0.05 ppm and BDL, 15, 30 and 45 days later in case of dose at 0.5 kg. a.i./ha. (2 g/plant) The higher doses of 1.0 and 1.5 kg a.i./ ha (4 and 6 g/ plant) gave corresponding residues of 0.31, 0.12 and 0.03 ppm and 0.55, 0.24 and 0.09 ppm, respectively. The soil sample analysed at 90th day after application contained non-detectable residues in all the three cases.

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INTRODUCTION

Pointed gourd(*Trichosanthes dioica* Roxberg) commonly known as *Parwar* in India is one of the remunerative cucurbitaceous vegetable crop grown extensively in Gujarat. Farmers of South Gujarat uses aldicarb (2 - methyl -2 (methylthio) propionaldehyde 0 - (methyl - carbamoyl) Oxime) 10% granules to be applied in soil for the control of sucking pests particularly for the mealy bugs (*Ferrisia virgata* Cockerel) and scales (*Chloropulvinaria psidii* Maskell). However, no work has been done on the extent of aldicarb residues in the fruits of this vegetable crop and its soil under Indian agroclimatic condition. Hence, the present investigation on extent of aldicarb residues in the fruits of pointed gourd plant and its soil was carried out in Gujarat and the results are reported overhere.

MATERIALS AND METHODS

A field experiment was conducted in the farmer's field having silty to clayey soil at the village Tankal of Chikhali taluka in Valsad district of Gujarat. The experiment was carried out from March to May, 1984 in the plot having 2500 pointed gourd plants per hectare spaced at 2 x 2 m. distance. Three treatments of aldicarb 10 G *viz.*, 0.5 kg. a.i./ha (2 g/plant), 1.0 kg a.i./ha (4 g/plant) and 1.5 kg a.i./ha (6 g/plant) were selected for the study and each treatment was given to 25 isolated pointed gourd plants. The granules were applied in the soil in ring fashion about 6 inches away from the plant. The treatments were given during fruiting period.

For the residue study, the fruit samples

from each plant were taken randomly at 15, 30 and 45 days after treatment, pooled treatment-wise, chopped finely and finally a representative samples (50 g) was taken from each treatment on each days of sampling and analysed separately. The soil samples were collected (90 days after treatments) from 15 different spots in each treatment upto a depth of 5-10 cm. with the help of metal scoop. These samples were dried at room temperature and ground to pass through 2 mm. sieve. Soil sample weighting 100 g was taken for analysis.

Aldicarb, aldicarb sulphoxide and aldicarb sulphone were determined as total toxic aldicarb residues by first oxidising aldicarb and its sulphoxide to the sulphone with a mixture of hydrogen perodixe : glacial acetic acid (2:1) and then determining the total aldicarb sulphone by the colorimetric procedure described by Johnson and Stansbury (1966) and Romine (1973). The extraction as well as cleanup of the fruit and soil samples was carried out following the methods used by Singh *et al.* (1982) and Singh *et al.* (1983) respectively.

The methods was validated by fortifying the untreated fruit as well as soil samples with aldicarb sulphone at 0.2 to 10.0 ppm. The method sensitivity for fruit and soil sample was 0.012 and 0.03 ppm, respectively. The average aldicarb sulphone recovery from the fortified fruit and soil samples was 95.64 and 97.25% respectively which was used for the correction of the data for 100% recovery.

RESULTS AND DISCUSSION

Residues in fruits :

It can be seen from the data presented in Table 1 that the toxic aldicarb residues in fruits were dose related. At the dose 0.5 kg a.i./ha (2 g/plant), the aldicarb is not likely to pose any health hazard problem as the residues at 15, 30 and 45 days after treatment (DAT) were (0.09, 0.05 ppm and BDL) below the tolerance limit of 0.2 ppm prescribed by FAO/WHO (Anonymous, 1980) for fruits. However, at the dose of 1.0 kg a.i./ha (4 g/plant), the residue at 15 DAT was (0.31 ppm) above the tolerance limit while at 30 and 45 DAT, it was (0.12 and 0.03 ppm) below the tolerance limit. Further, at the dose of 1.5 kg a.i./ha (6 g/plant), the residues at 15 and 30 DAT were (0.55 and 0.24 ppm) above the tolerance limit while it was (0.09 ppm) below the tolerance limit at 45 DAT. Hence, if aldicarb is to be used at 1.0 and 1.5 kg a.i./ha (*i.e.*, 4 g and 6 g/plant), more than 15 to 30 days should be lapsed between the actual treatment and harvesting of fruits. Thus, the use of last two treatments for the plant protection work on pointed gourd during fruiting period is questionable from the view point of toxic residues as the fruits of this crop are harvested at 8-10 days interval. However, these two treatments may be utilized before one month of the starting of regular picking *i.e.*, after planting of the pointed gourd vines and thus sufficient time interval is required to be lapsed as waiting period (time between application and harvesting of fruits) so as to avoid the residues problem during regular fruiting and picking period.

Residues in soil :

The soil samples at 60 DAT showed non-detectable residues in all the treatments under study, thereby eliminating the chance of contamination to the succeeding crops. Subramanium and Krishnamoorthy (1977) who have reported non-detectable aldicarb residues in soil samples drawn at 75 DAT in

TABLE 1

Aldicarb residues in pointed gourd and its soil.

Aldicarb dose	*Total toxic aldicarb residues (ppm)**			
	In Fruits		*In Soil*	
	15 DAT	*30 DAT*	*45 DAY*	*90 DAT*
1	*2*	*3*	*4*	*5*
*0.5 kg a.i./ha (2 g/plant)***	*0.09*	*0.05*	*BDL*	*BDL*
1.0 kg a.i./ha (4 g/plant)	*0.31*	*0.12*	*0.06*	*BDL*
1.5 kg a.i./ha (6 g/plant)	*0.55*	*0.24*	*0.09*	*BDL*

* *Average of two replicates.*

** *Dose of formulated material.*

BDL=Below Detectable Limit (i.e., 0.012 ppm for fruits and 0.03 ppm for soil).

okra (*Abelmoschus esculentus*) crop treated at the dose 0.5 kg a.i./ha. Similarly, Dikshit *et al.*, (1976) have also reported non-detectable residues of aldicarb in soil samples drawn 80 DAT of aldicarb 10 G @ 1.5 kg a.i./ha in case of pea plant (*Pisum sativum* L. var. *arvense* Poir.), while Malik and Yadav (1979) have reported non-detectable aldicarb residues in soil samples drawn after 90 days of treatments in case of cotton (*Gossypium hirsutum* L.) crop treated with 1 and 2 kg a.i./ha aldicarb granules. Thus, the present findings are in close agreements with the findings reported by above workers in India.

From the data of present investigation, it can be concluded that the aldicarb granules would not pose any health hazard problem after 15, 30 and 45 days of its application at the rate 0.5, 1.0 and 1.5 kg a.i./ha respectively in case of pointed gourd. The residues in soil 90 DAT have also been found below detectable level and there will not be any contamination to the succeeding crop. Hence, all the three doses to be applied after planting of vines can be utilized for plant protection work on pointed gourd crop as the fruiting and picking in this crop usually starts after 3-4 months of planting and as such it would not pose residue in fruits.

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REFERENCES

Anonymous (1980). *Pesticide residue in food.* Report of joint meeting of FAO/WHO expert bodies on pesticide residues held in Geneva, 3-12 December, 1979.

Dikshit, A.K.; N.P. Agnihotri; R.S. Dewan and H.P. Saxena (1976). Dissipation of aldicarb in soil and pea plant. *Indian J. agric. Sci.*, **46**(3) : 117-9.

Johnson, D.P. and H.A. Stansbury (1966). Determination of TEMIC residues in raw fruits and vegetables. *J. Assoc. Offic. Anal. Chem.*, **49**(2) : 399-403.

Malik, S.K. and P.R. Yadav (1979). Persistance of aldicarb in soil and its translocation in cotton seeds. *Indian J. agric. Sci.*, **49**(9) : 745-8.

Romine, R.R. (1973). Aldicarb. In : *Analytical methods for pesticides and plant growth regulators* (Gunther, Z. ed.). Academic Press, New York, 7 : 147-162.

Singh, K.P.; S.Y. Pandey and S. Singh (1982). Aldicarb residues in red chillies. *Indian J. agric. Sci.*, **52**(11) : 776-8.

Singh K.P.; S.Y. Pandey; M.M. Khan and S. Singh (1983). Residues of aldicarb in cotton seed. *Indian J. Ent.*, **45**(1) : 64-70.

Subramaniam, T.R. and K.K. Krishnamoorthy (1977). Persistance of TEMIC (Aldicarb) in soil and its residues in *bhendi* fruits (*Abelmoschus esculentus*). *Curr. Sci.*, **46**(4) : 108-109.