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RESIDUES OF CARBOFURAN, ALDICARB, ZIRAM AND COPPER OXYCHLORIDE IN BETELVINE

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Carbofuran 3G and aldicarb 10G when applied to one year old betelvine crop at 0.5, 1.0 kg ai/ha each dissipated to non-detectable levels in 41 days. The half life values were 6 and 7 days respectively for carbofuran and aldicarb in betel leaves. While the aldicarb application required a waiting period of 12 to 14 days, carbofuran required a waiting period 13 to 15 days for safe chewing of betal leaves. Ziram dissipated faster than copper oxychloride and the half-life values were 5 and 8 days respectively. Ziram applied as 0.2% spray and copper oxychloride sprayed at 0.25% concentration to betelvine crop required 4.3 days and one day respectively as waiting period for the safe chewing of betel leaves.

The betel leaf plant is a creeper which is cultivated for its leaves which are chewed along with arecanut and lime throughout India. In recent years there has been considerable loss in betelvine production due to pests and diseases. Mildews, black rot, marginal blight(anthracnose)etc. are some of the diseases which affect the betel leaves and the yield of leaves is considerably reduced. Besides, the root knot nematode *(Meloidogyne incognita)* affect the crop and cause considerable yield loss to the growers. It has been found that copper fungicides like copper oxychloride and dithiocarbamate fuhgicides like cuman could control the fungal diseases effectively. The root knot nematodes have been found successfuly ontrolled by the application of aldicarb and carbofuran granules at 0.5 and1.0 kgai/ha As the edible part is the leaves, it is essential to study the persistence of these chemicals in leaves before they are offered for chewing to the consumers. The results of the e ments carried out to study the pe tence of these fungicides nematicides in betel leaves and establish waiting periods for the s consumption are reported.

MATERIALS AND METHODS

An experiment was conduc during September 1984 in a priv betelvine garden at Pothanur n Karur of Tamil Nadu with nematici and fungicides as treatments. Car furan 3G and aldicarb 10G at 0.5 0.75 kg ai/ha each were applied to year old vines. Copper oxychlo 0 25% and cuman 0.2% were spra separateiy. The treatments were plicated thrice in a completely ran mised block design. Leaf samp were collected from carbofuran aldicarb applied plots at 3, 5, 12, and 41 days after the treatment; leaf samples from fungicide spra

plots were collected 1 hr, 1, 4, 9 and 16 days after the spray. The leaf samples were immediately transported to the pesticide residue laboratory through ice boxes and analysed for the nematicide and fungicide residues. Carbofuran residues were extracted by blending the leaf samples with 0.25N Hcl and refluxing it for 45 minutes over sand bath and extracting with dichloromethane The dichlon-methane extract was concentrated and cleaned up by passing through a column of alumina and silica gel (Williams and Brown, 1973). The cleaned up extract was then hydroly-sed and derivatised with 1-fluoro 2, 4-dinitrophenyl and estimated through a GC-ECD system (Holden, 1973). Aldicarb residues were extracted by blending tne leaf samples with acetone and partitioned into chloform solvent. The chloroform extract was then cleaned up through coagulation techni-que (Miskus *et al.*, 1959) and the residues were estimated spectrophoto-metrically as aldicarb sulfoxides (John son and Stanbury, 1966). Copper oxychloride was extracted by blending with 20% sulphuric acid. After min-eralisation of the extracts by adding nitric acid, the copper was complexed as copper diethylcarbamate, extracted by chloroform and determined colori-metrically (Anon, 1979). Ziram (Zinic dimethyl dithiocarbamate) was esti-mated by decomposing the leaf samples in boiling dilute sulphuric acid and trapping the CS_2 in an ammoniacal solution of copper acetate and dietha-nolamine. The yellow complex was ex tracted with amylacetate and deter-mined spectrophotometrically at 435nm (Zweig, 1964). The per cent recovery of the pesticides in betel leaf samples were 91, 89, 96 and 92 for carbofuran, aldicarb, copper oxychloride and ziram respectively.

Table 1. Carbofuran add Aldicarb residues in betel leaves.

Sampling days after treatment	Residues in ppm			
	Carbofuran		Aldicarb	
	0.5 kg ai/ha	0.75 kg ai/ha	0.5 kg ai/ha	0.75 kg ai/ha
3	0.195	0.239	0.262	0.338
5	0·437	0.567	0.388	0.402
12	0.242	0.270	0.300	0.368
24	0.167	0.181	0.138	0.168
41	ND	ND	ND	ND
Half-life (days)	7	7	6	7
MRL (ppm)	0.2	0.2	0.2	0.2
Waiting period (days)	13	15	12	15

RESULTS AND DISCUSSION

The persistence of carbofuran and aldicarb in betel leaves following their application at 0.5 and 0.75 kg ai/ha to betelvine crop is given in table 1. Both the nematicides had been translocated to the leaves even on 3rd day and the 5th day samples had recorded the highest amount of residues and thereafter the residues declined slowly and reached to non-detectable leaves on 41st day. The half-life was found to be 7 days for carbofuran and 6 to 7 days for aldicarb. Based on the MRL value of 0.2 ppm for both the nematicides 13 and 15 days were required for carbofuran residues to reach below the tolerance level for 0.5 and 0.75 kg ai/ha applications respectively, while 12 and 14 days were required for 0.5 and 0.75 kg ai/ha aldicarb applicantions.

Table 2 Residues of ziram and copper oxychloride in betel leaves.

Sampling days after treatment	Residues in ppm	
	Ziram 0.2% spray	Copper oxychloride 0.25% spray
0 (1 hr)	19.50	14.19
1	11.80	8.16
4	7.70	5.52
9	5.43	4.43
16	1.46	2.17
Ralf life (days)	5.11	8.29
MRL (ppm)	7 00	10.00
Waiting period (days)	4.30	1

The dissipation of ziram was faster than copper oxychloride as evidenced from their half life value (Table 2), Silva Fernandes (1971) found greater persistence of inorganic fungicides than the organic compounds like captan and zineb and the half-life of the cupric fungicide was found between 10 and 66 days depending upon the conditions. In the present study also the persistence of copper oxychloride was greater than ziram. Considering the maximum residue limit of these fungicides (Anon, 1981 and Stobwasser *et al.*, (1968) viz. 7 ppm for ziram and 10ppm as cu for copper oxychloride one and 4:3 days were required as waiting periods for the safe consumption of betel leaves. Silva Fernandes (1971) reported a safety interval of 1 day for copper oxychloride in agricultural crops of Portugal The study indicated that carbofuran and aldicarb when applied at 0.5 and 0.75 kg ai/ha to betelvine crop required a waiting period of 12 15 days. Ziram and copper oxychloride required four days and one day as waiting period for the safe chewing of betel leaves.

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EFFECT OF NEEM OIL ON RICE TUNGRO VIRUS INFECTION IN RICE VARIETIES WITH DIFFERENT LEVELS OF RESISTANCE

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The effect of neem oil application on rice tungro infection in susceptible (S), moderately resistant (MR) and resistant (R) varieties which were inoculated by using 1, 3 and 5 viruliferous *Nephotettix virescens* per plant was studied. Neem oil [5%] was applied as both pre-inoculation and post-inoculation sprays. The varieties used were ADT 31 [S], ACM 9 [MR], IR 50 (MR) and TNAU 831520 (R).

The results indicated that increasing the number of insects used for inoculation increased the per cent infection from 50 to 95 in susceptible ADT 31, from 20 to 60 in moderately resistant ACM 9 and IR 50 and from 0 to 35 in resistant TNAU 831520. In the case of susceptible ADT 31, pre inoculation application of neem oil reduced the infection significantly from 50 to 15 per cent when one green leaf hopper [GLH] was used for inoculation. Similar reduction in the percent infection was observed when 3 or 5 GLH per plant were used for inoculation. In the moderately resistant ACM 9 and IR 50 the reduction in infection was respectively from 20 to 5 percent and from 25 to 10 per cent when one GLH was used for inoculation. When the number of insects used for inoculation increased to 3 or 5, the reduction in infection per cent was significant. In the resistant culture TNAU 831520, all the treated plants were free from

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