

## PERSISTENCE OF PHORATE IN BETELVINE LEAVES

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The persistence of phorate in the leaves of Machavaram non-pungent local variety betelvine (*Piper betel* L.) was prolonged; it dissipated below the detectable limit on the 30th day at 1.25 and 2.50 kg a.i./ha and on the 45th day at 3.75, 5.00, 6.25, 7.50, 8.76 and 10.00 kg a.i./ha. Rate of dissipation was more pronounced at the initial stages

One of the main constraints for higher leaf yield of betelvine (*Piper betel* L.) is the incidence of root knot nematode, *Meloidogyne incognita*. Phorate (6-8 kg. a.i./ha) had proved very effective in the control of this nematode (Sitaramaiah et. al., 1985). The present study was undertaken to ascertain the dissipation pattern of phorate residues in betelvine, in view of the fact the foliage is consumed without any further processing.

### MATERIALS AND METHODS

The betelvine yard (variety Machavaram non-pungent local) was raised in the Botanical Garden of Agricultural College, Bapatla in August, 1985 in randomized block design with three replications for each treatment. The propping crop was *Sesbania grandiflora*. The plot size was 5x5 m<sup>2</sup>. The soil was sandy loam in texture with a pH of 8.2. Phorate (Thimet 10 G) was applied @ 1.25, 2.50, 3.75, 5.00, 6.25, 7.50, 8.75 and 10.0 kg. a.i./ha as side dressing when the plants were 50 days old. The toxicant was thoroughly incorporated into the soil

upto a depth of 3 cm around the plants. The higher dosages of phorate were adopted primarily because the chemical will be simultaneously taken up by the propping crop and for the effective control of the nematode.

Two hundred gram leaf samples drawn at random from each replicate after 3, 7, 11, 15, 20, 25, 30 and 45 days of application. The leaf samples were cut into small pieces and the three replicate samples were mixed thoroughly from which a representative 100 g sample was drawn for analysis. It was extracted in chloroform using waring blender. The extract was concentrated after filtration to about 8-10 ml. The colouring matters were removed by treating the extract with a coagulating solution and then reextracting it thrice with 100 ml portions of chloroform. Further clean up was done by passing a concentrated abstract of this through a glass column containing a 5 g mixture of activated charcoal-celite-magnesia (2:2:1) activated at 100°C for 1 hour before use and then eluted with chloroform. The

cleaned up extracts were dried over anhydrous  $\text{Na}_2\text{SO}_4$ , filtered and concentrated to a definite volume from which suitable aliquots were drawn for chemical assay. Residues of phorate were analysed by the method suggested by Getz and Watts (1964) as modified by Jain *et al.* (1974).

The recovery from fortified leaf samples was in the range of 88 to 99 percent. The residue data were subjected to statistical analysis as suggested by Hoskins (1961). As no statutory health agency has so far proposed, the tolerance limit of phorate in betel leaves and the total values could not be computed. The field was irrigated to field capacity and no rainfall was recorded during the period under study.

## RESULTS AND DISCUSSION

The residues of phorate in betel leaves on the 3rd day ranged from

2.56 ppm in 1.25 kg a.i./ha to 8.81 ppm in 10.0 kg a.i./ha treatment. The residue quantum continued to remain more or less static or even increased on the 7th day, despite the fact that there was a continual increase in weight of the plant. The toxicant, therefore, continued to be absorbed in greater amount till at least the 7th day metabolic degradation, if any was more than compensated by greater absorption during this period. On 15th day, the highest per cent dissipation of residue was 64.46 in 1.25 kg a.i./ha treatment. On the 25th day, the per cent dissipation ranged from 94.54 in the lowest dosage to 83.66 in the highest dosage. This may be attributed to the fact that at higher dosages, the toxicant continued to be absorbed for a longer period. The chemical could not be detected with the present analytical tool on the 30th day at 1.25 and 2.50 kg a.i./ha and on the 45th day above 2.5 kg dose level. RL 50 values for the first five treatments ranged from 5.11 to 5.83 days.

Residues of phorate in/on betelvine leaves

Phorate kg a.i./ha	Residues of phorate (ppm) at different time intervals (days)								RL 50 value (days)
	3	7	11	15	20	25	30	45	
1.25	2.56	2.33	1.94	0.91	0.34	0.14	ND	ND	5.63
2.50	3.58	3.26	1.89	1.27	0.59	0.25	ND	ND	5.58
3.75	4.94	4.36	3.06	2.09	1.44	0.43	0.14	ND	5.35
5.00	5.89	5.59	4.04	2.58	1.56	0.45	0.16	ND	5.11
6.25	6.44	5.75	4.23	3.06	1.85	0.56	0.23	ND	5.56
7.50	7.14	6.88	5.06	3.95	2.09	0.94	0.45	ND	6.76
8.75	8.09	8.36	6.59	4.95	2.40	1.07	0.59	ND	6.71
10.00	8.81	9.79	7.33	4.79	2.56	1.44	0.77	ND	7.08

N. D. = Nondetectable

However, for the highest three doses, there was a marked increase in RL 50 values which was found to be 6.76, 6.71 and 7.08 days for 7.5, 8.75 and 10.0kg a.i./ha treatments respectively. Garg and Sethi (1982) studied the persistence of phorate granules in paddy when applied @ 2.0 kg a. i./ha and reported that the deposit on the first day itself was 3 ppm which declined to 2.71 ppm on 10th day. Comparative less uptake of phorate in the present study may be attributed to that the fact the plant had to compete with *Sesbania grandiflora*, a comparatively taller and sturdy plant with more proliferated root system, for the uptake of the toxicant and also due to light textured nature of soil thereby leaching loss being an important factor

for its disappearance from root zone of the plant. In any case, phorate could not be detected in any treatment on the 45th day, and therefore, application of phorate in betelvine does not pose any residue hazard when consumed after the stipulated period.

Since the tops of the propping crop are fed to cattle after 5-6 months age, application of phorate to 50 day old planted betelvine may not cause any residue problem in the consumption of sesbania leaves to cattle. However, determination of phorate residues may help in the prediction of waiting period for its use as cattle feed at the test doses.

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