I J T A
© Serials Publications
National Academy of Agricultural Science (NAAS)
Rating : 3. 03

Extent of Cypermethrin 25% EC Residues in/on Tomato *Lycopersicum Esculentum* Mill Fruit

S. S. Sarangdevot, P. S. Naruka , C. P. Pachauri and Shilpi Kerketta

Abstract: *Residual deposit of sprayed Cypermethrin 25% EC @ 40 g.a.i./ha ranged from 0.8585-0.9460 ppm. with the lapse of time. The deposits dissipated has been recorded and found to be more than 29 per cent loss on 1st day, 53.09-54.63,70.03-74.64,85.01-89.32 and 100 per cent on 3rd, 5th,7th and 9th day in tomato fruits, respectively. The half life values recorded were 2.28-2.69 days.*

Key words: *Cypermethrin, Residue, Waiting period, Half life.*

INTRODUCTION

The tomato, L*ycopersicum esculentum* Mill**.** is an important vegetable crop which is grown throughout the year in the country. Tomato fruits are eaten raw, cooked or used to prepare soup, juice, ketchup puree, paste, powder etc. Tomato provide all the nutrient components, like carbohydrate, protein, fat, vitamins, minerals and water along with roughages, which are the essential constituents of a balanced diet.

The production of tomato crop is affected by a variety of limiting factors including the insect – pests. Cypermethrin has been reported to be highly effective synthetic pyrethroids for the control of major insect - pests of tomato (Singh and Narang 1990).

The persistence and dissipation of residues of Cypermethrin on tomato fruits in different agro climatic conditions seems to be unavailable in India. Keeping the above in view and establishment of waiting period, the residues of Cypermethrin was estimated on tomato fruits.

MATERIALS AND METHODS

The crop of tomato (var. Arjuna) was transplanted at Horticulture Farm of RCA, Udaipur, Rajasthan during two years consecutively following recommended horticultural practices. Experimental trial was laid out in Randomized Block Design. The size of each plot was 3.0 X 4.05 m. Cypermethrin (Colt 25%EC was applied at 40 g.a.i./ha with knapsack sprayer . An untreated control was simultaneously maintained. Cypermethrin treatment and control plot replicated four times.

Micro bioassay residue film method as described by Kavadia and Gupta (1986) using one day old male vinegar flies *Drosophila melanogaster* Meig was used for detection of micro quantities of Cypermethrin residue on tomato fruits. Sample of fruits were drawn from each plot at different time intervals viz 2 hrs after spray (0 days), 1days after spray and further 2 days interval till residues recover.

Tomato fruit samples weighing about 200gm. was collected at random from different plants. Samples of fruits were chopped , thoroughly mixed and reduced up to appropriate analytical size (50 gm.) by successive quartering. The representative sample of chopped fruits were extracted using acetone (as solvent) in the ratio of 1:4 on mixture (Anonymous,1979). In case of bioassay no cleanup was required as there was no difficulty in getting

* Krishi Vigyan Kendra Neemuch, RVSKVV,Gwalior, M.P.

valid responses. Recovery of Cypermethrin from fruits was 91.04. The data were analyzed to work out half life value ($T_{1/2}$) and waiting period (T to 1) formula given by Hoskins (1961) .

RESULT AND DISCUSSION

The result of present investigation revealed that after spraying the tomato crop with Cypermethrin at 40g.a.i./ha the deposit ranged from 0.8585-0.9460 ppm (Table 1). The present findings are in agreement with the work of Pandit *et al* . (1996), who obtained initial deposit of 0.736 ppm on cabbage heads with lapse of time the deposits dissipated. It has been recorded that more than 29 per cent loss on 1st day; 53.09-54.63,70.03-74.64,85.01-89.32 and 100 per cent on 3rd, 5th, 7th and 9th day was recorded in tomato fruits, rspectively.The half life values recorded were 2.28-2.69 days. These finding are in accordance with the findings of Choudhary (1990), who reported the loss of residues to 35 per cent after one day of spraying on leaves ,on 10th day , the loss reached to 90 per cent and almost 100 per cent in 15 days with a half life of 2.20 days after spraying of soybean crop with 0.005 and 0.01 per cent Cypermethrin, respectively. Pandit *et al* (1996) reported that the half life and waiting period of Cypermethrin on cabbage head ranged from 1.95-2.10 and 3.51-5.26 days, respectively from the spray dosages at 30,45 and 60g.a.i./ha of alpha - Cypermethrin . Singh and Kalra (1992) also reported the half life value of Cypermethrin at 50 g a.i./ha and 100g a.i./ha on bringal fruits varied between 2.2 and 2.9 days, respectively.

The time taken to reach the tolerance limit of 0.5 ppm (Anonymous,1978) known as a waiting period was worked to be up to 2.36-2.48 days on tomato fruits after spraying the crop with Cypermethrin at 40 g.a.i./ha. These findings are well in accordance with the findings of Singh and Udean (1989) ,who suggested a waiting period of at least one day after application of Cypermethrin at 50 and 100 g.a.i. /ha for residues to fall below the maximum limit of 0.5 mg/kg on okra crop. Panwar and Jadav (1993) reported a waiting period of 3.49 and 3.56 days of Cypermethrin on okra fruits and leaves by GLC, respectively. Awasthi (1987) also reported 6 to 9 days waiting period of Cypermethrin on cabbage head by GLC method. It is thus , evident from the above and also from the result of present investigation that there was lot of variation in the amount of insecticides deposition, waiting period and half life values. These differences might be due to variation in treatment dosage and also the difference in age vigour of the crop, type of crop as well as variety of crop. These differences may also differ due to method of spraying adopted and from person to person. Besides these, the environmental factor are also responsible for these differences.

Table 1
Residues of Cypermethrin 25 % EC @40 g.a.i. /ha. in / on tomato fruits

DAS	*First Year*	*Second Year*
0	0.8585	0.9460
1	0.6063 (29.37)	0.6443 (31.89)
3	0.4027 (53.09)	0.4992 (54.63)
5	0.2573 (70.03)	0.2396 (74.67)
7	0.1286 (85.01)	0.1010 (89.32)
9	BDL (100.00)	BDL (100.00)
$T_{1/2}T_{to1}$	2.692.48	2.282.36

$T_{1/2}$ = Half life

T_{to1} = waiting period (in days)

BDL = Below Detectable Level

Maximum Residue Limit in tomato fruit =0.5 ppm

Thus it is clear from the above that at least a waiting period between last spray and harvesting of crop has to be given for safer consumption of commodities without any health hazards.

Bibliography

Anonymous (1978), Agricultural chemical news and report no 104, pp.13. united states Deportment of health education of health education and welfare Washington DC.

Anonymous (1979), The pesticide manual - A world compendium. 6th edition, published by the British crop protection council. pp. 244.

Awasthi M.D. (1987), Residues of synthetic pyrethroids on cabbage heads. *Indian J. Horti* 44 (1-2): 135-139.

Chaudhary, H. (1990), Studies on toxicity, bio-efficacy residues and allied problems of some insecticides against pests of soybean [*Glycine max* (L.) merrill.] Ph.D. thesis submitted to RAU, Bikaner.

Hoskins, W.M. (1961), Mathematical treatment of the rate of loss of pesticide residue pl. Prot. Bull FAI 9: 163-168.

Kavadia V.S. and Gupta, H.C.L. (1986), Generation of data on bio-efficacy, residues and half life of pesticide formulation Final Technical Report, Sukhadia University, Department of Entomology, R.C.A., Udaipur.

Panndit, G.K, Bhattacharya A. Bose, A.K. Bandyopadhyay, D. Das A.K. and Choudhary A.N. (1996), Persistence of alpha-cypermethrin in cabbage and Monocrotophos in three soils of West Bengal. *Pesticide Research Journal* 8(2): 132-138.

Panwar D. S. and Jadav, G.D. (1993), Dissipation of Lambdachylalothrin chinmix, Cypermethrin ,Fenvalerate and Endosulfan in/on okra.P*estology*. 18(4): 37-41.

Singh B.and Udean A.S. (1989), Estimation of Cypermethrin residues in the fruit of okra, *Abelmoschus esculentus* (Linn) Moench. *J. Insect Sci*. 2(1): 49-52.

Singh, D. and Narang , D.D. (1990), Control of tomato fruits borer *Heliotuis armigera* Hub. with synthetic pyrethroids. *Indian J. Ent.* 52(40): 534-540.

Singh I.P. and Kalra, R.L. (1992), GLC analysis of deltamethrin in brinjal fruits, leaves and soil. *Indian J. Ent*. 54(2): 196-201.