UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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MEMORANDUM

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

FAP#1H5295 Chlorpyrifos on tomatoes. Amendment of 8/31/83

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In our initial review of this petition (memo of 11/20/81, K. Arne) we recommended against the proposed feed additive tolrance for tomato pomace because available residue data were limited to studies in California, Mississippi, Israel, and Mexico. We therefore required additional residue data from the Eastern and Midwestern United States. Since the data submitted from California indicated that the existing tolerance for tomatoes would be exceeded by this use we also required a pesticide petition in which an appropriate tolerance for tomatoes was proposed.

With this amendment the petitioner has submitted addtional residue data, representing a total of twelve experiments, from California, Florida, Georgia, Illinois, Indiana, Michigan, New York, Pennsylvania, and South Carolina. These data are summarized following:

No. of 1.0 lb. a.i./A applications	PHI (Days)	Residue (ppm) Chlorpyrifos	TCP	Total
9-10	0	0.09-1.7	0.06-0.32	0.09-1.96
9-10	7	0.03-0.92	<0.05-0.37	0.09-1.16
9-10	14	0.01-0.94	<0.05-0.15	0.08-1.02
9-10	21-24	0.02-0.40	<0.05-0.40	<0.08-0.76

(The proposed use allows up to 10 applications at 1.0 lb a.i./A. The PHI is 7 days). These data are representative of ground applications; the data submitted earlier demonstrate that residues from aerial applications are not expected to be higher than those resulting from ground applications and is corroborated by comparisons of ground and aerial applications to other crops (see PP#1F2588, chlorpyrifos on sunflowers, and PP#0F2281,

chlorpyrifos on alfalfa). Based on these data and a processing study submitted with the original petition, which showed a concentration of 65X in producing dry tomato pomace, the petitioners have proposed a tolerance of 100 ppm (of which no more than 65 ppm is chlorpyrifos) for tomato pomace. The petitioners have also proposed a tolerance of 1.5 ppm (of which no more than 1 ppm is chlorpyrifos) for tomatoes (the existing tolerance is 0.5 ppm). We consider the submitted data to adequately support the proposed tolerances. However, as we requested earlier, the tolerance for tomatoes must be proposed in a pesticide petition.

Meat, Milk, Poultry, and Eggs

Since many chlorpyrifos tolerances in which the amount of chlorpyrifos, per se, is to be stipulated are pending, determining the potential for secondary residues in meat, milk, poultry, and eggs becomes a little more complicated. Since no feeding studies are available for TCP we will presume that it behaves similarly to chlorpyrifos on ingestion; in practice we expect TCP to be retained in tissues to a lesser extent as it should readily conjugate and be excreted. The tolerances for secondary residues will therefore be based on the total residue (chlorpyrifos plus TCP) that might be fed to livestock and the available chlorpyrifos feeding studies. We will then use the chlorpyrifos portion of the feed item tolerance and the same feeding studies to determine how much of the tisssue, milk, or egg tolerance should be chlorpyrifos, per se.

Tomato pomace is used as a feed item for beef and dairy cattle, up to 25% of the diet. A diet that would provide the maximum potential for secondary residues in beef cattle would be:

Feed	Total Residue	Chlorpyrifos, per se	% in diet	ppm in diet	
				Total	Chlorpyrifos
alfalfa hay	15	13	25	3.75	3.25
soybean straw	15	15	10	1.5	1.5
corn grain	0.1	0.05	40	0.04	0.02
tomato pomace	100	65	25	25	16.25
				30.3	21.0

Cattle feeding studies were conducted at 3, 10, 30, and 100 ppm in the diet (see PP#3F1306). Results of the 10 and 30 ppm levels are summarized following:

feeding level	Max. Residue(chlorpyrifos, per se) ppm			
	muscle	liver	kidney	fat
10 ppm	0.07(0.02)	0.52(0.03)	0.55(0.01)	0.36(0.16)
30 ppm	0.09(0.02)	1.67(0.01)	1.06(0.01)	1.23(1.09)

Based on the 30 ppm feeding study a cow that received 30 ppm total residues in its diet might carry residues of 1.23 ppm in fat. In liver secondary residues may approach 1.67 ppm, but very little

of this would be parent. Another source of residues in cattle is a dermal treatment (a 0.025% spray not to be applied within 14 days of slaughter) that produces residues of about 1 ppm chlorpyrifos (no TCP detected) in fat, much less in other tissues. Therefore combined residues in fat may be as high as 2.23 ppm. Residues of chlorpyrifos, per se, as a result of 21 ppm in the diet of cattle would be, based on the 30 ppm feeding study, up to 0.76 ppm in fat, considerably lower in other tissues. The highest expected chlorpyrifos residues, including those from the spray treatment, would be 1.76 ppm (fat). A tolerance of 2.5 ppm or 2.5 ppm (of which no more than 2 ppm is chlorpyrifos) is needed for the meat, fat, and meat byproducts of cattle and should be proposed.

For dairy cows the following diet would be expected to provide the greatest potential for secondary residues of chlorpyrifos:

Feed	Total Residue	Chlorpyrifos, per se	% in diet	ppm in diet	
				Total	Chlorpyrifos
alfalfa hay	15	13	75	11.25	9.75
tomato pomace	100	65	25	25	16.25
				36.3	26.0

A dairy cow feeding study was submitted with PP#3F1306. Cows fed 30 ppm chlorpyrifos produced whole milk that carried residues of up to 0.02 ppm chlorpyrifos, per se, and <0.01 ppm TCP; in cream residues of chlorpyrifos were to 0.15 ppm and residues of TCP were <0.025 ppm. The combined residues in whole milk, based on a 36 ppm feeding level, could be up to 0.03 ppm; the amount of chlorpyrifos, per se, based on feeding 26 ppm, could be 0.02 ppm. Therefore the existing tolerance for whole milk, 0.02 ppm, and the tolerance proposed with PP#3F2884, 0.02 ppm (of which no more than 0.01 ppm is chlorpyrifos), are both inadequate. A tolerance of 0.03 ppm or 0.03 ppm (of which no more than 0.02 ppm is chlorpyrifos) would be adequate and should be proposed. The existing (0.5 ppm) and proposed (PP#3F2884; 0.5 ppm (of which no more than 0.25 ppm is chlorpyrifos))tolerances for milkfat are both adequate.

Following is a diet expected to provide the greatest potential for secondary residues in hog tissues:

Feed	Total Residue	Chlorpyrifos, per se	% in diet	ppm in diet	
				Total	Chlorpyrifos
alfalfa hay	15	13	50	7.5	6.5
corn grain	0.1	0.05	40	0.04	0.02
tomato pomace	100	65	10	10	6.5
				17.5	13.0

Hog feeding studies have been carried out at levels of 1, 3, and 10 ppm in the diet. At the 10 ppm level combined residues were 0.08 (0.03 ppm chlorpyrifos), 0.09 (<0.01), 0.06 (<0.01), and 0.29 (0.22) ppm in muscle, liver, kidney, and fat, respec

tively. Based on a dietary level of 17.5 ppm and the 10 ppm feeding level study residues in hog fat could be to 0.5 ppm, and considerably less in other tissues. Based on a dietary level of 13 ppm chlorpyrifos and the 10 ppm feeding level study residues of chlorpyrifos, per se, in hog fat could be to 0.29 ppm, and again, considerably less in other tissues. The existing tolerance for the meat, fat, and meat byproducts of hogs, 0.5 ppm, is adequate, but the tolerance suggested by us in conjunction with PP#3F2884, 0.5 ppm (of which no more than 0.2 ppm is chlorpyrifos) would not be adequate. If the petitioner wishes to separately specify the amount of chlorpyrifos, a tolerance of 0.5 ppm (of which no more than 0.3 ppm is chlorpyrifos) would be adequate and could be proposed. If not, the existing tolerance is adequate.

Following is a diet expected to provide the greatest potential for secondary residues in horse tissues:

Feed	Total Residue	Chlorpyrifos, per se	% in diet	ppm in diet	
				Total	Chlorpyrifos
alfalfa hay	15	13	90	13.5	11.7
tomato pomace	100	65	10	10	6.5
				23.5	18.2

Based on the cattle feeding studies, neither the existing tolerances (all at 1 ppm) nor the tolerances suggested by us with PP#3F2884 (1ppm (of which no more than 0.25 ppm is chlorpyrifos)) for horse tissues are adequate. Total residues might be as high as 1.3 ppm (liver) as a result of a dietary intake of 23.5 ppm. Residues of chlorpyrifos, per se, might be as high as 0.66 ppm as a result of a dietary intake of 18.2 ppm. A tolerance of 1.5 ppm or 1.5 ppm (of which no more than 0.8 ppm is chlorpyrifos) is needed for the meat, fat, and meat by-products of horses and should be proposed.

Following is a diet expected to provide the greatest potential for secondary residues in the tissues of goats and sheep:

Feed	Total Residue	Chlorpyrifos, per se	% in diet	ppm in diet	
				Total	Chlorpyrifos
alfalfa hay	15	13	80	12	10.4
tomato pomace	100	65	20	20	13.0
				32	23.4

Based on the cattle feeding study (30 ppm level) this diet would result in total residues of up to 1.8 ppm of which 0.01 ppm might be chlorpyrifos in the liver and residues of 1.3 ppm of which 0.84 ppm might be chlorpyrifos in fat of goats and sheep. The existing (1 ppm) and suggested (PP#3F2884; 1 ppm (of which no more than 0.25 ppm is chlorpyrifos)) tolerances for the meat, fat, and meat byproducts of goats and sheep are not adequate. Tolerances of 2.0 ppm or 2.0 ppm (of which no more than 1.0 ppm is chlorpyrifos) would be adequate and should be proposed.

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Since tomato pomace is not normally used as a poultry feed item there will be no problem of secondary residues in poultry and eggs.

Recommendations

We recommend against the proposed tolerance. For further consideration we require the following:

1. Submit a pesticide petition in which a tolerance of 1.5 ppm (of which no more than 1.0 ppm is chlorpyrifos) is proposed for tomatoes)

2. Propose tolerances of 2.5 ppm or 2.5 ppm (of which no more than 2.0 ppm is chlorpyrifos) for the meat, fat, and meat byproducts of cattle.

3. Propose tolerances of 0.5 ppm (of which no more than 0.3 ppm is chlorpyrifos) for the meat, fat, and meat byproducts of hogs. Alternatively, the established 0.5 ppm tolerance for hog tissues would be adequate if the petitioner did not wish to separately specify the level of chlorpyrifos, per se.

4. Propose tolerances of 2.0 ppm or 2.0 ppm (of which no more than 1.0 ppm is chlorpyrifos) for the meat, fat, and meat byproducts of sheep and goats.

5. Propose tolerances of 1.5 ppm or 1.5 ppm (of which no more than 0.8 ppm is chlorpyrifos) for the meat, fat, and meat byproducts of horses.

6. Propose a tolerance of 0.03 ppm or 0.03 (of which no more than 0.02 ppm is chlorpyrifos) for whole milk.

7. Remove from consideration the following tolerances that were proposed by the petitioner or suggested by us with PP#3F2884.

Meat, fat, and meat byproducts of cattle	2 ppm (of which no more than 1.5 ppm is chlorpyrifos)
Meat, fat, and meat byproducts of goats and sheep	1 ppm (of which no more than 0.25 ppm is chlorpyrifos)
Meat, fat, and meat byproducts of hogs	0.5 ppm (of which no more than 0.2 ppm is chlorpyrifos)
Meat, fat, and meat byproducts of horses	1 ppm (of which no more than 0.25 ppm is chlorpyrifos)
Whole milk	0.02 ppm (of which no more than 0.01 ppm is chlorpyrifos)

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In summary, the following tolerance levels for meat and milk are required before the proposed use on tomatoes can be approved (existing tolerances are marked with an asterisk (*)).

Meat, fat, and meat byproducts of cattle	2.5 ppm or 2.5 ppm (of which no more than 2.0 ppm is chlorpyrifos)
Meat, fat, and meat byproducts of goats and sheep	2.0 ppm or 2.0 ppm (of which no more than 1.0 ppm is chlorpyrifos)
Meat, fat, and meat byproducts of hogs	0.5 ppm or 0.5 ppm (of which no more than 0.3 ppm is chlorpyrifos)
Meat, fat, and meat byproducts of horses	1.5 ppm or 1.5 ppm (of which no more than 0.8 ppm is chlorpyrifos)
Whole milk	0.03 ppm or 0.03 ppm (of which no more than 0.02 ppm is chlorpyrifos)
Milkfat	0.5 ppm or 0.5 ppm (of which no more than 0.25 ppm is chlorpyrifos)

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CC - RF, Circ., KHA, Thompson, TOX, EEB, EAB, FDA, FAP#1H5295
RDI - Nelson, 11/18/83; RDS, 11/18/83

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FAP Anne 11/19

INTERNATIONAL RESIDUE LIMIT STATUS

CHEMICAL Chlorpyrifos

PETITION NO. FAP#1H5295

CCPR NO. 17

Codex Status

[ ] No Codex Proposal Step 6 or above

Residue (if Step 9):
chlorpyrifos only 1/

Crop(s) Limit (mg/kg)
tomatoes 0.5

Proposed U.S. Tolerances

Residue: Parent plus TCP 1/

Crop(s) Tol. (ppm)
tomatoes @1.5 ppm (of which not 1.0 ppm is chlorpy
tomato pomace 100ppm (of which not 65 ppm is chlorpyrif

CANADIAN LIMIT

Residue:
parent presumably

Crop Limit (ppm)
none (on tomatoes)

MEXICAN TOLERANCIA

Residue:

Crop Tolerancia (ppm
None (on tomatoes)

NOTES: 1/ whether the U.S. can use the Codex definition of residue needs to be considered.

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