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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP#8F3578: Evaluation of Acetonitrile Residues in Edible Beef Tissues and Milk Resulting from the use of Thiodicarb (TDC) on Sweet Corn Forage (DEB #5519).

FROM: W. T. Chin, Ph.D., Chemist
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Dietary Exposure Branch
Health Effect Division (H7509C)

W. T. Chin

THRU: Philip V. Errico, Section Head
Tolerance Petition Section III
Dietary Exposure Branch
Health Effect Division (H7509C)

Philip V. Errico

TO: Dennis Edwards, PM #12
Insecticide-Rodenticide Branch
Registration Division (H7505C)

and

Toxicology Branch (K. C. Swentzel)
Health Effect Division (H7509C)

Registration Division requested DEB to determine the acetonitrile residues in edible beef tissues and milk from the proposed and established uses of thiodicarb on potential livestock feeds. With respect to this petition, the petitioner, Union Carbide Corp., has proposed a tolerance for the combined residues of thiodicarb and its metabolite, methomyl, in/on sweet corn forage at 40 ppm; DEB has recommended the requested tolerance be raised to 300 ppm (see W. T. Chin's 7/22/88 memo). In connection with PP#0F2413/FAP0H5275, a ¹⁴C-thiodicarb/cattle feeding study (Acc. # 099600) was submitted and acetonitrile residues were determined in edible beef tissues and milk as cited in Table 1 below:

Table 1. Acetonitrile Residues Determined In Beef Tissues and Milk

Animal Com- modities	Liver			Kidney			Muscle			Milk		
TDC Feeding Level (ppm)	10	30	100	10	30	100	10	30	100	10	30	100
Acetonitrile found (ppb)	2	14	625	2	13	36	4	47		51	26	81

DEB issued an exposure analysis based on the assumption that the proposed tolerance for thiodicarb and methomyl residues in/on sweet corn forage is raised to 300 ppm (at 0-day PHI) (see Table 5 of W. T. Chin's 7/22/88 memo), as cited below:

Table 2. An Exposure Analysis for Livestock

Feeding Items	Tolerance (ppm)	% of Live- stock Diet		Diet Exposure to Livestock Diet (ppm)	
		Beef	Dairy	Beef	Dairy
Sweet Corn Forage	300*	25	10	75.00	30.00
Cottonseed, Hull	0.8	25	20	0.20	0.16
Wheat grain	1.0**	50	50	0.50	0.50
Sum		100%	80%	75.70	30.66

* RCB's recommended tolerance for sweet corn forage at 300 ppm and a zero-day PHI.

** Tolerance established for methomyl under 40 CFR 180.253.

Data shown above indicate that sweet corn forage at the suggested zero-day PHI and 300 ppm tolerance level may lead to a maximum exposure of thiodicarb residues of 75.70 and 30.66 ppm to beef and dairy livestock, respectively. The maximum acetonitrile residues in edible beef tissues and milk at these maximum exposure levels are evaluated with Figure 1 on the next page.

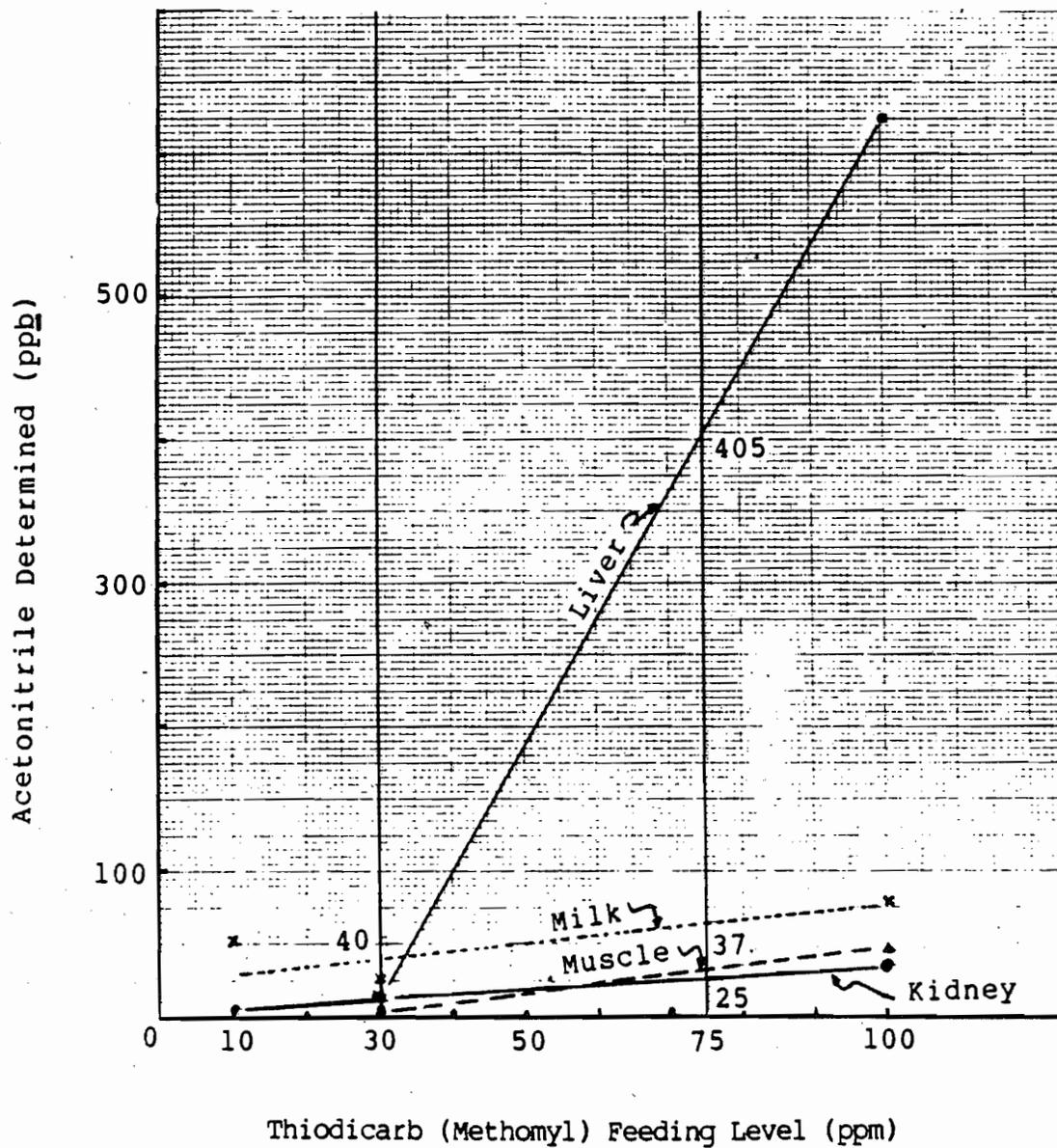


Figure 1. Evaluation of maximum acetonitrile residue levels in edible beef tissues at a 75.7 ppm and in milk at 30.66 ppm feeding levels of thiodicarb

As shown in Figure 1, at the 75.70 and 30.66 ppm maximum exposure feeding levels of thiodicarb, the maximum acetonitrile residues in beef liver, muscle, kidney and milk may reach as high as 405, 37, 25 and 40 ppb, respectively.

Previously, DEB has deferred to TOX on the toxicological significance, if any, of the acetonitrile residues in the edible beef tissues and milk and whether it needs to be regulated. TOX indicated that acetonitrile should be regulated as part of the tolerance expression in meat, milk, poultry and eggs (see K. C. Swentzel's 11/7/88 memo). Since sweet corn forage and peppers are not considered poultry feed items, therefore, acetonitrile residues should be considered only in edible beef tissues and milk for the subjected PP#8F3578.

Based on the maximum acetonitrile residues evaluated above, DEB can conclude that the petitioner should submit a revised Section F proposing tolerances for acetonitrile residues in the meat (except liver) and meat by-products of cattle, goats, hogs, horses and sheep at 0.05 ppm; in the liver of cattle, goat, hogs, horses and sheep at 0.5 ppm; and in milk at 0.05 ppm.

OTHER CONSIDERATIONS (Acetonitrile Residues In Poultry and Eggs)

In connection with PP#0F2413/FAP0H5275, a ¹⁴C-thiodicarb/laying hen feeding study (Acc. # 099600) was also submitted. BRIEFLY: ¹⁴C-Thiodicarb was orally administered to laying hens for 21 days at 15.4, 28.6 and 102.0 ppm levels in the diet. Eggs were analyzed during the treatment period and for seven days after discontinuation of dosing. Tissues were analyzed at 6 hours, 3 and 7 days after the last dose was given. Acetonitrile residues determined in poultry tissues and eggs are summarized in Tables 3 and 4, respectively.

Table 3. Acetonitrile Residues (ppb) Determined in Poultry Tissues

Chicken Tissues	Dosage: 15.4 ppm			28.6 ppm			102.0 ppm		
	6 hrs.	3 days	7 days	6 hrs.	3 days	7 days	6 hrs.	3 days	7 days
Liver	47	7	2	134	16	5	445	76	18
Breast	32	2	trace	69	4	1	271	12	2
Thigh	35	2	trace	67	3	trace	219	9	4
Fat	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Table 4. Acetonitrile Residues (ppb) Determined in Eggs

Chicken Egg	Dosage: 15.4 ppm		28.6 ppm		102.0 ppm	
	14 days	21 days	14 days	21 days	14 days	21 days
Yolk	12	24	84	76	162	154
White	37	24	142	82	269	210
Ave. (Eggs)	25	24	113	79	216	182

A maximum exposure analysis based on the tolerances established for methomyl residues in/on sorghum and barley grains at 1.0 ppm is evaluated in Table 5 below:

Table 5. An Exposure Analysis for Poultry

Feeding Items	Tolerance (ppm)	% of laying hen Diet	Diet Exposure to Laying hen (ppm)
Sorghum, grain	1.0*	50	0.5
Barley, grain	1.0*	50	0.5
Sum		100%	1.0

* Tolerance established for methomyl under 40 CFR 180.253.

Data shown above indicate that sorghum and barley grains with the established tolerance for methomyl at 1.0 ppm may lead to a maximum exposure of thiodicarb or methomyl residues at 1.0 ppm. At this 1.0 ppm maximum exposure of thiodicarb or methomyl, the maximum acetonitrile residues in poultry tissues and eggs are evaluated with Figure 2 on the next page.

Results shown in Figure 2 indicate that at the maximum 1.0 ppm exposure of thiodicarb or methomyl, the maximum acetonitrile residues in poultry tissues are less than 5 ppb in poultry tissues 6 hours after the last dose. At longer treatment periods, no acetonitrile residues can be detected. Similar pattern holds true for acetonitrile residues in egg yolk and white.

Based on this evaluation, DEB can conclude that acetonitrile residues in poultry and eggs resulting from feeding ration containing 1 ppm thiodicarb will not exceed a calculated 5 ppb.

No validated analytical methodology has been submitted. With TOX's recommendation to regulate acetonitrile in meat, milk and eggs, the petitioner must submit validated analytical methodology adequate for enforcement purposes.

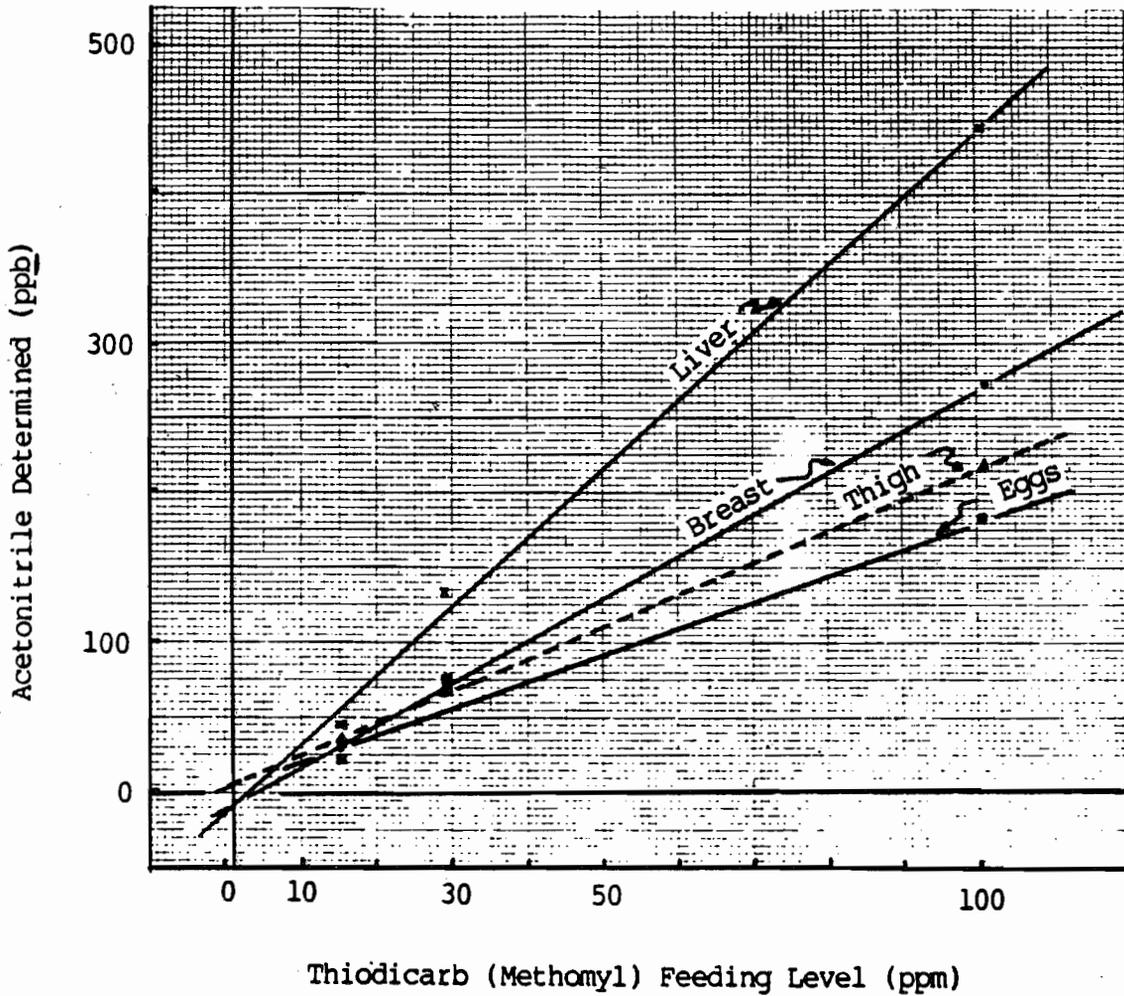


Figure 2. Evaluation of maximum acetonitrile residue levels in poultry and eggs at a maximum 1.0 ppm feeding level of thiodicarb or methomyl (Tissues: 6 hours; Eggs: 21 days)

cc: Circu., RF, W.T.Chin, R.D.Schmitt, PMDS/ISB, PP#8F3578 and PP#0F2413, TOX (C. Swentzel)
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