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MEMORANDUM

SUBJECT: Methidathion. Reregistration Case No. 0034, Chemical No. 100301. Follow-up to Residue Chemistry Chapter of the RED. Anticipated Residues for Acute Dietary Risk Assessment. CBRS No.17467. DP Barcode D228746.

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THROUGH: R. B. Perfetti, Ph.D., Acting Branch Chief
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TO: John Redden, Chemical Review Manager
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DRES has identified an unacceptable acute dietary risk for methidathion using the Tier 1 assessment procedures and is requesting anticipated residue information. MOEs are on the order of 1 to 5, based on presently established tolerances for methidathion. MOEs, based on reassessed tolerances, are < 1 to 2 (B. Steinwand, personal comm.). The contribution of individual food commodities to acute dietary risk is not available at this time; however, it should be noted that the only tolerance reassessment that would result in lower MOEs was an increase in the citrus tolerance from 2 ppm to 4 ppm. On the other hand the reassessment included revocation of tolerances on potatoes (0.2 ppm); milk (0.03 ppm); and meat, poultry and eggs (0.05 ppm). Essentially all other tolerances on food commodities are set at the limit of detection of the analytical method.

Anticipated residues for purposes of acute dietary risk assessment are provided in Table 1. The source of these data and any assumptions made are described in the following discussion.

Table 1. Methidathion Anticipated Residues for Acute Dietary Risk Assessment

Commodity	Reassessed Tolerance (ppm)	Anticipated Residue (ppm)	Comments
Artichokes	0.05	0.05	
Oranges (exc. Mandarin)	4	-	
peeled fruit/pulp	-	0.33	May be consumed as a single serving. (tolerance on RAC) X (conc. factor for orange pulp)
juice	-	0.26	May be consumed as a single serving. (tolerance on RAC) X (conc. factor for orange juice)
peel	-	0.114	Blended or mixed before consumption. (95th %tile PDP data) X (conc. factor for orange peel)
Grapefruit	4	-	
peeled fruit/pulp	-	0.33	May be consumed as a single serving. Used conc. factor for orange wet pulp.
juice	-	0.26	May be consumed as a single serving. Used conc. factor for orange juice.
peel	-	0.114	Blended or mixed before consumption. (95th %tile PDP data) X (conc. factor for orange peel).
Lemon	4	-	
peeled fruit/pulp	-	0.33	May be consumed as a single serving. Used conc. factor for orange wet pulp.
juice	-	0.001	Blended or mixed before consumption. (95th %tile PDP data on oranges) X (conc. factor for orange juice).
peel	-	0.114	Blended or mixed before consumption. (95th %tile PDP data on oranges) X (conc. factor for orange peel).
Lime	4	-	
peeled fruit/pulp	-	0.33	May be consumed as a single serving.
juice	-	0.001	Blended or mixed before consumption. (95th %tile PDP data on oranges) X (conc. factor for orange juice).
peel	-	0.114	Blended or mixed before consumption. (95th %tile PDP data on oranges) X (conc. factor for orange peel).
Mandarin (Tangerine)	6	-	
peeled fruit/pulp	-	0.49	May be consumed as single serving. (Tolerance) X (conc. factor for orange wet pulp)
Citrus oil	420	3.48	Blended or mixed before consumption. (95th %tile PDP data on oranges) X (conc. factor for orange oil)
Apples	0.05	0.05	May be consumed as a single serving.

Commodity	Reassessed Tolerance (ppm)	Anticipated Residue (ppm)	Comments
juice	-	0.015	Blended or mixed before consumption. 95th %tile from PDP data
Peaches	0.05	0.05	May be consumed as a single serving. Anticipated residues = tolerance.
hulled	-	0.015	Blended or mixed before consumption. 95th %tile PDP data
juice	-	0.015	Blended or mixed before consumption. 95th %tile PDP data
All other pome fruits and stone fruits	0.05	0.05	No expectation of detectable residues in <u>any</u> food form in these crop groups. Anticipated residues = tolerances, which are based on LOD of analytical method.
Cottonseed	0.2	-	
oil	-	0.05	Based on nondetectable residues in a processing study.
Mangoes	0.05	0.05	
Tree nuts	0.05	0.05	No expectation of detectable residues in <u>any</u> food commodity from the tree nut group. Anticipated residues = tolerances, which are based on LOD of analytical method.
Olives	0.05	0.05	
oil	-	0.05	
Safflower seeds	0.2	-	
oil	-	0.01	Used sunflower processing data as surrogate.
Sunflower seeds	0.5	0.5	
oil	-	0.01	Based on nondetectable residues in a processing study.
Carambola	0.1	0.1	
Kiwi Fruit	0.1	0.1	
Longan	0.1	0.1	
Sugar apple	0.2	0.2	

DISCUSSION

Anticipated residue are estimated in this memorandum using tolerance level residues and survey data from the USDA Pesticide Data Program (PDP). For food forms that are typically mixed prior to consumption, the 95th percentile residue from PDP monitoring data is used as the anticipated residue. The remaining anticipated residues on raw food commodities are set at the tolerance.

Citrus Fruits

A citrus processing study was summarized in the Methidathion Registration Standard - Residue Chemistry Chapter dated 6/30/82. The following paragraph and table are taken from that review. The original data are found in MRID 00011323 (PP#0F0892).

Residue data were presented for methidathion applied at 0.25 lb, 0.5 lb, 1.0 lb, and 2.0 lb of a.i./100 gallons of water by ground equipment. The fruits were sampled for residue analysis at 0, 7, 14, 21, 30 and 45 days after the last application. The data on oranges with 2 applications (winter) and 3 applications (summer-fall) with and without summer oil have been tabulated for the whole fruit and various important fractions as follows:

Table 2. Summary of Residues in whole oranges and orange fractions following treatment with Methidathion

Day	Rate (lb ai/ 100gal)	Methidathion Residues (ppm)					
		Whole fruit (unwashed)	Wet pulp (after wash)	Juice	Peel (after wash)	Dried pulp	Pressed Oil
Two applications - Florida (Winter)							
30	1/2	1.08	<0.05	<0.05	2.78	0.64	78
30	1	2.30	<0.05	<0.09	10.0	1.09	158
45	1/2	0.82	<0.05	<0.05	6.71	0.46	90
45	1	2.03	<0.05	0.14	12.3	1.23	230
60	1/2	0.61	<0.05	<0.05	4.14	0.34	65
60	1	3.47	<0.05	<0.05	14.5	1.27	208
Three applications - Florida (Summer/Fall)							
50	1/4 (w/o summer oil)	0.96	0.09	0.05	1.2	0.75	120
50	1/2 (w/o summer oil)	1.6	0.21	0.13	1.9	2.2	257
50	1/4 (with summer oil)	1.0	0.18	0.09	1.7	0.68	142
50	1/2 (with summer oil)	1.9	0.32	0.21	3.3	2.8	376

In the following table average concentration factors are derived from the processed fractions

for purposes of estimating acute anticipated residues.

Table 3. Concentration of Methidathion Residues in Orange Fractions

Day	Rate (lb ai/ 100gal)	Concentration/Reduction factor (residues in fruit/residues in processed fraction)					
		Whole fruit (unwashed)	Wet pulp (after wash)	Juice	Peel (after wash)	Dried pulp	Pressed Oil
Two applications - Florida (Winter)							
30	1/2	-	0.046	0.046	2.57	0.59	72.2
30	1	-	0.022	0.039	4.35	0.47	68.7
45	1/2	-	0.061	0.061	8.18	0.56	109.8
45	1	-	0.025	0.069	6.06	0.61	113.3
60	1/2	-	0.082	0.082	6.79	0.56	106.6
60	1	-	0.014	0.014	4.18	0.37	59.9
Three applications - Florida (Summer/Fall)							
50	1/4 (w/o summer oil)	-	0.094	0.052	1.25	0.78	125
50	1/2 (w/o summer oil)	-	0.13	0.081	1.19	1.375	160.6
50	1/4 (with summer oil)	-	0.18	0.09	1.7	0.68	142
50	1/2 (with summer oil)	-	0.168	0.111	1.737	1.474	197.9
Avg. conc. factor->		-	0.082	0.065	3.8	0.747	116

PDP survey data are available for oranges and grapefruit.

During 1993 and 1994 a total of 1315 orange samples were analyzed for methidathion. There were 67 samples (5.1%) with detectable residues. The maximum residue detected was 0.034 ppm. The 95th percentile level is 0.030 ppm.

During 1993 a total of 632 grapefruit samples were analyzed for methidathion. Three samples (0.5%) had detectable residues with a maximum residue of 0.014 ppm. No grapefruit samples were surveyed in 1994. The maximum limit of detection will be used as the 95th percentile, 0.015 ppm.

Pome Fruits, Stone Fruits and Tree Nuts

Methidathion is used as a delayed dormant spray in fruit and nut orchards. Residue data support establishment of the existing crop group tolerances at 0.05 ppm, which is the limit of detection for the residue analytical method used in field trials. Processing studies were not required for any of these crops because of the use pattern and the absence of detectable residues, even in trials conducted at exaggerated rates. There is no expectation of detectable residues in any food commodity derived from uses on crops in these three crop groups.

Some monitoring data are available confirming that residues are nondetectable even at lower LODs. These data are summarized below.

Apples:

PDP survey data are available for apples. In 1994 there were 687 samples analyzed with no detectable residues (LOD = 0.002-0.015 ppm).

Apple juice is blended or mixed before consumption; therefore, acute anticipated residues could be estimated from the 95th percentile residue value from monitoring data on apples. Since there were no detectable residues in these data we will use the maximum limit of detection, which is 0.015 ppm.

The anticipated residue for the fruit, which may be consumed as a single serving, should be estimated as equivalent to the tolerance.

Peaches:

PDP survey data are available for peaches. In 1994 there were a total of 396 samples analyzed; no sample had detectable residues (LODs = 0.002-0.015 ppm).

Peach juice and hulled peaches are blended or mixed before consumption; therefore, the anticipated residues of 0.015 ppm are based on the maximum limit of detection from the

monitoring data.

The anticipated residue for the fruit and any other peach food forms is the tolerance level of 0.05 ppm, since these may be consumed as single servings.

Olives

No processing study was required on olives as residues were nondetectable in field trials, even at exaggerated use rates. Detectable residues are not expected in olive oil.

Cotton

A cotton processing study was summarized in the Methidathion FRSTR - Residue Chemistry Chapter dated 6/7/88. Residues were nondetectable in refined oil.

Sunflower and Safflower

A sunflower processing study was summarized in the Methidathion FRSTR - Residue Chemistry Chapter dated 6/7/88. Residues were nondetectable in the oil. In the absence of data on safflower oil we recommend using the sunflower data as a surrogate.

CBRS has recommended revocation of tolerances on meat, milk, poultry, eggs, and potatoes; therefore, no residues are anticipated on these food commodities.

cc: Reviewer(W. Smith), Reg. Std. File, RF, SF, Circ.

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