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OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

MEMORANDUM

DATE: August 11, 1999

SUBJECT: Dichlormid - Acute and Chronic (Non-cancer) Dietary Exposure Analyses. Chemical#: 900497. DP Barcode: D258442. Case #: 260310. Submission #: S546651.

FROM/ TO: Susie Chun, Chemist
Registration Action Branch 1
Health Effects Division

THROUGH: Will Donovan, Ph.D. Chemist
Sheila Piper, Chemist
Dietary Exposure Science Advisory Council

Melba Morrow, D.V.M., Branch Senior Scientist
Registration Action Branch 1
Health Effects Division

Action Requested

Provide an estimate of the dietary exposure and associated risks for the safener, dichlormid, *N,N*-diallyl dichloroacetamide, resulting from a request to extend an expired time-limited tolerance of 0.05 ppm in/on corn raw agricultural commodities (RACs) (PP# 6F3344).

Executive Summary

For the acute dietary analysis, an acute population adjusted dose (aPAD) of 0.010 mg/kg/day (incorporating 10x for interspecies extrapolation, 10x for intraspecies variation, and 10x FQPA Safety Factor) was used for the general population, infants, and children. The acute dietary analysis for dichlormid is a conservative estimate of dietary exposure, or Tier 1 assessment, with the use of tolerance level residues and 100 percent crop treated (%CT). The percent aPADs found in this analysis were below HED's level of concern at the 95th percentile for the U.S. population and all subgroups with all exposures ≤ 5% aPAD. HED's level of concern is for exposures >100 % aPAD. The results of this analysis indicate that the estimated acute dietary risk associated with the use of dichlormid in/on corn is below HED's level of concern.

For the chronic dietary analysis, a chronic population adjusted dose (cPAD) of 0.022 mg/kg/day (incorporating 10x for interspecies extrapolation, 10x for intraspecies variation, 3x FIFRA factor, and 10x FQPA Safety Factor) was used. The chronic dietary analysis for dichlormid is a conservative

estimate of dietary exposure, or Tier 1 assessment, with the use of tolerance level residues and 100 %CT. The %cPADs were below HED's level of concern for the U.S. population and all subgroups with all exposures <10% cPAD. HED's level of concern is for exposures >100 % cPAD. The results of this analysis indicates that the estimated chronic dietary risk associated with the use of dichlormid in/on corn RACs is below HED's level of concern.

Toxicological Endpoints

The Hazard Identification Assessment Review Committee (HIARC) met on August 5, 1999 and selected doses and endpoints for dietary and non-dietary exposure risk assessments. The decisions made at the meeting are only for this action (Memo, B. Tarplee, 8/5/99).

FQPA Recommendation

For the purposes of this action, a FQPA Safety Factor (SF) of 10x has been retained for acute and dietary analyses as recommended by HIARC. According to HED policy for expedited actions (i.e., Section 18s, Time-limited tolerances), an FQPA SF of 10x can be retained. If risk estimates do not exceed HED's level of concern under these circumstances, the action can go forward, noting that the safety factor determination applies only to this action and is subject to change when the chemical undergoes full review by the FQPA Safety Factor Committee (SFC).

Since a 10x FQPA SF is retained for acute and chronic dietary analyses, the acute population dose (aPAD) is 0.010 mg/kg/day and chronic population adjusted dose (cPAD) is 0.022 mg/kg/day. The PAD is a modification of the aRfD or cRfD to include the FQPA Safety Factor:

$$acute\ or\ chronic\ PAD = \frac{RfD\ (acute\ or\ chronic)}{FQPA\ SF}$$

Table 1 summarizes the doses and endpoints used for dietary analyses.

Table 1- Toxicological Doses and Endpoints for Dichlormid

EXPOSURE SCENARIO	Dose (mg/kg/day)	ENDPOINT AND TOXICOLOGICAL EFFECT	STUDY
Acute - General Population, including Females 13+, Infants, and Children (Dietary)	Maternal NOAEL = 10.0 UF = 100 FQPA SF = 10	Maternal LOAEL = 40 mg/kg/day based on decreased body weight gain and food consumption (most significant on days 7-10 of dosing).	Developmental toxicity study in rats
	Acute RfD = 0.10 mg/kg/day Acute PAD =0.010 mg/kg/day		
Chronic (Dietary)	NOAEL = 6.5 mg/kg/day UF = 300 FQPA SF = 10	LOAEL = 32.8 mg/kg/day (♂) based on liver clinical pathology/histopathology and increased liver weight Extra 3x due to data gap for the chronic dog study	2-year study in rats
	Chronic RfD = 0.022 mg/kg/day Chronic PAD = 0.0022 mg/kg/day		

Cancer

Dichlormid is not cancer classified, due to no review by the Cancer Assessment Review Committee (CARC). A cancer dietary assessment is not required at this time.

Residue Information

The expired time-limited tolerance expression for dichlormid is in 40 CFR 180.469 at a level of 0.05 ppm for all corn RACs. Dietary Exposure Evaluation Model (DEEM™) default processing factors were used in all analyses. Tolerance level residues and 100% CT were used in both the acute and chronic analyses (Tier 1).

Results

The DEEM™ analysis evaluated the individual food consumption as reported by respondents in the USDA 1989-92 Continuing Surveys for Food Intake by Individuals (CSFII) and accumulated exposure to the chemical for each commodity. Summaries of the residue information used in the acute and chronic (non-cancer) dietary exposure analyses are attached (Attachment 1).

Acute Dietary Exposure Analysis

The acute dietary exposure analysis estimates the distribution of single-day exposures for the U.S. population and certain subgroups and accumulates exposure to the chemical for each commodity. Each analysis assumes uniform distribution of dichlormid for the commodities on which dichlormid is used.

HED's level of concern is for acute dietary exposures greater than 100% aPAD. The acute dietary exposure analysis was performed for the U.S. population and 26 subgroups. Summaries with all population subgroups are attached (Attachment 2).

Acute estimates of the per capita dietary exposures at the 95th percentile are shown in Table 2. For all population subgroups, per capita and per user exposures are essentially equal.

Table 2 - Acute Dietary Exposure Results

Subgroups[1]	aPAD (mg/kg/day)	95th Percentile		99th Percentile		99.9th Percentile	
		Exposure (mg/kg/day)	% aPAD	Exposure (mg/kg/day)	% aPAD	Exposure (mg/kg/day)	% aPAD
U.S. Population	0.01	0.000200	2	0.000366	4	0.000605	6
All infants (<1 year)	0.01	0.000459	5	0.000682	7	0.001091	11
Nursing infants (< 1 year)	0.01	0.000157	2	0.000266	3	0.000310	3
Non-nursing infants (< 1 year)	0.01	0.000501	5	0.000745	7	0.001134	11
Children (1-6 years old)	0.01	0.000375	4	0.000563	6	0.000799	8
Children (7-12 years old)	0.01	0.000276	3	0.000393	4	0.000578	6
Hispanics	0.01	0.000219	2	0.000429	4	0.000642	6
Non-hispanic blacks	0.01	0.000235	2	0.000421	4	0.000614	6
Females (13-29 yrs/np/nn)	0.01	0.000171	2	0.000230	2	0.000322	3

[1] Population subgroups shown include the U.S. general population, all infants and children subgroups, the highest females 13-50 subgroup, and any other population subgroup whose exposure exceeds that of the U.S. general population at the 95th percentile of exposure.

Chronic Dietary Analysis

The Tier 1 chronic DEEM™ dietary exposure analysis used mean consumption data (3 day average). HED's level of concern is for chronic dietary exposures greater than 100% cPAD. The chronic dietary exposures are summarized in Table 3

Table 3 - Chronic Dietary Exposure Results

Subgroups[1]	Exposure (mg/kg/day)	% cPAD
U.S. Population (48 states)	0.000064	3
All infants (<1 year)	0.000152	7
Nursing infants (< 1 year)	0.000038	2
Non-nursing infants (< 1 year)	0.000200	9
Children (1-6 years old)	0.000149	7
Children (7-12 years old)	0.000114	5
Females (13-19/np/nn)	0.000065	3
Hispanics	0.000068	3
Non-hispanic blacks	0.000074	3
Males (13-19 yrs)	0.000082	4

[1] Population subgroups shown include the U.S. general population, all infants and children subgroups, the highest females 13-50 subgroup, and any other population subgroup whose exposure exceeds that of the U.S. general population.

The complete chronic dietary exposure analysis is attached (Attachment 3).

Conclusions

The acute dietary analysis for dichlormid is a conservative estimate of dietary exposure, or Tier 1 assessment, with the use of tolerance level residues and 100 percent crop treated (%CT). The percent aPADs found in this analysis were below HED's level of concern at the 95th percentile (per capita) for the U.S. population and all subgroups with the highest exposure in non-nursing infants (<1 year) at 5% aPAD. HED's level of concern is for exposures >100 % aPAD. The percent aPADs for users versus per capita are essentially the same. The results of this analysis indicate that the estimated acute dietary risk associated with the use of dichlormid in/on corn is below HED's level of concern.

The chronic dietary analysis for dichlormid is a conservative estimate of dietary exposure, or Tier 1 assessment, with the use of tolerance level residues and 100 %CT. The %cPADs were below HED's level of concern for the U.S. population and all subgroups with with the highest exposure in non-nursing infants at 9% cPAD. HED's level of concern is for exposure >100 % cPAD. The results of this analysis indicates that the estimated chronic dietary risk associated with the use of dichlormid in/on corn RACs is below HED's level of concern.

Attachment 1: Residue Information - Acute and Chronic
Attachment 2: Acute DEEM™ analysis (S. Chun, 8/6/99)
Attachment 3: Chronic DEEM™ analysis (S. Chun, 8/10/99)

cc(with attachments): S. Chun (RAB1); M. Sahafeyan (CEB1), PP# 6F3344
RDI: Dietary Exposure SAC [S. Piper (8/10/99), W. Donovan (8/11/99)]; M. Morrow (//99)
S. Chun:806R:CM#2:(703)305-2249:7509C:RAB1

Attachment 1: Residue Information - Acute and Chronic

Note: The values denoted RfDs are actually the PADs as explained in the Comment Line.

Filename: C:\deem\resdata\900497.r96
Chemical name: Dichlormid
RfD(Chronic): .0022 mg/kg bw/day NOEL(Chronic): 6.5 mg/kg bw/day
RfD(Acute): .01 mg/kg bw/day NOEL(Acute): 10 mg/kg bw/day
Date created/last modified: 08-06-1999/08:23:36/8 Program ver. 6.77
Comment: cPAD- 300 UF, 10x FQPA; aPAD - 100 UF, 10x FQPA

Food Code	Crop Grp	Food Name	RESIDUE (ppm)	RDF #	Adj.Factors #1	#2	Comment
267	15	Corn grain-bran	0.050000	0	1.000	1.000	Extension of TLT, 6F3344
266	15	Corn grain-endosperm	0.050000	0	1.000	1.000	Extension of TLT, 6F3344
289	15	Corn grain-oil	0.050000	0	1.000	1.000	Extension of TLT, 6F3344
268	15	Corn grain/sugar/hfcs	0.050000	0	1.500	1.000	Extension of TLT, 6F3344
388	15	Corn grain/sugar-molasses	0.050000	0	1.500	1.000	Extension of TLT, 6F3344
237	15	Corn/pop	0.050000	0	1.000	1.000	Extension of TLT, 6F3344

Attachment 2: Acute Dietary Exposure Analysis
Note: %aRfD is actually %aPAD.

U.S. Environmental Protection Agency Ver. 6.78
DEEM ACUTE analysis for DICHLORMID (1989-92 data)
Residue file: 900497.r96 Adjustment factor #2 NOT used.
Analysis Date: 08-06-1999/08:25:42 Residue file dated: 08-06-1999/08:23:36/8
Acute Reference Dose (aRfD) = 0.010000 mg/kg body-wt/day
NOEL (Acute) = 10.000000 mg/kg body-wt/day
Run Comment: cPAD- 300 UF, 10x FQPA; aPAD - 100 UF, 10x FQPA

Summary calculations:

95th Percentile			99th Percentile			99.9th Percentile		
Exposure	% aRfD	MOE	Exposure	% aRfD	MOE	Exposure	% aRfD	MOE
U.S. pop - all seasons:								
0.000200	2.00	50097	0.000366	3.66	27356	0.000605	6.05	16518
U.S. pop - spring season:								
0.000198	1.98	50408	0.000346	3.46	28880	0.000515	5.15	19422
U.S. pop - summer season:								
0.000207	2.07	48258	0.000359	3.59	27845	0.000648	6.48	15441
U.S. pop - autumn season:								
0.000203	2.03	49344	0.000398	3.98	25111	0.000677	6.77	14781
U.S. pop - winter season:								
0.000186	1.86	53646	0.000325	3.25	30806	0.000535	5.35	18683
Northeast region:								
0.000177	1.77	56338	0.000354	3.54	28265	0.000583	5.83	17164
Midwest region:								
0.000213	2.13	46981	0.000407	4.07	24580	0.000568	5.68	17613
Southern region:								
0.000202	2.02	49580	0.000344	3.44	29082	0.000644	6.44	15533
Western region:								
0.000205	2.05	48681	0.000350	3.50	28531	0.000684	6.84	14628
Hispanics:								
0.000219	2.19	45700	0.000429	4.29	23316	0.000642	6.42	15566
Non-hispanic whites:								
0.000193	1.93	51693	0.000346	3.46	28861	0.000593	5.93	16855
Non-hispanic blacks:								
0.000235	2.35	42607	0.000421	4.21	23760	0.000614	6.14	16290
Non-hispanic other:								
0.000185	1.85	54074	0.000351	3.51	28515	0.000663	6.63	15094
All infants (<1 year):								
0.000459	4.59	21793	0.000682	6.82	14660	0.001091	10.91	9167
Nursing infants (<1 year):								
0.000157	1.57	63762	0.000266	2.66	37591	0.000310	3.10	32295
Non-nursing infants (<1 yr):								
0.000501	5.01	19977	0.000745	7.45	13419	0.001134	11.34	8821
Children (1-6 years):								
0.000375	3.75	26643	0.000563	5.63	17763	0.000799	7.99	12514
Children (7-12 years):								
0.000276	2.76	36180	0.000393	3.93	25426	0.000578	5.78	17310

Acute Dietary contd.

U.S. Environmental Protection Agency Ver. 6.78
DEEM ACUTE analysis for DICHLORMID (1989-92 data)
Residue file: 900497.r96 Adjustment factor #2 NOT used.
Analysis Date: 08-06-1999/08:25:42 Residue file dated: 08-06-1999/08:23:36/8
Acute Reference Dose (aRfD) = 0.010000 mg/kg body-wt/day
NOEL (Acute) = 10.000000 mg/kg body-wt/day

Summary calculations:

95th Percentile			99th Percentile			99.9th Percentile		
Exposure	aRfD	MOE	Exposure	aRfD	MOE	Exposure	aRfD	MOE
Females (13+/preg/not nsg):								
0.000116	1.16	86034	0.000150	1.50	66644	0.000228	2.28	43903
Females (13+/nursing):								
0.000132	1.32	75518	0.000202	2.02	49493	0.000210	2.10	47604
Females (13-19 yrs/np/nn):								
0.000171	1.71	58416	0.000230	2.30	43434	0.000322	3.22	31011
Females (20+ years/np/nn):								
0.000110	1.10	90600	0.000175	1.75	57221	0.000282	2.82	35464
Females (13-50 years):								
0.000131	1.31	76087	0.000198	1.98	50531	0.000275	2.75	36420
Males (13-19 years):								
0.000195	1.95	51395	0.000343	3.43	29117	0.000475	4.75	21057
Males (20+ years):								
0.000127	1.27	78809	0.000191	1.91	52341	0.000313	3.13	31957
Seniors (55+):								
0.000095	0.95	105172	0.000152	1.52	65905	0.000295	2.95	33852

Attachment 5: Chronic (Non-Cancer) Dietary Exposure Analysis
Note: %RfD is actually %cPAD.

U.S. Environmental Protection Agency Ver. 6.76
DEEM Chronic analysis for DICHLORMID (1989-92 data)
Residue file name: C:\deem\resdata\900497.r96 Adjustment factor #2 NOT used.
Analysis Date 08-10-1999/15:07:44 Residue file dated: 08-10-1999/15:07:14/8
Reference dose (RfD, CHRONIC) = .0022 mg/kg bw/day
COMMENT 1: cPAD- 300 UF, 10x FQPA; aPAD - 100 UF, 10x FQPA

Total exposure by population subgroup

Population Subgroup	Total Exposure mg/kg body wt/day	Total Exposure Percent of Rfd
U.S. Population (total)	0.000064	2.9%
U.S. Population (spring season)	0.000063	2.9%
U.S. Population (summer season)	0.000066	3.0%
U.S. Population (autumn season)	0.000066	3.0%
U.S. Population (winter season)	0.000061	2.8%
Northeast region	0.000058	2.6%
Midwest region	0.000067	3.1%
Southern region	0.000067	3.0%
Western region	0.000062	2.8%
Hispanics	0.000068	3.1%
Non-hispanic whites	0.000062	2.8%
Non-hispanic blacks	0.000074	3.4%
Non-hisp/non-white/non-black)	0.000055	2.5%
All infants (< 1 year)	0.000152	6.9%
Nursing infants	0.000038	1.7%
Non-nursing infants	0.000200	9.1%
Children 1-6 yrs	0.000149	6.8%
Children 7-12 yrs	0.000114	5.2%
Females 13-19(not preg or nursing)	0.000065	3.0%
Females 20+ (not preg or nursing)	0.000040	1.8%
Females 13-50 yrs	0.000047	2.2%
Females 13+ (preg/not nursing)	0.000045	2.0%
Females 13+ (nursing)	0.000048	2.2%
Males 13-19 yrs	0.000082	3.7%
Males 20+ yrs	0.000046	2.1%
Seniors 55+	0.000036	1.6%
Pacific Region	0.000058	2.6%

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Chemical:	**Valid PC Code**
PC Code:	**900497**
HED File Code	**11000 Chemistry Reviews**
Memo Date:	**08/11/99**
File ID:	**DPD258442**
Accession Number:	**412-01-0056**

HED Records Reference Center
12/05/2000