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

JUN 13 1995

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: CHLOROTHALONIL: List A Reregistration Case No. 0097: Chemical No. 081901: Anticipated Residues for Dietary Exposure. CBRS No. 14503: DP Barcode D208333.

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THROUGH: Edward Zager, Chief
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TO: Karen Whitby, Acting Chief
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As part of the Reregistration Eligibility Decision process, the anticipated residues of Chlorothalonil and its contaminant, hexachlorobenzene (HCB) in/on plant and animal commodities must be determined in order to perform dietary risk assessment.

Table 1 lists the anticipated residues (chronic cancer) of Chlorothalonil and HCB on raw agricultural commodities and in animal commodities from uses of Chlorothalonil on food and feed crops. Also included in the table are processing factors for some of the foods derived from the commodities, which should be incorporated in any dietary exposure assessment.

FDA monitoring data (1988-1993), FOODCONTAM monitoring data (1989-1993), which is monitoring data from major agricultural states collected by FDA through a cooperative agreement), and USDA PDP survey data (1992-1994 partial) are used in arriving at the anticipated residues of Chlorothalonil. In those cases for which adequate data are not available in the above databases, anticipated residues were taken from a previous assessment (D. Edwards, 8/88) or tolerance level residues were used.

ISK Biosciences has provided anticipated residues and chronic dietary exposure analysis for Chlorothalonil and HCB (MRID 42272101), which was prepared by Technical Assessment Systems, Inc. (TAS). Another document prepared by TAS (No MRID; Document # RC-93-RPB-001-001, 11/24/92; Scientific Rationale for Waiving Data Requirements for Chlorothalonil and Hexachlorobenzene) was also provided by the registrant. Both of these documents were given consideration in arriving at the present assessment of anticipated residues.

The following conclusions were used in arriving at the anticipated residue estimates in Table 1 and should be noted in any dietary risk assessments that are based on these values.

1. Although Chlorothalonil and its 4-hydroxy metabolite are both regulated, only Chlorothalonil is considered to be a possible human carcinogen (B2) by the Agency. Therefore, these anticipated residues do not include the 4-hydroxy metabolite.

2. Hexachlorobenzene, which is also a B2 possible human carcinogen, is present as an impurity in Chlorothalonil formulations and is considered to be a residue of concern on Chlorothalonil treated crops. Anticipated residues of HCB on plant food commodities will be estimated by assuming that residues will be present at a level proportional to the maximum level certified to be present in Chlorothalonil formulations, i.e., if the maximum certified limit of HCB is 0.05%, then HCB anticipated residues on a plant commodity will be estimated as 0.0005 x the anticipated residues of Chlorothalonil on that commodity.

3. The maximum level of HCB in Chlorothalonil allowed by the Agency is 0.05%. The basic producer has committed to reducing the level of HCB in their technical formulations to less than [redacted] and requests that the Agency take this into consideration in dietary risk assessments. Since there are other producers of Chlorothalonil that have not committed to this reduction, we will assume a level of 0.05% in this assessment. For purposes of evaluating risk mitigation due to this reduction in level of HCB, the anticipated residues in Table 1 can be multiplied by a [redacted]

4. The Agency has concluded that residues of Chlorothalonil per se will not transfer to meat, milk, poultry and eggs; therefore, only anticipated residues for HCB on these commodities will be provided.

MANUFACTURING PROCESS INFORMATION IS NOT INCLUDED

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Table 1. Anticipated Residues of Chlorothalonil and HCB From the Use of Chlorothalonil on Food or Feed Crops [1,2].

Commodity	Processing factors	Anticipated Residues (ppm)		% crop treated
		Chloro-thalonil	HCB	
apricots	None	0.0078	3.9×10^{-6}	35
banana pulp	None	0.0005	0.3×10^{-6}	10
beans, dry	None	0.0087	4.4×10^{-6}	2
beans, snap	0.05 for all cooked, canned or frozen beans	0.0133	6.7×10^{-6}	40
broccoli	None	0.0015	0.8×10^{-6}	15
Brussels sprouts	None	0.0135	6.8×10^{-6}	42
cabbage	0.2 for all food forms	0.0137	6.9×10^{-6}	50
cabbage, Chinese	0.2 for all food forms	0.0116	5.8×10^{-6}	100
cocoa	0.1 for all food forms	0.05	2.5×10^{-6}	100
cantaloupe	None	0.0191	9.6×10^{-6}	30
carrots	0.005 for all cooked or processed food forms	0.0036	1.8×10^{-6}	35
cauliflower	None	0.0115	5.8×10^{-6}	20
celery	None	0.0874	43.7×10^{-6}	85
cherries	0.05 for all processed food forms	0.002	1×10^{-6}	40
cranberries	None	0.4125	206×10^{-6}	60
coffee	O.1 for all food forms	0.20	1×10^{-4}	100
corn, sweet	None	0.0002	0.1×10^{-6}	5
cucumbers	0.2 for cold-canned pickles 0.04 for hot-canned pickles	0.0062	3.1×10^{-6}	35

Commodity	Processing factors	Anticipated Residues (ppm)		% crop treated
		Chloro-thalonil	HCB	
garlic	None	0.0005	0.3×10^{-6}	10
honeydew	None	0.0033	1.7×10^{-6}	20
nectarines	None	0.00175	0.9×10^{-6}	35
onions, bulb	None	0.0033	1.7×10^{-6}	65
onions, green & leeks	None	0.0262	13.1×10^{-6}	65
papayas	None	0.005	2.5×10^{-6}	100
parsnips	None	0.0052	2.6×10^{-6}	10
passion fruit	None	3	1.5×10^{-3}	100
peaches	0.02 for all cooked or canned food forms	0.0018	0.9×10^{-6}	35
peanuts	0.5 for peanut oil	0.0045	2.3×10^{-6}	90
plums	0.33 for dried prunes	0.0005	0.3×10^{-6}	10
potatoes	None	0.0030	1.5×10^{-6}	30
pumpkins	0.002 for raw pumpkin	0.0065	3.3×10^{-6}	30
soybeans	0.5 for soybean oil	0.00005	2.5×10^{-8}	1
squash	None for summer squash 0.002 for raw winter squash 0.001 for cooked winter squash	0.0058	2.9×10^{-6}	15
tomatoes	0.25 for juice 0.02 for paste, puree & catsup	0.0716	35.8×10^{-6}	70
watermelon	None	0.0228	11.4×10^{-6}	55

Commodity	Processing factors	Anticipated Residues (ppm)		% crop treated
		Chloro-thalonil	HCB	
Residues in Animal Commodities				
Cattle fat		0	1.65×10^{-4}	-
meat		0	1.24×10^{-5}	-
liver		0	8×10^{-6}	-
kidney		0	8×10^{-6}	
Poultry fat		0	2.2×10^{-6}	-
meat		0	3.7×10^{-8}	-
liver		0	7.3×10^{-7}	-
Milk		0	1.7×10^{-6}	-
Egg-white only		0	1.5×10^{-9}	-
Egg-yolk only		0	7.3×10^{-7}	-
Eggs-whole (36.55 yolk)		0	2.7×10^{-7}	-

[1] All anticipated residue values have been adjusted for the indicated % crop treated.
[2] DRES should incorporate the indicated processing factors in estimating dietary exposure.

ANTICIPATED RESIDUES ON FOODS DERIVED FROM CROPS

Chlorothalonil residues occur on the surface of plant commodities; therefore, it is to be expected that residues will be reduced by the preparation of food items for consumption. The following paragraphs include anticipated residues of Chlorothalonil, the source of the data, and any processing factors that are available for food items. The anticipated residues of HCB are estimated by assuming that HCB dissipates to the same extent as Chlorothalonil from the various food forms.

Apricots

The anticipated residue for the RAC is 0.0078 ppm. This value is based on Foodcontam monitoring data (Table 2). There is no processing factor available.

Bananas

The anticipated residue for the RAC bananas pulp is 0.0005 ppm. This value is based on Foodcontam monitoring data (Table 2). Percent treated crop imported is from the Agency

anticipated residue estimate of 1988 (D. Edwards, 8/88). There is no processing factor available.

Beans, Dry

The anticipated residue for all dry bean RACs is 0.0087 ppm. This value is based on combined FDA monitoring and PDP survey data (Table 2). There is no processing factor available.

Beans, Succulent

The anticipated residue for all succulent bean RACs is 0.0133. This value is based on combined FDA and Foodcontam monitoring data (Table 2).

A study was conducted in 1978 (MRID 00129178) to determine the potential for reduction of Chlorothalonil residues of concern in/on snap beans processed for canning or freezing. In two separate processing studies residues were reduced on washing by factors of <0.01 (ND) and 0.1. Blanching of the washed samples further reduced the residues in the measurable sample at least 20-fold. Assuming that most of the monitored RAC samples had been washed, a reduction factor of 0.05 will be used for all cooked, canned or frozen succulent beans.

Broccoli

The anticipated residue for the RAC is 0.0015 ppm. This value is based on PDP survey data (Table 2). There is no processing factor available.

Brussels Sprouts

The anticipated residue for the RAC is 0.0135 ppm. This value is based on Foodcontam monitoring data (Table 2). There is no processing factor available.

Cabbage

The anticipated residue for the RAC is 0.0137 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2).

A dietary exposure study was conducted in 1985 (MRID 00158892) to determine the various levels of Chlorothalonil residues on Chlorothalonil-treated cabbage at the farm gate immediately after harvest and after commodities are transported to restaurant or grocery stores. Four field trials were conducted in FL(2) and TX(2). In addition to field samples, cabbage samples from these field trials were taken from a packing house, prior to crating, and from grocery stores and restaurants, following trimming of the stem and removal of outer wrapper leaves according to normal practices; in the TX trials, cabbage samples were

sorted and washed prior to sampling at the packing house. Residues concentrated from the field to the packing house in one trial (1.5x) but reduced in the other three trials (0.6-0.8x). Residues reduced from the field to the restaurant/grocery store (0.06-0.2x). A reduction factor of 0.2 will be used for all cabbage food forms based on the least reduction seen in these studies.

Cabbage, Chinese

The anticipated residue for the RAC is 0.0116 ppm. This value is based on Foodcontam monitoring data (Table 2). Based on data in MRID 00158892, a processing factor of 0.2 will be used for all chinese cabbage food forms.

Cantaloupe

The anticipated residue for the RAC is 0.0191 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). There is no processing factor available.

Carrots

The anticipated residue for the RAC is 0.0036 ppm. This value is based on PDP survey data (Table 2).

A study was conducted in 1988 (MRID 41819401) to determine the potential for reduction of Chlorothalonil residues of concern in carrots following commercial processing. Carrots grown in WI were harvested following foliar applications of Chlorothalonil. Samples were shipped to the processor (Gerber Products Co., Fremont, MI) and were processed according to simulated commercial procedures. Following processing, the fractions were analyzed for Chlorothalonil, SDS-3701, and HCB. Residues of Chlorothalonil and SDS-3701 reduced in peeled carrots, pureed carrots, partially cooked carrots, and baby food. Based on the reduction of residues in partially cooked carrots a processing factor of 0.005 will be used for all cooked or processed food forms of carrot.

Cauliflower

The anticipated residue for the RAC is 0.0115 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). There is no processing factor available.

Celery

The anticipated residue for the RAC is 0.0874 ppm. This value is based on PDP survey data (Table 2).

A dietary exposure study was conducted in 1985 (MRID 00158893) to determine the various levels of Chlorothalonil residues in/on Chlorothalonil-treated celery at the farm gate

immediately after harvest, after celery is transported and processed, and at grocery stores and restaurants. Celery grown in CA (2 trials) and in FL (2 trials) was harvested following foliar applications of Chlorothalonil. In addition to field samples, celery samples from these field trials were taken from a packing house, following washing and trimming prior to crating, and from grocery stores and restaurants, following washing and trimming according to normal practices.

Residues were reduced on samples taken at the packing house by an average factor of 0.5x. The average reduction factor for samples taken at the grocery was 0.3x and for restaurant samples it was 0.04x. Assuming that PDP survey samples were taken at a point equivalent to the grocery samples, and recognizing the prevalence of Chlorothalonil residues on celery, no reduction factor will be used in the assessment.

Cherries

The anticipated residue for the RAC is 0.002 ppm, based on PDP survey data (Table 2).

A study was conducted in 1977 (MRID 00145400) to determine the potential for reduction of Chlorothalonil residues of concern in/on cherries. Cherries grown in MI were harvested following foliar applications of a 6 lb/gal SC/L formulation (total seasonal rate of 13.5 lb ai/A). Harvested samples were processed according to simulated commercial procedures (Michigan State University) into whole pitted cherries canned with water or with a 25% sugar solution. Residues of Chlorothalonil reduced in washed cherries (0.2x), washed pitted cherries (0.1x), and canned pitted cherries (0.01x). Assuming that PDP survey data were collected on washed cherries, a processing factor of 0.05 will be used for processed cherry food forms.

Cocoa

The anticipated residue for cocoa beans is 0.05 ppm. This value is equivalent to the tolerance. and assumes that 100% of the crop is treated. A processing factor of 0.1 will be used for all food forms derived from cocoa beans (A. Smith; 2/83; PP#2E2744).

Coffee

The anticipated residue for the RAC is 0.20 ppm. This value is equivalent to the tolerance and assumes that 100% of the crop is treated. A processing factor of 0.1 (A. Smith; 2/8/83; PP#2E2744) will be used for all food forms of coffee.

Corn, sweet

The anticipated residue for all food forms of sweet corn is 0.0002 ppm. This value is based on PDP survey data (Table 2).

Cranberries

The anticipated residue for the RAC is 0.4125 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). There is no processing factor available.

Cucumbers

The anticipated residue for the RAC is 0.0062 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2).

A study was conducted in 1985 (MRID 41630802) to determine the potential for reduction of Chlorothalonil residues of concern in/on cucumbers following commercial processing. Cucumber (Fremont pickle variety) grown in OH were harvested following foliar applications of Chlorothalonil. Following harvest, samples were directly transported to the OH State University Horticulture Dept. where the cucumber samples were processed according to simulated commercial procedures. Residues of Chlorothalonil reduced in washed cucumbers (0.5x), post-rinse cucumbers (0.4x), pickle slices (0.3x), cold-canned pickles (0.1x) and hot-canned pickles (0.02x). Assuming that monitoring data were collected from washed cucumber samples, a processing factor of 0.2 will be used for cold-canned pickles and 0.04 for hot-canned pickles.

Garlic

The anticipated residue for the RAC is 0.0005 ppm. Bulb onion data were used for this RAC assuming 10% of the crop treated. There is no processing factor available.

Honeydew

The anticipated residue for the RAC is 0.0033 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). There is no processing factor available.

Nectarines

The anticipated residue for the RAC is 0.00175 ppm. This value is based on Foodcontam monitoring data. There is no processing factor available.

Onion (dry bulb)

The anticipated residue for the RAC is 0.0033 ppm. This value is taken from the 1988 assessment (D. Edwards; 8/88), which was based on FDA monitoring data, adjusting for a change in percent crop treated from 43% to 65%. There is no processing factor available.

Onions, green & Leeks

The anticipated residue for the RAC is 0.0262 ppm. This value is based on Foodcontam monitoring data (Table 2). There is no processing factor available.

Papayas

The anticipated residue for the RAC is 0.005 ppm. This value is from the 1988 assessment (D. Edwards, 8/88), which is based on FDA monitoring data, and assumes 100% crop treated. There is no processing factor available.

Parsnips

The anticipated residue for the RAC is 0.0052 ppm. This value is based on Foodcontam monitoring data (Table 2). There is no processing factor available.

Passion fruit

The anticipated residue for the RAC is 3 ppm, which is the established tolerance. There is no processing factor available.

Peaches

The anticipated residue for the RAC is 0.0018 ppm. This value is based on Foodcontam monitoring data (Table 2).

A study was conducted in 1976 (MRID 00124128) to determine the potential for reduction of Chlorothalonil residues of concern in/on peaches. Peaches grown in OH were harvested following foliar applications of Chlorothalonil. Harvested samples were processed (Ohio State University Department of Horticulture) one day following harvest according to simulated commercial procedures into canned peach puree. Residues of Chlorothalonil reduced in washed peaches (0.5x), in peaches washed with caustic (0.02x), and in canned peaches (<0.01x). Assuming that monitored peach samples had been washed a processing factor of 0.02 (0.01/0.5) will be used for all cooked or canned peach food forms.

Peanuts

The anticipated residue for the RAC is 0.0045 ppm. This value is from the 1988 assessment (D. Edwards, 8/88), which is based on FDA monitoring data, assuming 90% crop treated.

A study was conducted in 1985 (MRID 40183417) to determined the potential for concentration/reduction of Chlorothalonil residues of concern in the processed commodities of peanuts. In three field trials conducted in GA, peanuts were harvested following foliar applications of Chlorothalonil. Samples of peanuts were processed according to a simulated

commercial procedure (Texas A&M University, College Station, TX). Residues of Chlorothalonil reduced in refined oil (<0.5x). A processing factor of 0.5 will be used for peanut oil.

Plums

The anticipated residue for the RAC is 0.0005 ppm. This value is based on Foodcontam monitoring data (Table 2). There is no processing factor available.

A study was conducted in 1992 (MRID 42875927) to determine the potential for concentration/reduction of Chlorothalonil residues of concern in the processed commodities of plums. In three trials conducted in CA, plums were harvested following foliar applications of Chlorothalonil. Samples were maintained for 2 days at ambient temperatures until transported to the processing plant (National Food Laboratory, Dublin, CA), where samples were refrigerated at 2 C for 5 days prior to processing into dry prunes and reconstituted prunes. Residues of Chlorothalonil were reduced in dry prunes (<0.33x). A processing factor of 0.33 will be used for dried prunes.

Potatoes

The anticipated residue for the RAC is 0.0030 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). No processing factor is available.

Pumpkins

The anticipated residue for the RAC is 0.0065 ppm. This value is based on squash monitoring data (Table 2). A processing factor of 0.002 will be used for raw pumpkin assuming it would be peeled before consumption.

Soybeans

The anticipated residue for the RAC is 0.00005 ppm. This value is based on the 1988 assessment (D. Edwards, 8/88), which used FDA monitoring data.

A study was conducted in 1986 (MRID 40183413) to determine the potential for concentration/reduction of Chlorothalonil residues of concern in the processed commodities of soybeans. In two trials conducted in LA, soybeans were harvested following foliar applications of the 6 lb/gal FlC formulation. Samples were stored at ambient temperatures for 8 days until shipped to the processor (Texas A&M University, College Station, TX). Samples were processed according to a simulated commercial procedure. Residues of Chlorothalonil concentrated in hulls (up to 3.5x) and reduced in refined oil (<0.5x). A processing factor of 0.5x will be used for soybean oil.

Squash (including summer and winter squash)

The anticipated residue for the RAC is 0.0058 ppm. This value is based on Foodcontam monitoring data (Table 2).

No processing factor is available for summer squash.

A study was conducted in 1988 (MRID 41630801) to determine the potential for reduction of Chlorothalonil residues of concern on winter squash following commercial processing. Winter squash (Butternut variety) grown in OH were harvested following foliar applications of the 6 lb/gal FlC formulation. Samples were processed according to simulated commercial procedures by Gerber Products Co., Fremont, MI. Residues of Chlorothalonil were reduced in the peeled squash (0.002x), partially cooked squash (0.001x) and baby food (0.001x). Processing factors of 0.002 and 0.001 will be used for raw winter squash and cooked winter squash.

Tomatoes

The anticipated residue for the RAC is 0.0716 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). The following processing factors from the 1988 assessment will be used, which were based on MRID 00129178: juice = 0.25; paste, puree and catsup = 0.02.

Watermelon

The anticipated residue for the RAC is 0.0228 ppm. This value is based on combined FDA and Foodcontam monitoring data (Table 2). There is no processing factor available.

Table 2. Chlorothalonil Monitoring and Survey Data

Commodity	Source of data	Number of samples analyzed	LOD	Number of samples > LOD	min	max	sum of residues > LOD	mean of samples > LOD	mean of all samples	% crop treated[1]
apricots	FOODCONTAM	142	0.01	9	0.01	0.31	0.8802	0.0978	0.00784	35
bananas, pulp	FOODCONTAM	135	0.01	0	ND	ND	-	-	0.0005	10[2]
bananas, pulp	PDP	1624	0.02 0.003	0	ND	ND	-	-	0.001	10
beans, dry	PDP & FDA	67	0.01	3	0.070	0.380	0.579	0.193	0.00873	2[3]
beans, snap	PDP	1477	0.15 0.001	171	0.005	1.1	22.743	0.133	0.0402	40
beans, snap	FDA & FOODCONTAM	666	0.01	50	0.01	0.810	7.6122	0.1522	0.01327	40
broccoli	FDA & FOODCONTAM	636	0.01	21	0.02	0.870	4.8807	0.2324	0.0084	15
broccoli	PDP	1249	0.015 0.002	9	0.002	0.210	0.59796	0.06644	0.00152	15
Brussels sprouts	FOODCONTAM	156	0.01	8	0.090	0.260	1.18	0.1475	0.0135	42[3]
cabbage	FDA & FOODCONTAM	808	0.01	21	0.01	2.8	9.0895	0.4328	0.0137	50
cabbage, Chinese	FOODCONTAM	199	0.01	4	0.15	0.266	1.326	0.3315	0.01156	NA[4] (100)
cantaloupe	FDA & FOODCONTAM	420	0.01	69	0.01	0.495	7.4919	0.10858	0.01909	30
carrots	PDP	1245	0.02 0.004	1	0.059	0.059	0.059	0.059	0.00355	35

Commodity	Source of data	Number of samples analyzed	LOD	Number of samples > LOD	min	max	sum of residues > LOD	mean of samples > LOD	mean of all samples	% crop treated[1]
cauliflower	FDA & FOODCONTAM	279	0.01	5	0.100	1.34	2.92	0.584	0.01145	20
celery	PDP	1303	0.02 0.001	592	0.007	7.1	107.862	0.1822	0.0874	85
celery	FDA & FOODCONTAM	751	0.01	279	0.007	112.5	327.138	1.173	0.438	85
cherries	FDA & FOODCONTAM	193	0.01	20	0.003	0.360	2.145	0.10725	0.0129	40
cherries	PDP	100	0.01	0	ND	ND	-	-	0.002	40
cranberries	FDA & FOODCONTAM	152	0.01	98	0.01	34.2	62.543	0.6382	0.4125	60
corn, sweet (frozen and canned)	PDP	243	0.008 0.003	0	ND	ND	-	-	0.0002	5
cucumbers	FDA & FOODCONTAM	829	0.01	38	0.01	0.770	3.7616	0.09898	0.00621	35
honeydew	FDA & FOODCONTAM	91	0.01	4	0.02	0.1	0.21	0.0525	0.00326	20
nectarines	FOODCONTAM	305	0.01	0	ND	ND	-	-	0.00175	35
onions, green & leeks	FOODCONTAM	564	0.01	9	0.033	10	12.996	1.444	0.0262	65
parsnips	FOODCONTAM	522	0.01	2	0.05	0.05	0.1	0.05	0.00517	10^5
peaches	FOODCONTAM	610	0.01	0	ND	ND	-	-	0.00175	35

Commodity	Source of data	Number of samples analyzed	LOD	Number of samples > LOD	min	max	sum of residues > LOD	mean of samples > LOD	mean of all samples	% crop treated[1]
peaches	PDP	1006	0.02 0.003	2	0.010	0.025	0.035	0.0175	0.0035	35
plums	FOODCONTAM	332	0.01	0	ND	ND	-		0.0005	10
potatoes	PDP	1637	0.02 0.004	1	0.130	0.130	0.0130	0.0130	0.0031	30
potatoes	FDA & FOODCONTAM	635	0.01	2	0.04	0.94	0.98	0.49	0.0030	30
pumpkins	used squash data	1074	0.01	21	0.01	1.07	5.418	0.258	0.0065	30
squash	FOODCONTAM	1074	0.01	21	0.010	1.07	5.418	0.258	0.00578	15
tomatoes	FDA & FOODCONTAM	1056	0.01	196	0.005	4.60	72.576	0.3703	0.07158	70
watermelon	FDA & FOODCONTAM	131	0.01	18	0.01	0.700	2.67	0.1483	0.0228	55

[1] Unless indicated otherwise, these values are the maximum % from a range given for each crop by BEAD (G. Ali, 6/94).
[2] Percent of imported bananas treated (from D. Edwards; 8/10/88; Anticipated Residue Data for Chlorothalonil).
[3] Taken from a report by Resources for the Future (L.P. Gianessi & C.A. Puffer; 8/92; Fungicide Use in U.S. Crop Production).
[4] Percent crop treated data not available; therefore, 100% is assumed.
[5] From memo of D. Edwards (8/10/88; Anticipated Residue Data for Chlorothalonil).

ANTICIPATED RESIDUES IN MEAT, MILK, POULTRY AND EGGS

Chlorothalonil is registered for use on a number of crops used as animal feeds. Animal feed items that may contain residues of Chlorothalonil are summarized in Table 3 along with anticipated residues of Chlorothalonil and HCB. Residues of Chlorothalonil per se are not transferred from feed items to meat, milk, poultry and eggs. Residues of HCB are expected to accumulate in animal commodities; therefore, the remainder of this section is restricted to estimation of anticipated residues of HCB in meat, milk, poultry and eggs.

Table 3. Livestock Feeds Derived From Field Crops Potentially Treated with Chlorothalonil.

CROP	% CROP TREATED	FEEDSTUFF	% DM	ANTICIPATED RESIDUES		MAXIMUM PERCENT OF LIVESTOCK DIET		
				Chloro-thalonil (ppm)	HCB[1] (ppm)	BEEF CATTLE	DAIRY CATTLE	POULTRY
Bean	2	seed	88	0.0087	0.0000044	15	15	10
Carrot	35	culls	12	0.0036	0.0000018	40	25	NU
Potato	30	culls	20	0.0030	0.0000015	75	50	NU
		processed waste	12	0.012[2]	0.0000060	75	50	NU
Peanut	90	meal	85	0.0045[3]	0.0000023	15	20	25
		hulls	95	0.015[4]	0.0000075	15	NU	NU
Tomato	70	pomace, wet	15	0.0609[5]	0.0000305	30	20	NU
		pomace, dried	92	0.0072[6]	0.0000036	25	10	10
Soybean	1	seed	89	0.00005	2.5×10^{-6}	15	20	20
		meal	92	0.00004[7]	2×10^{-6}	15	20	40
		hulls	90	0.00015[8]	7.5×10^{-6}	20	20	20

[1] Estimated as 0.0005 x Chlorothalonil residues.
[2] Assuming a processing factor of 4.
[3] Residues in meal assumed to be same as nuts.
[4] Residues in hulls assumed 3.3 x nut based on field trial data.
[5] Estimated as 0.85 x RAC residues.
[6] Estimated as 0.1 x RAC residues.
[7] Estimated as 0.8x seed residues.
[8] Estimated as 3 x seed residues.

Currently there are label restrictions in effect to prevent livestock feeding or grazing on bean forage and straw/hay; soybean forage, hay and silage; sweet corn forage, fodder and cannery waste; and peanut hay. Due to changes in Table II of the Pesticide Assessment Guidelines (Subdivision O, Residue Chemistry) Chlorothalonil end-use product labels with uses on beans (snap and dry), corn (field, grown for seed, and sweet), and peanuts must be amended to remove most of these livestock feeding restrictions. Tolerances must be proposed for the combined residues of Chlorothalonil and its 4-hydroxy metabolite in/on field corn grain and fodder; sweet corn fodder and peanut hulls. In addition, upon submission of adequate residue data, tolerances must be proposed for the combined residues of Chlorothalonil and its 4-hydroxy metabolite in/on bean forage and straw/hay; sweet corn forage; and peanut hay. Anticipated residues and the associated dietary risk associated with these requirements will be estimated when tolerances are proposed for these feed items.

Any of the feed items listed in Table 3 can be important on a local level at any given time but most of them will not occur in a typical national level livestock diet over an extended period of time. In fact, only soybean commodities would be expected to be a consistent component of the national level diet and it represents only a minor use of Chlorothalonil ($< 1\%$ of crop treated). The registrant has proposed maximum practical beef and dairy diets, which we will use for this assessment as a conservative estimate. These diets and a maximum anticipated diet for poultry are shown in Table 4.

Table 4. Estimation of maximum level dietary burdens for ruminants and poultry[1].

Feed Commodity	HCB Residues	Proportion of Diet	Contribution to Diet (ppm)
Beef Cattle			
Soybean meal	2×10^{-8}	0.10	2.17×10^{-9}
Soybean hulls	7.5×10^{-8}	0.15	1.25×10^{-8}
Wet tomato pomace	3.1×10^{-5}	0.20	4.13×10^{-5}
Other (not treated)	0	0.55	0
Total Dietary Burden = 4.13×10^{-5}			
Dairy Cattle			
Soybean meal	2×10^{-8}	0.15	3.26×10^{-9}
Soybean hulls	7.5×10^{-8}	0.15	1.25×10^{-8}
Wet tomato pomace	3.1×10^{-5}	0.10	2.07×10^{-5}
Other (not treated)	0	0.60	0
Total Dietary Burden = 2.07×10^{-5}			
Poultry			
Soybean seed	2.5×10^{-8}	0.20	0.5×10^{-8}
Soybean meal	2×10^{-8}	0.10	0.2×10^{-8}
Dried tomato pomace	3.6×10^{-6}	0.10	3.6×10^{-7}
Other (not treated)	0	0.60	0
Total Dietary Burden = 3.67×10^{-7}			

[1] Beef and dairy cattle diets are adjusted for percent dry matter.

Suitable feeding studies are not available from the Chlorothalonil registrant to estimate transfer of HCB residues to meat, milk, poultry and eggs; however, studies are available to the Agency, which were conducted with PCNB contaminated with HCB. It is assumed that the transfer of HCB to animal tissues from feed is independent of what other chemical may be in the feed; therefore, transfer factors estimated from these studies are applicable to this assessment. These studies and our derivation of HCB transfer factors from feed to animal tissues, which are included below in Table 5, are discussed at length in a memorandum by W. Smith dated 5/25/94 (Dietary Exposure to Pentachlorobenzene (PCB) and

Hexachlorobenzene (HCB) as a Result of Uses of Pentachloronitrobenzene (PCNB) on Food and Feed Crops: DP Barcode D203453: CBRS # 13727). Table 5 provides the HCB anticipated residues in meat, milk, poultry and eggs as a result of treatment of animal feed crops with Chlorothalonil.

Table 5. Anticipated Residues (Transfer Factor x Dietary Burden) of HCB in Livestock Commodities.

Commodity	Transfer Factor	Dietary Burden (ppm)	Anticipated Residue (ppm)
Cattle			
fat	4	4.13×10^{-5}	16.5×10^{-5}
meat	0.3	4.13×10^{-5}	1.24×10^{-5}
liver	0.2	4.13×10^{-5}	0.8×10^{-5}
kidney	0.2	4.13×10^{-5}	0.8×10^{-5}
milk	0.08	2.07×10^{-5}	0.166×10^{-5}
Poultry			
fat	6	3.67×10^{-7}	22×10^{-7}
meat	0.1		0.37×10^{-7}
liver	2		7.3×10^{-7}
egg yolk	2		7.3×10^{-7}
egg white	0.004		0.015×10^{-7}

cc: W.Smith; Registration Standard File; SF; RF.

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RDI: EZager:06/09/95