

US EPA ARCHIVE DOCUMENT

PP # 4354



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

MAR 29 1995

MEMORANDUM

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Subject: PP#4F04354. Abamectin (Avermectin B₁) for Use in/on the Cucurbit Crop Group (Cucumbers, Melons, and Squash). Evaluation of Analytical Methodology and Residue Data. (MRIDs# 432038-01 (8 volumes), and 432286-01 (1 volume). DP Barcode# D203373. CBTS# 13706 and 13707

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Merck and Co., Inc. is requesting the establishment of permanent tolerances for abamectin (avermectin B₁) insecticide/miticide and its delta-8,9-isomer in/on the following commodities:

<u>Commodity</u>	<u>Tolerance (ppm)</u>
Cucurbit vegetables (including melons, cucumbers, and squashes)	0.005

Tolerances have been established for avermectin B₁ on various RACs, processed commodities, and animal feeds (40 CFR 180.449, 185.300, and 186.300).

No registration standard has been prepared for abamectin.

Abamectin 0.025

Conclusions

1. Data in this petition were not generated by Craven Laboratories.

2. The manufacturing process of technical grade avermectin has been adequately described. No concern exists for any of the probable impurities. The formulation proposed for use on cucurbit vegetables is AGRI-MEK 0.15 EC (EPA Reg.# 618-98). All inerts in this formulation have been cleared under 40 CFR 180.1001.

3. The nature of the residue in plants is adequately understood for the purposes of the proposed use on cucurbit vegetables. CBTS concludes that the metabolism data are sufficient to support the proposed use on cucurbit vegetables. The residues of concern are avermectin B₁ and its delta-8,9-isomer.

4. No animal feed items are associated with this use of AGRI-MEK 0.15 EC on cucurbit vegetables. For other avermectin uses that involve animal feed items, the residues of concern have been determined to be avermectin B₁ and its delta-8,9-isomer.

5a. Merck Method 8920 for analysis of avermectin B₁ and its delta-8,9-isomer in/on cucurbit vegetables appears to be adequate and suitable for enforcement purposes. The method has been independently validated. However, CBTS believes that Method 8920 is sufficiently different from the other validated avermectin methods that it should be sent to the EPA Beltsville lab for validation (see memo of G.J. Herndon dated 3/27/95). Until the EPA lab validation is completed, CBTS cannot make any final conclusions concerning the adequacy of the proposed enforcement method for analysis of avermectin B₁ and its delta-8,9-isomer in/on cucurbits.

5b. Avermectin has been subjected to testing under FDA multi-residue protocol methodology and cannot be recovered using any of the methods.

6a. Samples from the submitted field trials were stored up to 204 days (6.8 months). Storage temperatures were not specified, except at the field facilities, where samples were held at about -31°C over storage intervals up to 110 days. CBTS would like Merck to comment on whether the samples were maintained in frozen condition until extraction.

6b. Provided Merck can show that the field samples were stored frozen until extraction (see Conclusion 7a), the previously submitted storage stability data on tomatoes should be representative and sufficient in duration to insure the stability of avermectin residues in the cucurbit field residue samples.

7a. Pending Merck's response to Conclusion 6a and Method 8920 successfully passing EPA Beltsville lab validation, the proposed crop group tolerance of 0.005 ppm on cucurbit vegetables should be adequate to cover residues expected from the proposed use.

7b. Pending the response to Conclusions 5a and 6a, CBTS will recommend that the following residue values be used in the acute and chronic dietary risk assessment for avermectin.

Acute and Chronic Residue Values to be Used in the Dietary Risk Assessment of Avermectin

DRES entry	Entry for ACUTE Risk Assessment (ppm)	Entry for CHRONIC Risk Assessment (ppm)
bitter melon	0.005	0.0013
cantaloupe	0.005	0.0013
casaba	0.005	0.0013
cucumber	0.005	0.0013
honeydew melon	0.005	0.0013
pumpkin	0.005	0.0013
squash, summer	0.005	0.0013
squash, winter	0.005	0.0013
watermelon	0.005	0.0013

8. Cucurbit vegetables (and their related parts) are not listed in the June 1994 Table II of Subdivision O as animal feed items. therefore, the current petition should not impact the current cattle meat, meat byproduct, and milk tolerances already established for residues of avermectin, nor should it require the establishment of other livestock tolerances.

9. Avermectin tolerances on various commodities are under consideration by Codex, but have not been officially adopted. No Canadian or Mexican tolerances are established for avermectin and therefore no compatibility problem exists between the proposed U.S. and Codex tolerances.

Recommendations

Until the deficiencies outlined in Conclusions 5a and 6a are satisfactorily resolved, CBTS cannot recommend in favor of the proposed tolerances.

Detailed Considerations

Manufacturing and Formulation

Abamectin (avermectin B₁ or AVM B₁) is produced by a fermentation process using a strain of Streptomyces avermitilis. (This manufacturing process was reviewed in detail in L. Cheng's memo dated 5/1/86 reviewing EPA 618-OL). The technical product abamectin is a mixture of two homologs containing not less than 80% AVM B_{1a} and not greater than 20% AVM B_{1b}. These components differ by only one methylene unit at the 25-carbon position, wherein AVM B_{1a} contains a sec-butyl group and AVM B_{1b} contains an isopropyl group.

The technical material is about 95% AVM B₁ and contains about 0.5% of other AVMs of elucidated structures. The technical also contains about 1% of unidentified impurities related to the AVMs. TOX has no concern over these AVM-related impurities (see PP# 5G3287, memo of W. Dykstra, 3/3/86).

The formulation proposed for use on cucurbit vegetables is AGRI-MEK 0.15 EC, which is an emulsifiable concentrate (EC) containing 0.15 lbs active ingredient (ai.) per gallon (2.0 wt%). All inertts have been cleared for use under 40 CFR 180.1001 (see PP# 6G3320, memo of A. Smith, 6/23/86).

Proposed Use

For control of leafminers and spiders on cucurbits (melons, cucumbers, and squashes), apply AGRI-MEK 0.15 EC (EPA Reg.# 618-98) using ground equipment only, at the rate of 8 to 16 fl.oz./A. (0.00938 to 0.0188 lb.ai./A.) depending on the extent of infestation. Apply when adult flies or mites are first observed and repeat applications no more frequently than every 7 days, not to exceed 48 fl.oz./A./growing season (0.056 lb.ai./A./growing season). The minimum PHI is 7 days. Do not apply through any type of irrigation system.

Nature of the Residue

Metabolism in Plants

No new plant metabolism data were submitted with this tolerance request. Metabolism data have been previously submitted on cottonseed, citrus, and celery (PP#'s 5G3500, 5G3287, and 8F3649, respectively). In addition, a report titled "Comparative Degradation of Avermectin B_{1a} in Cotton Leaf, Citrus Fruit, Celery, and In Vitro" was submitted in support of PP#9F3703 (reviewed by S. Willett in a memo from 12/15/89).

CBTS (formerly DEB) has previously concluded that the metabolism of abamectin in plants results in a complex mixture of

residues. The majority of the terminal residue is composed of several unidentified polar degradates. The parent compound, its delta-8,9-isomer, and the alpha 8-OH degradate have been identified in plants, with only the parent and its delta-8,9-isomer each accounting for at least 10% of the total residue. To support the uses on cotton and citrus, the polar degradates generated on citrus (30X, 7 day PHI) and in vitro (30 hour sample) have been tested for toxicity and were found to be of no toxicological significance at the levels tested (see TOX memos 7080 and 7081 of W. Dykstra dated 3/15/89, and DEB memo of F. Boyd concerning 8F3592 dated 6/21/89).

The proposed use on cucurbits specifies multiple applications up to a maximum application rate of 48 fl. oz./A./season (0.056 lb.ai./A./season). Previously, the metabolism components have been examined from radio-labeled abamectin on celery (10 applications at 7 day intervals for a total equivalent of 1.0 lb.ai./A./season), radio-labeled abamectin on cotton (3 applications at 50 to 89 day intervals for a total equivalent of 0.60 lb./A./season), and exaggerated application rates to citrus (30X, 2.25 lb.ai./A.). The available metabolism data on cotton, celery, and citrus represent a wide enough range of crop matrices, growth modes, and use rates to conclude that it is unlikely that application of abamectin to cucurbits will form new compounds that have not previously been produced and subjected to toxicity testing. While the petitioner should be prepared to conduct additional plant metabolism studies on other crops to support future uses (especially if the use patterns differ significantly from those of cotton, celery, and citrus), CBTS concludes that the metabolism data are sufficient to support the proposed use on cucurbits. The residues of concern are the parent compound (avermectin B_{1a} and B_{1b}) and its delta-8,9-isomer.

Metabolism in Animals

No additional animal metabolism data were submitted with this petition. Data from a goat metabolism study were previously reviewed in PP#7G3468 (memo of L. Cheng, 2/11/87) and summarized by S. Willett in her memo of 12/15/89 regarding PP#9F3703. Based on this study, the residues of concern in ruminants was determined to be the parent compound (avermectin B_{1a} and B_{1b}) and its delta-8,9-isomer. If the tolerances for residues in meat and milk need to be raised at some future time due to registration of abamectin on additional feed items, the 24-hydroxymethyl metabolite may need to be included in the tolerance expression and appropriate enforcement methods developed (see F. Boyd memo of 6/21/89).

Cucurbit vegetables (and their related parts) are not listed in the June 1994 Table II of Subdivision O as animal feed items. Therefore, the nature of the residue in animals does not impact the current petition.

Analytical Method

The petitioner has submitted the following method for the analysis of avermectin B₁ and its delta-8,9-isomer in cucurbits.

"HPLC-Fluorescence Determination For Avermectin B₁ and its Delta-8,9-Isomer in Cucumbers", J. Cobin, 10/25/89, Merck Sharp and Dohme Research Laboratories, Method# 8920, (MRID# 432038-01, vol. 6).

Extraction:

Samples were ground in a blender, extracted with methanol, and partitioned with water and isooctane. The aqueous/methanol layer is passed through a C-8 column. The C-8 column is coupled with 2 aminopropyl columns and eluted with methanol. The eluent is brought up to a 10 mL volume with methanol, split, and evaporated to dryness. The sample is reacted first with N,N-dimethylformamide/trifluoroacetic anhydride/1-methylimidazole reagent, and then with methanolic ammonium hydroxide to form a fluorescent derivative. The sample is dissolved in chloroform and purified on a silica gel column. The eluent is evaporated to dryness, dissolved in methanol, and analyzed by HPLC using a C-18 column and fluorescence detection. Since derivatization of the delta-8,9-isomer produces the same derivative as avermectin B₁, the derivatized residue quantitated represents the sum of avermectin and its delta-8,9-isomer. The recoveries are shown in Table 1.

Table 1

Lab Validation of Method 8920 for Avermectin Residues on Cucumbers

compound	spike level (ppb)	% recovery
B _{1a}	5.4	109
		107
		76
		65
		91
		71
		87
		97
	5.9	49
		92
		100
		100
	25.5	79
		106
		104
		91
89.1	92	
	94	
	89	
	87	
	86	
	75	
	71	
	75	
Δ -8,9-isomer	5.2	73
		73
		88
		73
		77
		70
		70
		69
	5.6	71
		75
		68
		69
	26.1	67
		72
		71
		71
102		
105		
97		
92		
52.2	94	
	92	
	97	
	94	
B _{1b}	6.6	102
		105
		97
		92
B _{2b}	6.6	94
		92
		97
		102

"High Performance Liquid Chromatography Fluorescence Determination For Avermectin B₁ and its Delta-8,9-Isomer in Cucumbers and Melons", T.J. Trainor, 8/26/91, Hazleton Labs, Inc., HLA 6012-320, (MRID# 432286-01).

This method was a revalidation of Merck Method #8920 (10/25/89) for use in cucumbers and melons. The independent lab validation was preformed by Hazleton Laboratories America, Inc..

The recoveries are shown in Table 2.

Table 2

Independent Lab Validation of Method 8920 for Avermectin Residues on Cucumbers and Melons

matrix	compound	spike level (ppb)	% recovery
cucumbers	B ₁ a	5.0	76
			82
			74
			86
			82
			80
	71.1	77	
		95	
		95	
	B ₁ b	5.3	87
			104
			102
	Δ-8,9-isomer	5.0	72
			72
			72
72			
20.0		75	
		84	
melon	B ₁ a	5.0	74
			80
			86
			80
			75
			87
	71.0	80	
		91	
		100	
	B ₁ b	5.3	91
			91
			100
	Δ-8,9-isomer	5.0	72
			74
			76
82			
50.0		81	
		81	

Comments and Recommendations

Based on the method, residues of avermectin B_{1a}/delta-8,9-isomer below 2 ng/g are non-detectable (reported as ND). The peak representing avermectin B_{1a}/delta-8,9-residues between 2 and 5 ng/g is identified but not quantitated (reported as NQ) and the peak for residues above 5 ng/g is identified and quantitated. Since avermectin B_{1b} is at most 20% (usually less than 10%) of the active ingredient, its residue levels are generally less than the quantitation limit (5 ng/g) or the detection limit (2 ng/g). The peak representing avermectin B_{1b} is identified but not quantitated when the residue level is between 2 and 5 ng/g. Residues of avermectin B_{1b} above 5 ng/g are identified and quantitated in the same manner as the avermectin B_{1a}/delta-8,9-isomer, using the avermectin B_{1a} standard curve for quantitation.

In general, it is inappropriate to quantitate one compound using the standard for another. The petitioner states that because it has been found that a standard curve of B_{1b} will produce a slightly higher slope than that of B_{1a}, attempts to quantitate avermectin B_{1b} from B_{1a} will, at worst, result in an overestimation of actual B_{1b} residues. In addition, the contribution of B_{1b} to the total B₁ is very small (typically about 10%). Therefore, CBTS does not believe that this questionable practice adversely affects the total residue values, in this case.

Method validations of analytical methodology to determine residues of avermectin B_{1a}, its delta-8,9-isomer, and B_{1b} in plant and animal commodities have been conducted by the Agency. Merck Method 1009R3 (citrus methodology) and Method 32A (animal commodities) were determined to be adequate for enforcement purposes (see method evaluation reports of F. Boyd dated 9/2/88, and S. Willett dated 9/11/89). The methods were recently sent to the FDA for publication in PAM II. A method for cottonseed has also been submitted as a letter method (see memo of S. Willett, 9/21/89). The methodology has not yet been published in PAM II but may be obtained from PIB/FOD. An additional validation of the method used for pears has been requested (Method# 8000, rev. 4; see memo of G.J. Herndon, 10/21/94).

Merck Method 8920 for analysis of avermectin B₁ and its delta-8,9-isomer in/on cucurbit vegetables appears to be adequate and suitable for enforcement purposes. However, CBTS believes that Method 8920 is sufficiently different from the other validated avermectin methods that it should be sent to the EPA Beltsville lab for validation. CBTS has initiated the validation request (see memo of G.J. Herndon dated 3/27/95). Until the EPA lab validation is completed, CBTS cannot make any final conclusions concerning the adequacy of the proposed enforcement method for analysis of avermectin B₁ and its delta-8,9-isomer in/on cucurbits.

Avermectin has been tested using methodology described in PAM I, multi-residue method protocol A, which is the only applicable protocol. Avermectin is not recovered using the multi-residue methodology.

Residue Data

Storage Stability

No storage stability data were provided with this petition. In conjunction with PP#1F3973/1H5611 (see memo 5/19/94), Merck referenced previously submitted storage stability data on various crops. The composite crops/recoveries are shown in Table 3.

Table 3

Storage Stability Recoveries for Abamectin Residues in Various Crop Matrices (stored at $\leq -10^{\circ}\text{C}$)

Matrix	Length of Frozen Storage (months)	Fortification Level (ppm) and Compound	Method Recovery at Longest Time Interval#	Storage Stability Recovery at Longest Time Interval*
celery	24	0.010 - B1a	70%	79%
		0.206 - B1a		70%
		0.015 - B1b		87%
		0.010 - Δ 8,9 isomer		70%
pears	35	0.010 - B1a	95%	84%
		0.071 - B1a		86%
		0.005 - B1b		72%
		0.010 - Δ 8,9 isomer		94%
strawberries	24	0.010 - B1a	105%	98%
		0.071 - B1a		102%
		0.005 - B1b		109%
		0.010 - Δ 8,9 isomer		94%
tomatoes	24	0.010 - B1a	87%	88%
		0.051 - B1a		86%
		0.004 - B1b		90%
		0.009 - Δ 8,9 isomer		74%
cottonseed	14	0.010 - B1a	73%	58%
whole oranges	29	0.010 - B1a	86%	89%
		0.052 - B1a		89%
		0.004 - B1b		95%
		0.010 - Δ 8,9 isomer		84%
whole grapefruit	29	0.010 - B1a	96%	92%
		0.052 - B1a		82%
		0.004 - B1b		104%
		0.010 - Δ 8,9 isomer		85%
whole lemons	29	0.010 - B1a	84%	86%
		0.052 - B1a		86%
		0.004 - B1b		98%
		0.010 - Δ 8,9 isomer		83%
orange peel	52	0.025 - B1a	87%	67%
grapefruit peel	47	0.005 - B1a	unk.	85%
		0.025 - B1a		70%
lemon peel	47	0.005 - B1a	88%	93%
		0.025 - B1a		79%

- fresh fortification

* - uncorrected for method recovery

Samples from the submitted field trials were stored up to 204 days (6.8 months). Storage temperatures were not specified, except at the field facilities, where samples were held at about -31°C over storage intervals up to 110 days. CBTS would like Merck to comment on whether the samples were maintained in frozen condition until extraction.

Provided Merck can show that the field samples were stored frozen until extraction, the previously submitted storage stability data on tomatoes should be representative and sufficient in duration to insure the stability of avermectin residues in the cucurbit field residue samples.

Magnitude of the Residue

"Determination of the Magnitude of the Residues of Avermectin B_1 and 8,9-Z Avermectin B_1 in/on Cucurbits from Abamectin 0.15 EC Applications Made with Ground Equipment", J.A. Norton, 3/23/94, (MRID# 432038-01, vols. 1 - 8).

Nineteen (19) total field trials were conducted on cucurbit vegetable in 1991 and 1992. The breakout for the trials included nine (9) for cantaloupe, four (4) for cucumber, four (4) for summer squash, and two (2) for watermelon. The trials were conducted using ground equipment and spray volumes of 10 to 23 gallons per acre. In the field trials, the individual applications of AGRI-MEK® 0.15 EC were applied at about 1X the proposed rate, but due to the 4 (and in one case 5) applications, the seasonal rate exceeded 1X. Samples were harvested at various PHIs; however, only the data from the proposed 7 day PHI are shown in Table 4 below. Merck Method 8920 was used to quantitate both the $B_{1a}/\text{delta-8,9-isomer}$ and $B_{1b}/\text{delta-8,9-isomer}$.

None of the cucurbit vegetable samples analyzed from the 7 day PHI, exhibited quantifiable residues ($<5 \text{ ug/g}$). Only one (1) sample exhibited a detectable residue ($>2 \text{ ug/g}$). The results are summarized in Table 4.

Table 4

Residue Summary of Avermectin Residues in/on Cucurbits

crop	study/state	average spray volume/application (gal./A.)	# applications	rate (g. ai./A.)			PHI (days)	maximum total residues in ppb (uncorrected for method and storage recoveries)		
				average	final application	total		B _{1a}	B _{1b}	Total
cantaloupe	001-91-1026R/TX	10.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-91-1027R/AZ	20.7	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-91-6011R/CA	10.1	4	0.019	0.020 (1X)	0.077 (1.4X)	7	ND	ND	4
								ND	ND	4
	001-92-0019R/FL	20.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-92-0020R/GA	20.1	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
001-92-0021R/SC	22.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4	
							ND	ND	4	
001-92-1001R/MI	22.9	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4	
							ND	ND	4	
001-92-3014R/PA	21.1	4	0.020	0.020 (1X)	0.80 (1.4X)	7	ND	ND	4	
							ND	ND	4	
001-92-6013R/CA	21.0	5	0.020	0.020 (1X)	0.099 (1.7X)	7	ND	ND	4	
							ND	ND	4	
watermelon	001-91-1025R/TX	20.4	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-91-6010R/CA	20.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
ND								ND	4	
cucumber	001-92-0030R/SC	22.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-92-1019R/MI	20.7	4	0.020	0.020 (1X)	0.079 (1.4X)	7	ND	ND	4
								ND	ND	4
	001-92-3019R/PA	20.9	4	0.020	0.019 (1X)	0.079 (1.4X)	7	ND	ND	4
ND								ND	4	
001-92-6015R/CA	19.9	4	0.019	0.020 (1X)	0.076 (1.3X)	7	NQ (2.6)	ND	4.6	
							ND	ND	4	
summer squash	001-92-0029R/FL	20.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-92-1020R/TX	15.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
								ND	ND	4
	001-92-3019R/NY	20.0	4	0.019	0.019 (1X)	0.076 (1.3X)	7	ND	ND	4
ND								ND	4	
001-92-6014R/CA	23.0	4	0.022	0.020 (1X)	0.087 (1.5X)	7	ND	ND	4	
							ND	ND	4	

Comments

Handling of Non-Quantifiable (NQ) and Non-Detectable Residues
in Setting the Tolerance (Acute Risk Assessment)

The matrix and methodology allow for a limit of quantitation (LOQ) of 5 ppb and a limit of detection (LOD) of 2 ppb. In Table 4, the designations NQ and ND are used. NQ refers to samples (in the case of Table 4, only 1 sample) that were not quantifiable (2 - 5 ppb). Since these samples exhibited a clear peak in the retention time window of the compound of interest, albeit below the LOQ (5 ppb), the concentration of avermectin residues in these samples will be estimated based on the peak height for the purposes of tolerances (and therefore, acute risk assessment). ND refers to samples that were not detected (< 2 ppb). A value of 2 ppb will be assigned to these samples for the purposes of tolerances (and therefore, acute risk assessment).

In Table 4, having a ND for both B₁a and B₁b will result in a total avermectin residue concentration of 4 ppb (2 ppb + 2 ppb). However, CBTS does not believe that a tolerance value should be set below the limit of quantitation (LOQ) of the major component of the residue (in this case, B₁a). **Therefore, a tolerance value of 0.005 ppm (the LOQ) should be established for residues of avermectin on cucurbits.**

Handling of Non-Quantifiable (NQ) and Non-Detectable Residues
in the Chronic Risk Assessment

The matrix and methodology allow for a limit of quantitation (LOQ) of 5 ppb and a limit of detection (LOD) of 2 ppb. In Table 4, the designations NQ and ND will be used. NQ refers to samples (in the case of Table 4, only 1 sample) that were not quantifiable (2 - 5 ppb). Since these samples exhibited a clear peak in the retention time window of the compound of interest, albeit below the LOQ (5 ppb), the concentration of avermectin residues in these samples will be estimated based on the peak height. ND refers to samples that were not detected (< 2 ppb). For the purposes of chronic risk assessment, a value of 1 ppb ($\frac{1}{2} \times 2$ ppb) will be used.

If B₁a is ND

Abamectin (avermectin B₁) is produced by a fermentation process using a strain of Streptomyces avermitilis. (This manufacturing process was reviewed in detail in L. Cheng's memo dated 5/1/86 reviewing EPA 618-OL). The technical product abamectin is a mixture of two homologs containing not less than 80% avermectin B₁a and not greater than 20% avermectin B₁b. These components differ by only one methylene unit at the 25-carbon position, wherein avermectin B₁a contains a sec-butyl group and avermectin B₁b contains an isopropyl group. Based on the residue

data reviewed to date, the metabolism in plants does not seem to alter this ratio of B_{1a} to B_{1b} (at least 4 to 1). Therefore, for the purposes of chronic risk assessment, for those samples which exhibit non-detectable (ND) B_{1a} residues, a value of $\frac{1}{4}$ of ND will be used to estimate B_{1b} residue levels. Since a value of 1 ppb will be used for ND B_{1a} residues, a value of 0.25 ppb ($\frac{1}{4} \times 1$ ppb) will be used to estimate the B_{1b} residue contribution of those samples.

For the one sample (from trial 001-92-6015R/CA) in which the residue was NQ but estimated to be 2.6 ppb, a value of 0.65 ppb ($\frac{1}{4} \times 2.6$ ppb) will be used to estimate the B_{1b} residue contribution of that samples.

From the 38 residue values, a mean of 1.30 ppb was determined. CBTS recommends that a value of 0.0013 ppm be used as the chronic anticipated residue for cucurbit vegetables.

Provided Merck can show that the field samples were stored frozen until extraction and Method 8920 passes Beltsville lab validation, CBTS will recommend that the residue values listed in Table 5 be used in the acute and chronic dietary risk assessment for avermectin.

Table 5

Acute and Chronic Residue Values to be Used in the Dietary Risk Assessment of Avermectin

DRES entry	Entry for ACUTE Risk Assessment (ppm)	Entry for CHRONIC Risk Assessment (ppm)
bitter melon	0.005	0.0013
cantaloupe	0.005	0.0013
casaba	0.005	0.0013
cucumber	0.005	0.0013
honeydew melon	0.005	0.0013
pumpkin	0.005	0.0013
squash, summer	0.005	0.0013
squash, winter	0.005	0.0013
watermelon	0.005	0.0013

Based on the EPA Field Trial Document (6/2/94), to get a crop group tolerance on cucurbit vegetables, 6 field trials are needed on cucumbers, 6 on cantaloupe, and 5 on summer squash. In the current petition, Merck submitted data from 4 field trials conducted on cucumbers, 9 on cantaloupe, 4 on summer squash, and 2 on watermelon. For the purposes of the current submission, Merck will not be held to the requirements outlined in the 6/2/94 document since the field trials were conducted prior (1991 and 1992) to the issuance of the document. Furthermore, since all of

the cucurbit samples exhibited similar residue levels, and all were either ND or NQ, no additional field trials will be required in the future in order to satisfy the requirements for a crop group tolerance on cucurbits as outlined in the 6/2/94 Field Trial Document.

Meat, Milk, Poultry, and Eggs

Cucurbit vegetables (and their related parts) are not listed in the June 1994 Table II of Subdivision O as animal feed items. Therefore, the current petition should not impact the current cattle meat, meat byproduct, and milk tolerances already established for residues of avermectin, nor should it require the establishment of other livestock tolerances.

Other Considerations

Avermectin tolerances on various commodities are under consideration by Codex, but have not been officially adopted. No Canadian or Mexican tolerances are established for avermectin and therefore no compatibility problem exists between the proposed U.S. and Codex tolerances.

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