9-6-94

MEMORANDUM

SUBJECT: Response to the Malathion Reregistration Standard: Magnitude of the Residue Studies. (Case No. 0248, Chemical I. D. No. 057701, MRID Nos. 43078702, 43108201, 43078701 and 43175501, CBRS Nos 13197, 13698 and 137843, Barcodes: D199259, D203201 and D203620).

FROM: R. B. Perfetti, Ph.D., Chemist
Reregistration Section 2
Chemistry Branch II: Reregistration Support
Health Effects Division (7509C)

THRU: W. J. Hazel, Ph.D., Section Head
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TO: Esther Saito, Chief
Reregistration Branch
Special Review & Reregistration Division (7508W)

Attached is a review of magnitude of the residue studies on cherries, oranges and peppers by A/S Cheminova in response to the malathion Reregistration Standard. This review was completed by Dynamac Corporation under supervision of CBRS, HED. It has undergone secondary review in the branch and has been revised to reflect Agency policies.

In the absence of supporting storage stability data, all conclusions pertaining to the magnitude of the residue in plants listed below are tentative. Cheminova has indicated that a storage stability study is ongoing.

Cherries, sweet

1a. The submitted field residue data (1994; MRID 43078702) indicate that the uncorrected combined residues of malathion and malaoxon were <0.27-2.01 ppm in/on mature sweet cherries harvested 3 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in CA, 4 applications at 8 lb ai/A/application (1x) followed by 2 applications at 1 lb ai/A/application (0.125x); and (ii) in MI and OR, 6 applications at 3.75 lb ai/A/application (≈0.5x).

1b. Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.03-0.18 ppm in/on mature sweet cherries harvested 1 day

(1)

MALATHIO. 016

following the last of 6 foliar applications to established sweet cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment.

1c. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for cherries in tests conducted with sweet cherries according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC (EPA Reg. No. 4787-20) and 9.79 lb/gal RTU (EPA Reg. No. 4787-8) formulations to reflect the use patterns used in the submitted field residue data, no additional field residue data for sweet cherries will be required for reregistration purposes. The available data will support: (i) up to 6 foliar applications per season, with a 7-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 3.75 lb ai/A/application in 60 gal of water/A using an airblast ground sprayer; and (ii) up to 6 foliar applications per season, with a 7-day treatment interval and a 1-day PHI, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application using ULV aerial equipment.

Cherries, tart

2a. The submitted field residue data (1994; MRID 43108201) indicate that the uncorrected combined residues of malathion and malaoxon were <1.11-2.62 ppm in/on mature tart cherries harvested 3 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in MI and NY, 6 applications at 3.75 lb ai/A/application (≈0.5x); and (ii) in MT, 3 applications at 8.0 lb ai/A/application (1x) followed by 3 applications at 3.75 lb ai/A/application (≈0.5x).

2b. Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.03-0.48 ppm in/on mature tart cherries harvested 1 day following the last of 6 foliar applications to established tart cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment.

2c. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for cherries in tests conducted with tart cherries according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC (EPA Reg. No. 4787-20) and 9.79 lb/gal RTU (EPA Reg. No. 4787-8) formulations to reflect the use patterns used in the submitted field residue data, no additional

field residue data for tart cherries will be required for reregistration purposes. The available data will support: (i) up to 6 foliar applications per season, with a 7-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 3.75 lb ai/A/application in 60 gal of water/A using an airblast ground sprayer; and (ii) up to 6 foliar applications per season, with a 7-day treatment interval and a 1-day PHI, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application using ULV aerial equipment.

Oranges

3a. The submitted field residue data (MRID 43078701) indicate that the uncorrected combined residues of malathion and malaoxon were 0.48-1.91 ppm in/on mature oranges harvested 7 days following the last of 3 foliar applications to established orange orchards, with a 30-day retreatment interval, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application (1x) in 200 gal of water/A using an airblast ground sprayer.

3b. Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.02-0.06 ppm in/on mature oranges harvested 1 day following the last of 10 foliar applications to established orange orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 0.175 lb ai/A/application using aerial ULV equipment with 9.6 oz/A protein hydrolysate bait (1x).

3c. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for oranges in tests conducted according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC formulation (EPA Reg. No. 4787-20) and SLN Nos. CA820007, CA830012, and FL880001 to reflect the use patterns used in the submitted field residue data, no additional field residue data for oranges will be required for reregistration purposes. The available data will support: (i) up to 3 foliar applications per season, with a 30-day retreatment interval and a 7-day PHI, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application in 200 gal of water/A using an airblast ground sprayer; and (ii) up to 10 foliar applications per season, with a 7-day retreatment interval and a 1-day PHI, of the RTU formulation at 0.175 lb ai/A/application plus 9.6 oz/A protein hydrolysate bait using aerial ULV equipment.

Peppers

4a. The submitted field residue data (MRID 43175501) indicate that the uncorrected combined residues of malathion and malaoxon were <0.02-0.09 ppm in/on mature bell peppers

harvested 3 days following the last of 5 foliar applications, with a 5-day retreatment interval, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application (1x) in 30 gal of water/A using ground (boom) equipment.

4b. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for peppers in tests conducted according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC formulation (EPA Reg. No. 4787-20) to reflect the use patterns used in the submitted field residue data, no additional field residue data for peppers will be required for reregistration purposes. The available data will support: (i) up to 5 foliar applications per season, with a 5-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application in 30 gal of water/A using ground (boom) equipment.

NOTE: Assuming that the registered uses of malathion on the crops listed above are limited to the use patterns employed in the submitted field trials, the currently established tolerances for many raw agricultural commodities may be reduced. However, CBRS recognizes that additional formulations and use patterns are still actively registered by companies other than Cheminova. Issues pertaining to tolerance reassessment will be considered when the reregistration eligibility decision for malathion is determined.

A revised Residue Chemistry summary sheet is included.

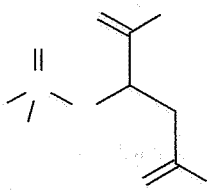
If you need additional input please advise.

Attachment 1: Malathion Cropfield Trials Review.

cc (With Attachment 1): RBP, Malathion Reregistration Standard File, Malathion Subject File, Circulation and Dynamac.

cc (Without Attachment): RF.

MALATHION



Shaughnessy No. 057701; Case 0248

(CBRS Nos. 13197, 13698, and 13784)

(DP Barcode Nos. D199259, D203021, and D203620)

Task 4

REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY DATA REQUIREMENTS

BACKGROUND

In response to the Malathion Reregistration Standard Guidance Document, dated 2/88, Cheminova Agro A/S, through its authorized representatives (Jellinek, Schwartz & Connolly, Inc.), submitted field residue data for: cherries, sweet (1994; MRID 43078702); cherries, tart (1994; MRID 43108201); oranges (1994; MRID 43078701); and peppers (1994; MRID 43175501). Data from these submissions are evaluated herein for adequacy in fulfilling residue chemistry data requirements for the reregistration of malathion. The Conclusions and Recommendations stated below pertain only to the above submissions. All other residue chemistry data requirements stated in the Malathion Reregistration Standard Guidance Document are not addressed herein.

The qualitative nature of malathion residues in plants is adequately understood based on acceptable metabolism studies involving alfalfa, lettuce, cotton, and wheat. The qualitative nature of the residue resulting from oral dosing of ruminants and poultry is adequately understood; neither malathion nor malaoxon were detected in any tissue. If the direct livestock treatment uses of malathion are removed from all product labels, the tolerances for residues of malathion in animal commodities can be revoked. However, if the direct livestock treatment uses of malathion are supported, then appropriate dermal metabolism and magnitude of the residue in meat, milk, poultry, and egg studies are required.

Tolerances for residues in/on food/feed commodities are expressed in terms of malathion (*O,O*-dimethyl dithiophosphate of diethyl mercaptosuccinate) [40 CFR §180.111, §185.3850, §185.7000, and §186.3850]. The HED Metabolism Committee has determined that the parent compound malathion and the malaoxon metabolite are the compounds to be regulated in plant commodities. Codex MRLs exist for residues of malathion *per se* in/on various plant and processed commodities. The Codex MRLs and the U.S. tolerances will be incompatible when the U.S. tolerance expression for plant commodities is revised to include both residues of malathion and the metabolite malaoxon.

Adequate methods are available for the enforcement of tolerances as presently expressed. The Pesticide Analytical Manual (PAM) Vol. II lists a TLC method, a GLC method with KCl thermionic detection, and a spectrophotometric method as Methods I, II, and III, respectively, for the enforcement of malathion tolerances. The Residue Chemistry Science Chapter of the Malathion Reregistration Standard, dated 7/87, recommends use of the GLC method for tolerance enforcement. When the tolerance expression is revised to include both malathion and malaoxon, new enforcement methodology may be required.

CONCLUSIONS AND RECOMMENDATIONS

In the absence of supporting storage stability data, all conclusions pertaining to the magnitude of the residue in plants listed below are tentative. Cheminova has indicated that a storage stability study is ongoing.

Cherries, sweet

1a. The submitted field residue data (1994; MRID 43078702) indicate that the uncorrected combined residues of malathion and malaoxon were <0.27-2.01 ppm in/on mature sweet cherries harvested 3 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in CA, 4 applications at 8 lb ai/A/application (1x) followed by 2 applications at 1 lb ai/A/application (0.125x); and (ii) in MI and OR, 6 applications at 3.75 lb ai/A/application (≈0.5x).

1b. Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.03-0.18 ppm in/on mature sweet cherries harvested 1 day following the last of 6 foliar applications to established sweet cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment.

1c. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for cherries in tests conducted with sweet cherries according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC (EPA Reg. No. 4787-20) and 9.79 lb/gal RTU (EPA Reg. No. 4787-8) formulations to reflect the use patterns used in the submitted field residue data, no additional field residue data for sweet cherries will be required for reregistration purposes. The available data will support: (i) up to 6 foliar applications per season, with a 7-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 3.75 lb ai/A/application using a ground sprayer; and (ii) up to 6 foliar applications per season, with a 7-day treatment interval and a 1-day PHI, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application using ULV aerial equipment.

Cherries, tart

2a. The submitted field residue data (1994; MRID 43108201) indicate that the uncorrected combined residues of malathion and malaoxon were <1.11-2.62 ppm in/on mature tart cherries harvested 3 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in MI and NY, 6 applications at 3.75 lb ai/A/application (≈0.5x); and (ii) in MT, 3 applications at 8.0 lb ai/A/application (1x) followed by 3 applications at 3.75 lb ai/A/application (≈0.5x).

2b. Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.03-0.48 ppm in/on mature tart cherries harvested 1 day following the last of 6 foliar applications to established tart cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment.

2c. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for cherries in tests conducted with tart cherries according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC (EPA Reg. No. 4787-20) and 9.79 lb/gal RTU (EPA Reg. No. 4787-8) formulations to reflect the use patterns used in the submitted field residue data, no additional field residue data for tart cherries will be required for reregistration purposes. The available data will support: (i) up to 6 foliar applications per season, with a 7-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 3.75 lb ai/A/application using a ground

sprayer; and (ii) up to 6 foliar applications per season, with a 7-day treatment interval and a 1-day PHI, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application using ULV aerial equipment.

Oranges

3a. The submitted field residue data (MRID 43078701) indicate that the uncorrected combined residues of malathion and malaoxon were 0.48-1.91 ppm in/on mature oranges harvested 7 days following the last of 3 foliar applications to established orange orchards, with a 30-day retreatment interval, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application (1x) in 200 gal of water/A using an airblast ground sprayer.

3b. Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.02-0.06 ppm in/on mature oranges harvested 1 day following the last of 10 foliar applications to established orange orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 0.175 lb ai/A/application using aerial ULV equipment with 9.6 oz/A protein hydrolysate bait (1x).

3c. The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for oranges in tests conducted according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC formulation (EPA Reg. No. 4787-20) and SLN Nos. CA820007, CA830012, and FL880001 to reflect the use patterns used in the submitted field residue data, no additional field residue data for oranges will be required for reregistration purposes. The available data will support: (i) up to 3 foliar applications per season, with a 30-day retreatment interval and a 7-day PHI, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application using a ground sprayer; and (ii) up to 10 foliar applications per season, with a 7-day retreatment interval and a 1-day PHI, of the RTU formulation at 0.175 lb ai/A/application plus 9.6 oz/A protein hydrolysate bait using aerial ULV equipment.

Peppers

4a. The submitted field residue data (MRID 43175501) indicate that the uncorrected combined residues of malathion and malaoxon were <0.02-0.09 ppm in/on mature bell peppers harvested 3 days following the last of 5 foliar applications, with a 5-day retreatment interval, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application (1x) in 30 gal of water/A using ground (boom) equipment.

4b. The combined residues of malathion and malaoxon did not

exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for peppers in tests conducted according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC formulation (EPA Reg. No. 4787-20) to reflect the use patterns used in the submitted field residue data, no additional field residue data for peppers will be required for reregistration purposes. The available data will support: (i) up to 5 foliar applications per season, with a 5-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application using ground equipment.

NOTE: Assuming that the registered uses of malathion on the crops listed above are limited to the use patterns employed in the submitted field trials, the currently established tolerances for many raw agricultural commodities may be reduced. However, CBRS recognizes that additional formulations and use patterns are still actively registered by companies other than Cheminova. Issues pertaining to tolerance reassessment will be considered when the reregistration eligibility decision for malathion is determined.

DETAILED CONSIDERATIONS

Residue Analytical Methods

The raw agricultural commodities from the submitted field trials were analyzed for residues of malathion and its malaoxon metabolite using a GLC/flame photometric detection (FPD) method with a detection limit of 0.01 ppm for each compound and designated as: (i) EN-CAS Method No. ENC-7/93 for sweet and tart cherries; (ii) EN-CAS Method No. ENC-4/93 for oranges; and (iii) EN-CAS Method No. ENC-9/93 for peppers. These methods use a DB-5 capillary column and flame photometric detection in the phosphorus mode and are essentially identical to the American Cyanamid Method M-1886 which has been recently proposed for enforcement purposes. Adequate method descriptions as well as acceptable radiovalidation data using samples from an alfalfa metabolism study have been submitted and evaluated (DP Barcode D196878, CBRS No. 12855, R. Perfetti, 2/28/94) for the American Cyanamid Method M-1886. Method M-1886 adequately recovered residues of malathion and malaoxon from samples of alfalfa hay treated with ^{14}C-malathion. The registrant has been required to conduct an independent laboratory validation, in accordance with PR Notice 88-5 dated 7/15/88, before the proposed method can be considered suitable for enforcement purposes.

Method validation and concurrent method recoveries were conducted by EN-CAS Analytical Laboratories, Inc. (Winston-Salem, NC) to determine the suitability of EN-CAS methods for residue data collection purposes. Untreated control samples of RACs from the respective field trials were fortified with malathion and malaoxon at various levels. Apparent residues of malathion and

malaoxon each were nondetectable (<0.01 ppm) in/on all untreated control samples of RACs. Representative chromatograms, sample calculations, and standard curves were provided. The recovery data are presented in Tables 1A and 1B. These data suggest that the EN-CAS methods are adequate for data collection of residues of malathion and malaoxon from cherries (sweet and tart), oranges, and peppers.

Table 1A. Method validation of EN-CAS Methods ENC-7/93, ENC-4/93, and ENC-9/93 using samples of cherries (sweet), oranges, and peppers, respectively, fortified with malathion and malaoxon.

Raw Agricultural Commodity (MRID)	Fortification Level (ppm)	Analyte Fortified	Percent Recovery	
			Malathion	Malaoxon
Cherries, sweet (MRID 43078702)	0.01	Both analytes	55, 76, 83, 91	52, 58, 86, 91
	0.05	Both analytes	76, 84, 84	80, 81, 83
	0.50	Both analytes	79, 86, 90	80, 82, 95
	0.50	Malathion only	82	<0.01
	0.50	Malaoxon only	<0.01	87
Oranges, whole (MRID 43078701)	0.01	Both analytes	84, 91, 92	79, 90, 99
	0.05	Both analytes	80, 88, 89	77, 79, 88
	0.50	Both analytes	71, 82, 89	68, 72, 91
	0.50	Malathion only	77	<0.01
	0.50	Malaoxon only	<0.01	77
Peppers, bell (MRID 43175501)	0.01	Both analytes	66, 67, 74	95, 102, 103
	0.05	Both analytes	70, 71, 71	87, 88, 91
	0.50	Both analytes	85, 88, 92	89, 92, 95
	0.50	Malathion only	78	<0.01
	0.50	Malaoxon only	<0.01	86

Table 1B. Concurrent method recoveries of malathion and its metabolite malaoxon from cherries (sweet and tart), oranges, and peppers fortified with each analyte and analyzed by EN-CAS Methods ENC-7/93, ENC-4/93, and ENC-9/93, respectively.

Raw Agricultural Commodity (MRID)	Fortification Level (ppm)		Percent Recovery	
	Malathion	Malaoxon	Malathion	Malaoxon
Cherries, sweet (MRID 43078702)	0.01	0.01	92	67
	0.05	0.01	79, 86	76, 76
	0.25	0.01	90	70
	0.50	0.05	73, 76	77, 78

	1.00	0.10	62	64
	2.00	0.02	82	76
Cherries, tart (MRID 43108201)	0.01	0.01	92, 98	96, 100
	0.20	0.01	88	120
	0.50	0.05	88, 88	89, 97
	2.00	0.02	79	100
Oranges, whole (MRID 43078701)	0.01	0.01	103	108
	0.10	0.01	82	89
	--	0.01	--	100
	--	0.03	--	83
	0.50	0.05	86, 87, 87, 88, 90	87, 96, 98, 105, 108
	1.00	0.10	84, 86, 90, 90	83, 89, 94, 103
	2.00	0.05	83	94
Peppers, bell (MRID 43175501)	0.01	0.01	78, 82, 134	79, 83, 88
	0.02	0.02	89, 90	79, 95
	0.05	0.05	97	88
	0.50	0.05	93	107
	1.0	0.10	81	90

Storage Stability Data

All samples from the submitted field trials were stored frozen prior to residue analysis. The maximum storage intervals prior to residue analysis of commodities collected from various field trials are presented in Table 2. There are no available data depicting the frozen storage stability of malathion and its metabolite malaoxon in/on the commodities of concern. Therefore, the conclusions regarding the adequacy of the submitted field trials are considered tentative until adequate supporting storage stability data have been submitted and evaluated. The registrant has indicated that a storage stability study is ongoing.

According to the Residue Chemistry Science Chapter to the Malathion Reregistration Standard Guidance Document dated 7/31/87, residues of malathion *per se* are stable in/on frozen plant commodities for up to 6.2 months.

Table 2. Storage intervals prior to residue analysis of commodities collected from various field trials.

Commodity	MRID	Storage Condition	Storage Interval
Cherries, sweet	43078702	-27 to -23 C	0.1.-3.0 months
Cherries, tart	43108201	-27 to -23 C	1.0-2.5 months
Oranges, whole	43078701	-27 to -23 C	1.2-5.8 months
Peppers, bell	43175501	-27 to -23 C	1.1-9.4 months

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Magnitude of the Residue in Plants

Cherries

Established tolerance: A tolerance of 8 ppm has been established for residues of malathion *per se* in/on cherries [40 CFR §180.111].

Use patterns registered to Cheminova: A REFS search, conducted 7/6/94, identified two Cheminova malathion end-use products, a 57% or 5 lb/gal EC formulation (EPA Reg. No. 4787-20 accepted 2/2/89, transferred from EPA Reg. No. 241-47) and a 95% or 9.79 lb/gal RTU formulation (EPA Reg. No. 4787-8 accepted 1/25/91), registered for use on cherries. The 5 lb/gal EC formulation is registered for multiple foliar applications to established cherry orchards at 0.625-0.94 lb ai/100 gal/application, not to exceed 8 lb ai/A/application; a 3-day PHI is in effect. Crop injuries may occur on certain varieties of cherries, particularly in the Northwest. The 9.79 lb/gal RTU formulation is registered for multiple foliar applications to established cherry orchards at 1.22 lb ai/A/application using aerial ULV equipment; a 1-day PHI is in effect. Neither formulation specifies a maximum seasonal rate or the maximum number of applications that may be made per season.

Discussion of the data (sweet cherries): Cheminova Agro A/S submitted data (1994; MRID 43078702) from 6 trials conducted in CA(2), MI(2), and OR(2) depicting the magnitude of the residue of malathion and its metabolite malaoxon in/on sweet cherries. In 3 trials, mature sweet cherry fruits were harvested 3, 7, and 14 days after the final of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in CA, 4 applications were made at 8 lb ai/A/application (1x the maximum registered single application rate for this formulation and use pattern) followed by 2 applications at 1 lb ai/A/application (0.125x); and (ii) in MI and OR, 6 applications were made at 3.75 lb ai/A/application (≈0.5x).

In another 3 trials, mature sweet cherry fruits were harvested 1, 4, 7, and 14 days after the last of 6 foliar applications, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation to established sweet cherry orchards using aerial ULV equipment at 1.22 lb ai/A/application (1x the maximum registered single application rate for this formulation and use pattern). Adequate raw data pertaining to field trial information, application of the test substances, and sample handling procedures were provided.

Intervals from sampling to shipment, homogenization, extraction, and analysis were provided for each test. The harvested treated and untreated sweet cherries were frozen within 0.75-4 hours of collection and shipped frozen to the analytical laboratory (EN-CAS Laboratory, Winston-Salem, NC). At the analytical laboratory, samples were stored frozen (-27 to -23 C) for 3-88 days prior to homogenization and subsampling. Following subsampling, samples were returned to the freezer. The intervals between harvest and residue analysis were 4-91 days (0.1-3.0 months); samples were analyzed within 6 days of extraction. Residues in/on treated and untreated pitted sweet cherries were determined using EN-CAS Method No. ENC-

7/93. The results of the sweet cherry field trials are presented in Table 3. Apparent residues of malathion and malaoxon were nondetectable (<0.01 ppm each) in/on three untreated control samples.

Geographic representation is adequate since the test states of CA(24%), MI(15%), and OR(26%) accounted for ≈70% of the 1991 U.S. sweet cherry production *(1992 USDA Agricultural Statistics; p. 185)*.

The submitted field residue data (1994; MRID 43078702) indicate that the uncorrected combined residues of malathion and malaoxon were <0.27-2.01 ppm in/on mature sweet cherries harvested 3 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation using a ground sprayer and the following use patterns: (i) in CA, 4 applications at 8 lb ai/A/application (1x) followed by 2 applications at 1 lb ai/A/application (0.125x); and (ii) in MI and OR, 6 applications at 3.75 lb ai/A/application (≈0.5x).

Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.03-0.18 ppm in/on mature sweet cherries harvested 1 day following the last of 6 foliar applications to established sweet cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment.

The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion per se) of 8 ppm for cherries in tests conducted with sweet cherries according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC (EPA Reg. No. 4787-20) and 9.79 lb/gal RTU (EPA Reg. No. 4787-8) formulations to reflect the use patterns used in the submitted field residue data, no additional field residue data for sweet cherries will be required for reregistration purposes. The available data will support: (i) up to 6 foliar applications per season, with a 7-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 3.75 lb ai/A/application using a ground sprayer; and (ii) up to 6 foliar applications per season, with a 7-day treatment interval and a 1-day PHI, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application using ULV aerial equipment.

Table 3. Residues of malathion and its metabolite malaoxon found in/on sweet cherries following multiple foliar applications of the 5 lb/gal EC and 9.79 lb/gal RTU formulations. Shading represents results from tests conducted according to registered use patterns.

Formulation	Application Parameters	Trial Site	Uncorrected Residues (ppm)		
			Malathion	Malaoxon	Combined
5 lb/gal EC	In CA, 4 foliar applications, with a 7-day retreatment interval, at 8 lb ai/A/application (1x) followed by 2 applications at 1 lb ai/A/application (0.125x) in 60 gal/A of water using an airblast ground sprayer. In MI and OR, 6 applications, with a 7-day retreatment interval, at 3.75 lb ai/A/application (≈0.5x) in 60 gal of water/A using an airblast ground sprayer.	**3-Day PHI**			
		CA	0.39, 0.60, 1.60, 2.00	0.01, 0.01, 0.01, 0.01	0.40, 0.61, 1.61, 2.01
		MI	0.26	<0.01	<0.27
		OR	0.39, 0.50	<0.01, <0.01	<0.40, <0.51
		7-Day PHI			
		CA	0.24	<0.01	<0.25
		MI	0.05	<0.01	<0.06
		OR	0.51	<0.01	<0.52
		14-Day PHI			
		CA	0.09	<0.01	<0.10
		MI	<0.01	<0.01	<0.02
		OR	0.05	<0.01	0.06
9.79 lb/gal RTU	6 foliar applications, with a 7-day retreatment interval, at 1.22 lb ai/A/application (1x) using aerial ULV equipment.	**1-Day PHI**			
		CA	0.08	<0.01	<0.09
		MI	0.02	<0.01	<0.03
		OR	0.17	<0.01	<0.18
		4-Day PHI			
		CA	0.13	<0.01	<0.14

MI	<0.01	<0.01	<0.02
OR	0.06	<0.01	<0.07
7-Day PHI			
CA	0.19	<0.01	<0.20
MI	<0.01	<0.01	<0.02
OR	0.05	<0.01	<0.06
14-Day PHI			
CA	0.09	<0.01	<0.10
MI	<0.01	<0.01	<0.02
OR	0.03	<0.01	<0.04

Discussion of the data (tart cherries): Cheminova Agro A/S submitted data (1994; MRID 43108201) from 6 trials conducted in MI(2), MT(2), and NY(2) depicting the magnitude of the residue of malathion and its metabolite malaoxon in/on tart cherries. In 3 trials, mature tart cherry fruits were harvested 3, 7, and 14 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in MI and NY, 6 applications were made at 3.75 lb ai/A/application (≈0.5x); and (ii) in MT, 3 applications were made at 8 lb ai/A/application (1x) followed by 3 applications at 3.75 lb ai/A/application (≈0.5x).

In another 3 trials, mature tart cherry fruits were harvested 1, 4, 7, and 14 days following the last of 6 foliar applications to established sweet cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment. Adequate raw data pertaining to field trial information, application of the test substances, and sample handling procedures were provided.

Intervals from sampling to shipment, homogenization, extraction, and analysis were provided for each test. The harvested treated and untreated tart cherries were frozen within 15-75 minutes of collection and shipped frozen to the analytical laboratory (EN-CAS Laboratory, Winston-Salem, NC). At the analytical laboratory, samples were stored frozen (-27 to -23 C) prior to residue analysis. The intervals between harvest and residue analysis were 30-74 days (1.0-2.5 months); samples were analyzed within 6 days of extraction. Residues in/on treated and untreated pitted tart cherries were determined using EN-CAS Method No. ENC-7/93. The results of the tart cherry field trials are presented in Table 4. Apparent residues of malathion and malaoxon were nondetectable (<0.01 ppm each) in/on three untreated control samples.

Geographic representation is adequate since the test states of MI(58%) and NY(13.4%) accounted for ≈71% of the 1991 U.S. tart cherry production *(1992 USDA Agricultural Statistics; p. 185)*.

Table 4. Residues of malathion and its metabolite malaoxon found in/on tart cherries following multiple foliar applications of the 5 lb/gal EC and 9.79 lb/gal RTU formulations. Shading represents results from tests conducted according to registered use patterns.

Formulation	Application Parameters	Trial Site	Uncorrected Residues (ppm)		
			Malathion	Malaoxon	Combined
5 lb/gal EC	In MI and NY, 6 applications, with a 7-day retreatment interval, at 3.75 lb ai/A/application (≈0.5x) in 60 gal of water/A using an airblast ground sprayer. In MT, 3 applications, with a 7-day retreatment interval, at 8 lb ai/A/application (1x) followed by 3 applications at 3.75 lb ai/A/application (≈0.5x) in 60 gal of water/A using an airblast ground sprayer.	**3-Day PHI**			
		MI	2.6	0.02	2.62
		MT	1.6	<0.01	<1.61
		NY	1.1	<0.01	<1.11
		7-Day PHI			
		MI	0.41	<0.01	<0.42
		MT	0.43	<0.01	<0.44
		NY	0.03	<0.01	<0.04
		14-Day PHI			
		MI	0.05	<0.01	<0.06
		MT	0.18	<0.01	<0.19
		NY	<0.01	<0.01	<0.02
9.79 lb/gal RTU	6 foliar applications, with a 7-day retreatment interval, at 1.22 lb ai/A/application (1x) using aerial ULV equipment.	**1-Day PHI**			
		MI	0.02, 0.03	<0.01, <0.01	<0.03, <0.04
		MT	0.47	<0.01	<0.48
		NY	0.34	<0.01	<0.35
		4-Day PHI			
		MI	0.02	<0.01	<0.03
		MT	0.23	<0.01	<0.24

NY	0.42	<0.01	<0.43
7-Day PHI			
MI	0.01	<0.01	<0.02
MT	0.13	<0.01	<0.14
NY	<0.01	<0.01	<0.02
14-Day PHI			
MI	<0.01	<0.01	<0.02
MT	0.05	<0.01	<0.06
NY	<0.01	<0.01	<0.02

The submitted field residue data (1994; MRID 43108201) indicate that the uncorrected combined residues of malathion and malaoxon were <1.11-2.62 ppm in/on mature tart cherries harvested 3 days after the last of multiple foliar applications, with a 7-day retreatment interval, of the 5 lb/gal EC formulation in 60 gal of water/A using an airblast ground sprayer and the following use patterns: (i) in MI and NY, 6 applications at 3.75 lb ai/A/application (≈0.5x); and (ii) in MT, 3 applications at 8.0 lb ai/A/application (1x) followed by 3 applications at 3.75 lb ai/A/application (≈0.5x).

Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.03-0.48 ppm in/on mature tart cherries harvested 1 day following the last of 6 foliar applications to established tart cherry orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application (1x) using aerial ULV equipment.

The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for cherries in tests conducted with tart cherries according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC (EPA Reg. No. 4787-20) and 9.79 lb/gal RTU (EPA Reg. No. 4787-8) formulations to reflect the use patterns used in the submitted field residue data, no additional field residue data for tart cherries will be required for reregistration purposes. The available data will support: (i) up to 6 foliar applications per season, with a 7-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 3.75 lb ai/A/application using a ground sprayer; and (ii) up to 6 foliar applications per season, with a 7-day treatment interval and a 1-day PHI, of the 9.79 lb/gal RTU formulation at 1.22 lb ai/A/application using ULV aerial equipment.

Oranges

Established tolerance: A tolerance of 8 ppm has been established for residues of malathion *per se* in/on oranges [40 CFR §180.111].

Use patterns registered to Cheminova: A REFS search, conducted 7/6/94, identified one Cheminova malathion end-use product, a 57% or 5 lb/gal EC formulation (EPA Reg. No. 4787-20 accepted 2/2/89, transferred from EPA Reg. No. 241-47), registered for use on oranges. The 5 lb/gal EC formulation is registered for multiple foliar applications to established orange orchards at 0.625-1.25 lb ai/100 gal/application, not to exceed 500 gal of water/A. A 7-day PHI is in effect. The label does not specify a maximum seasonal rate or the maximum number of applications that may be made per season.

Other registered use patterns: The current submission contains specimen labels of the following three FIFRA § 24(c) registrations which Cheminova intends to support: **(i) CA820007**: the 91% or 9.33 lb/gal RTU formulation is registered for multiple foliar applications to established orange orchards in CA using ground or aerial ULV equipment at 0.44-0.66 lb ai/A/application (with 1 lb/A yeast hydrolysate or 1 qt/A Sauce Base No. 2); a

3-day PHI is in effect; **(ii) CA830012**: various formulations (including the 9.33 lb/gal RTU) are registered for multiple foliar applications to established orange orchards in CA at 0.175 lb ai/A/application (with 9.6 fl. oz protein bait/A) with a retreatment interval of 6-14 days using ground (up to 39.9 gal of water/A) or aerial ULV (up to 2.9 gal of water/A) equipment; a 1-day PHI is in effect; and **(iii) FL880001**: the 91% or 9.33 lb/gal RTU formulation is registered for multiple foliar applications to established citrus orchards in FL at 0.175 lb ai/A/application (with 9.6 fl. oz protein bait/A) with a retreatment interval of 7-10 days using aerial ULV equipment; no PHI is in effect. None of the above SLN labels specify a maximum seasonal rate or the maximum number of applications that may be made per season.

Discussion of the data: Cheminova Agro A/S submitted data (1994; MRID 43078701) from 12 trials conducted in CA(6) and FL(6) depicting the magnitude of the residue of malathion and its metabolite malaoxon in/on oranges. In 6 trials, mature oranges were harvested 7 and 14 days following the last of 3 foliar applications to commercial and established orange orchards, with a 30-day retreatment interval, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application in 200 gal of water/A using an airblast ground sprayer (1x the maximum registered single application rate for this formulation and use pattern). In another 6 trials, mature oranges were harvested 1, 7, and 14 days following the last of 10 foliar applications to commercial and established orange orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 0.175 lb ai/A/application plus 9.6 oz/A protein hydrolysate bait using aerial ULV equipment (1x the maximum registered single application rate for this formulation and use pattern). Adequate raw data pertaining to field trial information, application of the test substances, and sample handling procedures were provided.

Intervals from sampling to shipment, homogenization, extraction, and analysis were provided for each test. The harvested treated and untreated oranges were frozen within 4-8 hours of collection and shipped frozen to the analytical laboratory (EN-CAS Laboratory, Winston-Salem, NC). At the analytical laboratory, samples were stored frozen (-27 to -23 C) for 24-113 days prior to homogenization and subsampling. Following subsampling, samples were returned to the freezer. The intervals between harvest and residue analysis were 36-175 days (1.2-5.8 months); samples were analyzed within 5 days of extraction. Residues in/on treated and untreated whole oranges were determined using EN-CAS Method No. ENC-4/93. The results of the orange field trials are presented in Table 5. Apparent residues of malathion and malaoxon were nondetectable (<0.01 ppm each) in/on seven untreated control samples.

Geographic representation is adequate since the test states of CA(28%) and FL(71%) accounted for virtually all (99%) of the 1991 U.S. orange production *(1992 USDA Agricultural Statistics; p. 189)*.

Table 5. Residues of malathion and its metabolite malaoxon found in/on oranges following multiple foliar applications of the 5 lb/gal EC and 9.79 lb/gal RTU formulations. Shading represents results from tests conducted according to registered use patterns.

Formulation	Application Parameters	Trial Site	Uncorrected Residues (ppm)		
			Malathion	Malaoxon	Combined

5 lb/gal EC	3 foliar applications, with a 30-day retreatment interval, at 6.25 lb ai/A/application (1x) in 200 gal/A of water using an airblast ground sprayer.	**7-Day PHI**		
		CA1	1.90	<0.01	<1.91
		CA2	1.30	0.02	1.32
		CA3	0.46 [a]	0.02	0.48
		FL1	1.00	0.02 [a]	1.02
		FL2	0.75	<0.01	<0.76
		FL3	0.79	0.02	0.81
		14-Day PHI		
		CA1	2.40	0.01	2.41
		CA2	0.50	0.02	0.52
		CA3	0.43	0.02	0.45
		FL1	0.64	0.03 [a]	0.67
		FL2	0.26	<0.01	<0.27
		FL3	0.40	0.01	0.41
9.79 lb/gal RTU	10 foliar applications, with a 7-day retreatment interval, at 0.175 lb ai/A/application with 9.6 oz/A protein hydrolysate bait (1x) using aerial ULV equipment.	**1-Day PHI**		
		CA1	0.03	<0.01	<0.04
		CA2	0.03	<0.01	<0.04
		CA1	0.05	<0.01	<0.06
		FL1	0.02	0.01	0.03
		FL2	<0.01	<0.01	<0.02
		FL3	<0.01	<0.01	<0.02
		7-Day PHI		
		CA1	<0.01	<0.01	<0.02
		CA2	0.02	<0.01	<0.03
		CA1	0.08	<0.01	<0.09
		FL1	<0.01	<0.01	<0.02
		FL2	<0.01	<0.01	<0.02
		FL3	<0.01	<0.01	<0.02
		14-Day PHI		
		CA1	<0.01	<0.01	<0.02
		CA2	0.03	<0.01	<0.04
		CA1	0.02	<0.01	<0.03
		FL1	0.01	<0.01	<0.02
		FL2	<0.01	<0.01	<0.02
		FL3	<0.01	<0.01	<0.02

[a] The highest value from multiple analyses of a sample.

The submitted field residue data (MRID 43078701) indicate that the uncorrected combined residues of malathion and malaoxon were 0.48-1.91 ppm in/on mature oranges harvested 7 days following the last of 3 foliar applications to established orange orchards, with a 30-day retreatment interval, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application (1x) in 200 gal of water/A using an airblast ground sprayer.

Additional data from this submission indicate that the uncorrected combined residues of malathion and malaoxon were <0.02-0.06 ppm in/on mature oranges harvested 1 day following the last of 10 foliar applications to established orange orchards, with a 7-day retreatment interval, of the 9.79 lb/gal RTU formulation at 0.175 lb ai/A/application using aerial ULV equipment with 9.6 oz/A protein hydrolysate bait (1x).

The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for oranges in tests conducted according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC formulation (EPA Reg. No. 4787-20) and SLN Nos. CA820007, CA830012, and FL880001 to reflect the use patterns used in the submitted field residue data, no additional field residue data for oranges will be required for reregistration purposes. The available data will support: (i) up to 3 foliar applications per season, with a 30-dy retreatment interval and a 7-day PHI, of the 5 lb/gal EC formulation at 6.25 lb ai/A/application using a ground sprayer; and (ii) up to 10 foliar applications per season, with a 7-day retreatment interval and a 1-day PHI, of the RTU formulation at 0.175 lb ai/A/application plus 9.6 oz/A protein hydrolysate bait using aerial ULV equipment.

Peppers

Established tolerance: A tolerance of 8 ppm has been established for residues of malathion *per se* in/on peppers [40 CFR §180.111].

Use patterns registered to Cheminova: A REFS search, conducted 7/6/94, identified one Cheminova malathion end-use product, a 57% or 5 lb/gal EC formulation (EPA Reg. No. 4787-20 accepted 2/2/89, transferred from EPA Reg. No. 241-47), registered for use on peppers. The 5 lb/gal EC formulation is registered for multiple foliar applications to peppers at 0.625-1.56 lb ai/A/application in a minimum of 30 gal of water/A using ground equipment or in 5 gal of water/A using aerial equipment. A 3-day PHI is in effect. The label does not specify a maximum seasonal rate or the maximum number of applications that may be made per season.

Discussion of the data: Cheminova Agro A/S submitted data (1994; MRID 43175501) from 8 trials conducted in CA(2), FL(2), MI(1), NC(1), NJ(1), and TX(1) depicting the magnitude of the residue of malathion and its metabolite malaoxon in/on bell peppers. Mature peppers were harvested 3, 7, and 14 days following the last of 5 foliar applications, with a 5-day retreatment interval, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application in 30 gal of water/A using ground (boom) equipment (1x the maximum registered single application rate for this

formulation and use pattern). The first application was made when pepper plants were in the late bloom stage (≈15-20 inches in height) and bearing early maturing peppers.

Intervals from sampling to shipment, homogenization, extraction, and analysis were provided for each test. The harvested treated and untreated peppers were frozen within 0.17-4 hours of collection and shipped frozen to the analytical laboratory (EN-CAS Laboratory, Winston-Salem, NC). At the analytical laboratory, samples were stored frozen (-27 to -23 C). The intervals between harvest and residue analysis were 33-283 days (1.1-9.4 months); samples were analyzed within 3 days of extraction. Residues in/on treated and untreated peppers were determined using EN-CAS Method No. ENC-9/93. The results of the pepper field trials are presented in Table 6. Apparent residues of malathion and malaoxon were nondetectable (<0.01 ppm each) in/on eight untreated control samples.

Geographic representation is adequate since the test states of CA(18%), FL(23%), MI(3%), NC(10%), NJ(7%), and TX(16%) accounted for ≈80% of the 1982 U.S. sweet pepper production *(1982 Census of Agriculture, Vol. 1, Part 151, p. 350)*.

The submitted field residue data (MRID 43175501) indicate that the uncorrected combined residues of malathion and malaoxon were <0.02-0.09 ppm in/on mature bell peppers harvested 3 days following the last of 5 foliar applications, with a 5-day retreatment interval, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application (1x) in 30 gal of water/A using ground (boom) equipment.

The combined residues of malathion and malaoxon did not exceed the established tolerance (presently expressed as malathion *per se*) of 8 ppm for peppers in tests conducted according to the use patterns described above. Provided that label revisions are made for the 5 lb/gal EC formulation (EPA Reg. No. 4787-20) to reflect the use patterns used in the submitted field residue data, no additional field residue data for peppers will be required for reregistration purposes. The available data will support: (i) up to 5 foliar applications per season, with a 5-day retreatment interval and a 3-day PHI, of the 5 lb/gal EC formulation at 1.56 lb ai/A/application using ground equipment.

Table 6. Residues of malathion and its metabolite malaoxon found in/on bell peppers following multiple foliar applications of the 5 lb/gal EC formulation. Shading represents results from tests conducted according to registered use patterns.

Formulation	Application Parameters	Trial Site	Uncorrected Residues (ppm)		
			Malathion	Malaoxon	Combined
5 lb/gal EC	5 foliar applications, with a 5-day retreatment interval, at 1.56 lb ai/A/application (1x) in 30 gal of water/A using ground (boom) equipment.	**3-Day PHI**			
		CA1	0.06 [a]	<0.01	<0.07
		CA2	0.08	<0.01	<0.09
		FL1	<0.01	<0.01	<0.02
		FL2	<0.01	<0.01	<0.02
		MI1	0.02 [a]	<0.01	<0.03
		NC1	<0.01	<0.01	<0.02
		NJ1	<0.01	<0.01	<0.02
		TX1	<0.01	<0.01	<0.02
		7-Day PHI			
		CA1	<0.01	<0.01	<0.02
		CA2	<0.01	<0.01	<0.02
		FL1	<0.01	<0.01	<0.02
		FL2	<0.01	<0.01	<0.02
		MI1	<0.01	<0.01	<0.02
		NC1	<0.01	<0.01	<0.02
		NJ1	<0.01	<0.01	<0.02
		TX1	<0.01	<0.01	<0.02
		14-Day PHI			
		CA1	<0.01	<0.01	<0.02
		CA2	<0.01	<0.01	<0.02
		FL1	<0.01	<0.01	<0.02
		FL2	<0.01	<0.01	<0.02
		MI1	<0.01	<0.01	<0.02
		NC1	<0.01	<0.01	<0.02
		NJ1	<0.01	<0.01	<0.02
		TX1	<0.01	<0.01	<0.02

[a] The highest value from multiple analyses of a sample.

EPA MEMORANDA CITED IN THIS REVIEW

CBRS No.: 12855
DP Barcode: D196878
Subject: Response to the Malathion Reregistration Standard: Radiovalidation of method in plants.
From: R. Perfetti
To: L. Rossi
Dated: 2/28/94
MRID(s): 42894601

MASTER RECORD IDENTIFICATION NUMBERS

Citations for the MRID document referred to in this review are presented below.

43078701 Bookbinder, M. (1994) Magnitude of the residue of malathion and its metabolite malaoxon in/on oranges harvested after ground and aerial treatment. AASI Study No. AA920117. EN-CAS Project No. 92-0058. Unpublished study conducted by American Agricultural Services, Inc., Cary, NC and EN-CAS Analytical Laboratories, Inc., Winston-Salem, NC., and submitted by Jellinek, Schwartz & Connolly, Inc., Washington, D.C. for Cheminova Agro A/S. 897 p.

43078702 Bookbinder, M. (1994) Magnitude of the residue of malathion and its metabolite malaoxon in/on sweet cherries harvested after ground and aerial treatment. AASI Study No. AA920128. EN-CAS Project No. 92-0040. Unpublished study conducted by American Agricultural Services, Inc., Cary, NC and EN-CAS Analytical Laboratories, Inc., Winston-Salem, NC., and submitted by Jellinek, Schwartz & Connolly, Inc., Washington, D.C. for Cheminova Agro A/S. 596 p.

43108201 Bookbinder, M. (1994) Magnitude of the residue of malathion and its metabolite malaoxon in/on tart cherries harvested after ground and aerial treatment. AASI Study No. AA920106. EN-CAS Project No. 92-0053. Unpublished study conducted by American Agricultural Services, Inc., Cary, NC and EN-CAS Analytical Laboratories, Inc., Winston-Salem, NC., and submitted by Jellinek, Schwartz & Connolly, Inc., Washington, D.C. for Cheminova Agro A/S. 611 p.

43175501 Bookbinder, M. (1994) Magnitude of the residue of malathion and its metabolite malaoxon in/on bell peppers harvested after ground treatment. AASI Study No. AA920118. EN-CAS Project No. 92-0032. Unpublished study conducted by American Agricultural Services, Inc., Cary, NC and EN-CAS Analytical Laboratories, Inc., Winston-Salem, NC., and submitted by Jellinek, Schwartz & Connolly, Inc., Washington, D.C. for Cheminova Agro A/S. 626 p.