3-9-89
R.F.

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

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MAR 9 1989

MEMORANDUM

SUBJECT: PP#8E3688/8H5566: Request of Tolerances for Vinclozolin (Ronilan®) in/on Greenhouse-grown Cucumbers and Tomatoes Imported from Spain and The Netherlands. Evaluation of Analytical Method and Residue Data (Acc. #408261-1, 2, 3 and 4; DEB #4452 and 4453).

FROM: W. T. Chin, Ph. D., Chemist
Tolerance Petition Section III
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

THRU: Philip V. Errico, Section Head
Tolerance Petition Section III
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

TO: Lois A. Rossi, PM #21
Heroicide-Fungicide Branch
Registration Division (TS-767)

and

Toxicology Branch
Hazard Evaluation Division (TS-769)

BACKGROUND

On 11/23/83 and in connection with PP#4E2998, BASF Corporation requested tolerances for combined residues of the fungicide vinclozolin (Ronilan®), 3-(3,5-dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione, and its metabolites containing the 3,5-dichloroaniline moiety in or on the raw agricultural commodities cucumbers and tomatoes at 1 and 2 ppm, respectively. These tolerances were originally requested to allow the import of these crops into the U. S. A. from European countries where Ronilan® was used on greenhouse-grown cucumbers and tomatoes. The Agency has requested BASF to submit additional residue data and propose a food additive tolerance for processed tomato commodities (see J. H. Onley's 3/30/84 memo). The petitioner withdrew these requests on 1/12/87 because of administrative reasons.

CURRENT CONSIDERATIONS

With a cover letter dated 8/3/88, BASF re-submitted the above requests plus the requests of a food additive tolerance on tomato paste at 6.0 ppm and feed additive tolerances on wet and dry tomato pomace at 22 and 67 ppm, respectively. To support these requests, BASF also submitted the following documents for review:

1. Magnitude of the Residue of Vinclozolin and Metabolites in Cucumber Samples from Spain (May, 1988; Acc. #408261-1).

2. Magnitude of the Residue of Vinclozolin and Metabolites in Tomato Samples from Spain (May, 1988; Acc. #408261-2).

3. Magnitude of the Residue of Vinclozolin and Metabolites in Cucumber Samples from The Netherlands (May, 1988; Acc. #408261-3).

4. Magnitude of the Residue of Vinclozolin and Metabolites in Tomato Process Fractions (May, 1988; Acc. #408261-4).

Tolerances have already been established under 40 CFR 180.380 for residues of vinclozolin and its metabolites in/on kiwifruit (10 ppm), lettuce, head (10 ppm), peppers (bell, 3 ppm), stonefruits (25 ppm) and strawberries (10 ppm). Several other tolerances are pending in connections with PP#1E2457, #4E2998, #3F2934, PP#5F3237/7H5531 and FAP#5H5462.

Vinclozolin has not yet been the subject of Registration Standard.

CONCLUSIONS

1a. The nature of residue in tomatoes and cucumbers is adequately understood based on the metabolism studies on other crops. Parent compound and its metabolites containing the 3,5-dichloroaniline moiety are the residues of concern.

1b. The nature of residue in animals is not adequately understood and more metabolism studies are requested in connection with PP#5F3237/FAP#5H5465. However, with the petitioner's assurance that the greenhouse-grown tomatoes are not diverted to processing in Spain and The Netherlands, EDB can conclude that there are no expectations for secondary residues of vinclozolin and its metabolites occuring in animal commodities as a result of these proposed greenhouse use. Therefore, we will not be concerned with secondary residues in meat and diary products imported from these two countries.

2. Adequate analytical methodology is available in PAM II to enforce the proposed tolerances.

3. The residue data of greenhouse-grown and Ronilan®-treated cucumbers and tomatoes from both The Netherlands and Spain are adequate to support the proposed tolerances.

4a. The petitioner should submit a letter to the Agency verifying that greenhouse grown tomatoes in Spain and The Netherlands are not diverted to processing. With this assurance, we can conclude that there is no need to establish tolerances on tomato processed commodities. Therefore, the petitioner is advised to revise Section F deleting the requests for food and feed additive tolerances along with their memo that greenhouse grown tomatoes in Spain and The Netherlands are not diverted to processing.

4b. If these proposed uses on tomatoes and cucumbers expand to other countries, additional residue data generated from those countries will be necessary.

4c, Also, if these uses expand to applications on field grown tomatoes, the petitioner should submit requests for appropriate food and feed additive tolerances, residue data reflecting the field uses, animal metabolism and feeding studies and appropriate tolerances for meat, milk, poultry and eggs, if necessary.

5. There are no Mexican and Canadian tolerances established for vinclozolin in tomatoes and cucumbers. Codex's 1 ppm limit for cucumbers is in harmony with this requested tolerance. Codex is presently considering a 3 ppm tolerance on tomatoes at level 7. We can recommend harmonizing with Codex, if the petitioner wishes to revise Section F raising the requested tolerance on tomatoes from 2 to 3 ppm.

RECOMMENDATIONS

With a memo from the petitioner stating that greenhouse-grown tomatoes in Spain and The Netherlands are not diverted to processing, a revised Section F raising the requested tolerance on tomatoes to 3 ppm and deleting the requests for food and feed additive tolerances, and TOX considerations permitting, DEB can recommend for the requested tolerances for the combined residues of the fungicide vinclozolin and its metabolites in or on the greenhouse-grown cucumbers and tomatoes at 1 and 3 ppm, respectively, imported from Spain and The Netherlands only.

A NOTE TO PM

When these import tolerances are established, DEB recommends that they be listed under a separate sub-section of 40 CFR 180.380 for imported tolerances.

DETAILED CONSIDERATIONS

Manufacture Process

A description for the manufacturing process of technical vinclozolin and a list of impurities in the technical product were favorably reviewed in detail in connection with PP#9F2205 (see M. Nelson's 7/23/79 memo) and PP#8G2068 (see G. Makhijani's 1/19/79 memo). DEB concluded that the impurities in vinclozolin technical are not expected to cause a residue problem at the levels present.

Formulation

The proposed formulation is Ronilan® Fungicide (50W), a wettable powder containing 50% active ingredient by weight (EPA Reg. No. 7969-53). Review of inerts is now under the preview of Registration Division.

Proposed Use

Vinclozolin is a contact fungicide for the control of Botrytis Sclerotinia and Monilia in horticultural crops, flowers and ornamentals. The labels in English translation contain many uses of Ronilan® Fungicide (50W) on different crops. In this review, only uses on the greenhouse-grown tomatoes and cucumbers treated in Spain and The Netherlands are considered. The proposed uses are cited below:

1. In The Netherlands: From observing initial incidence, spray regularly. At low disease pressure, treatments may be delayed from 2 to 3 weeks. If conditions are conductive to disease development, it is recommended to spray at 7 to 10 day intervals. Dosage: 0.05% (50 g/100 liters of water). A 3-day PHI is imposed for both crops.

2. In Spain: The treatments are made from the beginning of blossoming at intervals that depend on the climatic conditions and the degree of infection. When spraying at very short intervals, use always the lower rate. Dosage: Apply 50 to 100 grams of Ronilan® Fungicide (50W) per 100 liters of water and use 1,000 liters of spraying mixture per hectare. A 15-day PHI is imposed for both crops.

Nature of the Residue in Plants

No new plant metabolism studies are submitted with this petition. However, reports of metabolism studies using carbon-14 uniformly ring-labeled vinclozolin on strawberries, grapes, peaches, lettuce and peanut were submitted and reviewed in detail in connection with PP#8G2068, PP#9G2204 and PP#5F3237/FAP# 5H5465 (see G. Makhijani's 1/19/79, B. Davis's 1/18/80 and M. P. Firestone's 6/28/85 memos).

Results of these metabolism studies indicated that parent compound and its metabolites containing the 3,5-dichloroaniline moiety are the major residues of concern. DEB considers that the metabolic pattern of vinclozolin in tomatoes and cucumbers are similar to that in the plants studied. Therefore, DEB concludes that the nature of the residue of vinclozolin in these two crops is adequately understood.

Nature of the Residue in Animals

No new animal metabolism studies are submitted with this petition. The animal metabolism studies of vinclozolin in goats and hens were reviewed in detail in connection with PP#5F3237/FAP#5H5465. DEB has concluded that the nature of the residue in animals is not adequately understood and more metabolism studies are requested (see M. P. Firestone's 6/28/85 memo). However, with the petitioner's assurance that the greenhouse-grown tomatoes are not diverted to processing in to processing in Spain and The Netherlands, EDB can conclude that there are no expectations for secondary residues of vinclozolin and its metabolites occuring in animal commodities as a result of these proposed greenhouse use. Therefore, we will not be concerned with secondary residues in meat and diary products imported from these two countries.

Analytical Methodology

The method used to generate residue data is BASF's Metnod No. 182 which has been successfully passed a method trial in connection with PP#9F2205 (see G. Makhijani's 9/7/79 memo). Briefly: Crop samples are hydrolyzed with alkaline to convert vinclozolin and its metabolites to 3,5-dichloroaniline which is quantitatively isolated by steam distillation. Following partition extraction, the residue is acylated, determined with a GC equipped with an electron capture detector, and expressed in terms of vinclozolin equivalents. The sensitivity of this method is 0.05 ppm. An average recovery of 70% was reported over the range of 0.3 to 4.0 ppm fortifications. Adequate examples of calculations and chromatograms were given. DEB, therefore, concludes that this method is adequate. Enforcement methods are available in PAM II.

Storage Stability Data

No storage stability data are submitted with this petition. However, available data on strawberries and stonefruits were submitted and reviewed in connection with PP# 9F2205 and PP#9G2204, respectively. Results indicated that under frozen conditions, vinclozolin residues are stable for more than 19 months. All the samples used to support this re-submission were kept under frozen conditions and analyzed within 4 months after harvest.

Residue Data

Before BASF withdrew their tolerance requests for vinclozolin in or on greenhouse-grown tomatoes and cucumbers in connection with PP#4E2998 on 1/12/87, the petitioner had submitted the following residue data which were reviewed by DEB in detail:

Acc. #072159 ..... see J. H. Onley's 3/30/84 memo
Acc. #072841 and #262186..... see C. Deyrup's 10/17/84, 7/22/86, 11/17/86 and 3/16/87 memos

In all the above reviews, DEB concluded that the residue data submitted were not adequate to support the proposed tolerances and additional residue data were requested. In the current review, the new residue data submitted in Acc. No. 408261-1, -2, -3 and -4 are considered below:

CUCUMBERS

Residues in Greenhouse-Grown Cucumbers From Spain (Acc. #408261-1)

Seven greenhouse trials were conducted in 1987 with 1 to 7 applications. Depending on growth stage of cucumber plants, the application rates were raised from 0.32 to 1.00 kg ai/ha (=0.28 to 0.89 lb ai/A). Samples were harvested at normal maturity at PHI's varied from 7 to 63 days and kept under frozen condition until analyzed. Results are summarized in Table 1:

Table 1. Vinclozolin Residues in Greenhouse-Grown Cucumbers (Spain, 1987)

Number of Treatments	Treatment Dates and Rates (kg ai/ha)							PHI (Days)	Vinclozolin Equi. (ppm)
	9/10	9/23	10/1	10/9	10/20	10/29	11/5		
7	0.32	0.38	0.75	0.79	0.80	1.00	1.00	7	0.67
6	0.32	0.38	0.75	0.79	0.80	1.00	-	14	0.23
5	0.32	0.38	0.75	0.79	0.80	-	-	23	0.15
4	0.32	0.38	0.75	0.79	-	-	-	34	<0.05
3	0.32	0.38	0.75	-	-	-	-	42	<0.05
2	0.32	0.38	-	-	-	-	-	50	<0.05
1	0.32	-	-	-	-	-	-	63	<0.05
Untreated	-	-	-	-	-	-	-	-	<0.05

Residues in/on Greenhouse-Grown Cucumbers from The Netherlands (Acc. #408261-3)

Four greenhouse trials were conducted in four replications each in 1987. Two trials were treated three times and the other two trials were treated four times at a rate of 1.25 kg ai/ha (=1.12 lb ai/A). Samples were harvested at normal maturity at a PHI of three days and kept frozen until analyzed. Results are summarized in Table 2:

Table 2. Vinclozolin Residues in Greenhouse-Grown Cucumbers (The Netherland,1987)

Number of Treatments	Treatment Dates and Rates (kg ai/ha) 8/14	8/21	8/27	8/28	8/31	9/4	9/11	9/18	PHI (Days)	Vinclozolin Equi. (ppm)
3	1.25	1.25	-	1.25	-	-	-	-	3	0.27
3	-	-	1.25	-	-	1.25	1.25	-	3	0.26
4	-	-	1.25	-	-	1.25	1.25	1.25	3	0.26
4	-	-	1.25	-	-	1.25	1.25	1.25	3	0.26
Untreated	-	-	-	-	-	-	-	-	-	<0.05

DEB's Comments

1. Residue data shown in Table 1 indicate that, in Spain, at a maximum of six applications per season and at rates of 0.32 to 1.00 kg ai/ ha with a PHI of 15 days, the vinclozolin equivalents determined are less than the proposed tolerance of 1.0 ppm.

2. Residue data shown in Table 2 indicate that, in The Netherlands, at a maximum of four applications per season and at the rate of 1.25 kg ai/ha with a PHI of 3 days, the vinclozolin equivalents determined are less than the proposed tolerance of 1.0 ppm.

3. Residue data generated in The Netherlands from two greenhouse trials were reported previously in Acc. #262186 (see C. Deyrup's 7/22/86 memo, PP#4E2998). Results indicated that at a rate of 3 x 1.25 kg ai/A and a PHI of 3 days, 0.22 to 0.53 ppm residues were determined in/on the treated cucumbers. These data are consistent with the current submission.

4. DEB, therefore, concludes that the submitted data are adequate to support the requested tolerance of 1.0 ppm for this greenhouse use on cucumbers imported from Spain and The Netherlands. However, if the proposed use on cucumbers expands to other countries and/or expands to use on field grown cucumbers, additional residue data generated from those countries will be necessary using the maximum rate/ hectare/season and minimum PHI.

TOMATOES

Residues in/on Greenhouse-Grown Tomatoes From Spain (Acc. #408261-2)

Eight greenhouse trials were conducted in 1987 with 1 to 8 applications. Depending on growth stage of cucumber plants, the application rates were raised from 0.37 to 1.25 kg ai/ha (=0.33 to 1.12 lb ai/A). Samples were harvested at normal maturity at PHI's varing from 0 to 50 days and kept under frozen conditions until analyzed. Results are summarized in Table 3:

Table 3. Vinclozolin Residues in Greenhouse-Grown Tomatoes (Spain, 1987)

Number of Treatments	Treatment Dates and Rates (kg ai/ha) 9/25	10/3	10/10	10/17	10/24	10/31	11/9	11/14	PHI (Days)	Vinclozolin Equi. (ppm)
8	0.37	0.43	0.49	0.53	0.67	0.80	1.25	1.25	0	0.33
7	0.37	0.43	0.49	0.53	0.67	0.80	1.25	-	5	0.19
6	0.37	0.43	0.49	0.53	0.67	0.80	-	-	14	0.24
5	0.37	0.43	0.49	0.53	0.67	-	-	-	21	0.09
4	0.37	0.43	0.49	0.53	-	-	-	-	28	0.09
3	0.37	0.43	0.49	-	-	-	-	-	35	0.07
2	0.37	0.43	-	-	-	-	-	-	42	0.06
1	0.37	-	-	-	-	-	-	-	50	<0.05
Untreated	-	-	-	-	-	-	-	-	-	<0.05

Residues in/on Greenhouse-Grown Tomatoes from The Netherlands (Acc. #408261-4)

Tomato plants grown in two greenhouse trials in The Netherlands in 1987 were treated three times with Ronilan® Fungicide (50W) at a rate of 0.63 kg ai/ha (=0.56 lb ai/A). Samples were harvested at normal maturity at a 3-day PHI and kept frozen until analyzed. Results are summarized in Table 4:

Table 4. Vinclozolin Residues in Greenhouse-Grown Tomatoes (The Netherland, 1987)

Number of Treatments	Treatment Dates and Rates (kg ai/ha) 5/22	5/28	6/5	PHI (Days)	Vinclozolin Equi. (ppm)
3	0.63	0.63	0.63	3	0.80
3	0.63	0.63	0.63	3	0.88
Untreated	-	-	-	-	<0.05

DEB's Comments

1. Residue data shown in Table 3 indicate that, in Spain, at a maximum of six applications per season and at the rates from 0.37 to 0.80 kg ai/ha with a PHI of 15 days, the vinclozolin equivalents determined are less than the proposed tolerance of 2.0 ppm.

2. Residue data shown in Table 4 indicate that, in The Netherlands, at a maximum of three applications per season and at a rate of 0.63 kg ai/ha with a PHI of three days, the vinclozolin equivalents determined are less than the proposed tolerance of 2.0 ppm.

3. Residue data generated in The Netherlands from two greenhouse trials were reported previously in Acc. #262186 (see C. Deyrup's 7/22/86 memo, PP#4E2998). Results indicated that at a rate of 3 x 1.0 kg ai/A and a PHI of 3 days, 0.76 to 1.11 ppm residues were determined in/on the treated tomatoes. These data are consistent with the current submission.

4. DEB, therefore, concludes that the submitted data are adequate to support the requested tolerance of 2.0 ppm for greenhouse use on tomatoes imported from Spain and The Netherlands. If these proposed uses on tomatoes and cucumbers expand to other countries, additional residue data generated from those countries will be necessary. Also, if these uses expand to applications on field grown tomatoes, the petitioner should submit requests for appropriate food and feed additive tolerances, residue data reflecting the field uses, animal metabolism and feeding studies and appropriate tolerances for meat, milk, poultry and eggs, if necessary.

5. Because Codex is presently considering a 3 ppm tolerance on tomatoes at level 7, and the Codex value is so close to the requested tolerance of 2 ppm on tomatoes, wirh a revised Section F from the petitioner raising the requested tolerance on tomatoes from 2 ppm to 3 ppm, we can recommend harmonizing with Codex.

Residues in Tomato Process Fractions from the Netherlands (Acc. #408261-4)

The tomatoes treated three times at a rate of 0.63 kg ai/ha (=0.56 lb ai/A) as reported in Table 4 above were mixed into two samples (Treated-1 and Treated-2) and processed to pulp, paste, ketchup, wet pomace and dry pomace in the laboratory in a manner designed to minic commercial practice. The maximum residues determined in the process fractions of the two treated samples are summarized in Table 5.

Table 5. Vinclozolin Residues in Tomato Process Fractions (The Netherlands, 1987)

Samples	Vinclozolin Equ. (ppm)			Concentration Fractors	
	Treated-1	Treated-2	Untreated	Treated-1	Treated-2
Whole tomatoes	0.80	0.88	<0.05		
Pulp	0.32	0.24	<0.05	0.40	0.27
Puree	0.28	0.29	<0.05	0.35	0.33
Ketchup	0.26	0.33	<0.05	0.32	0.37
Paste	1.46	0.90	0.11	1.8	1.0
Wet Pomace	6.46	6.04	0.08	10.6	6.9
Dry Pomace	26.5	24.7	0.49	33.1	28.1

DEB's Comments

1. We assume that greenhouse-grown tomatoes will not be diverted to processing. The petitioner should submit a letter to the Agency verifying this assumption. Based on the petitioner's assurance, we can conclude that there is no need to establish tolerances on tomato processed commodities. Therefore, the petitioner should revise Section F deleting the requests for food and feed additive tolerances along with the memo that greenhouse-grown tomatoes in Spain and The Netherlands are not diverted to processing.

2. If the greenhouse use on tomatoes expands to applications on field grown tomatoes, the petitioner should submit requests for appropriate food and feed additive tolerances, residue data reflecting the field uses, animal metabolism and feeding studies and appropriate tolerances for meat, milk, poultry and eggs, if necessary.

Meat, Milk, Poultry and Eggs

There are no feed items associated with cucumbers. With assurance from the petitioner that greenhouse-grown tomatoes are not processed, we can conclude that there is no reasonable expectation of secondary residues for vinclozolin and its metabolites occuring in animal and dairy commodities imported from Spain and The Netherlands.

Other Considerations

There are no Mexican and Canadian tolerances established for vinclozolin in tomatoes and cucumbers. Codex's 1 ppm limit for cucumbers is in harmony with this requested tolerance. Codex is presently considering a 3 ppm tolerance on tomatoes at level 7. Because the Codex value is so close to the requested tolerance of 2 ppm on tomatoes, with a revised Section F from the petitioner we can recommend harmonizing with Codex.

Attachment: Codex Sheet.

cc: Circu., RF, W.T.Chin, R.D.Schmitt, PMDS/ISB, PP#8E3688/8H5566, F.Ives(SACB/HED)

RDI: P.V.Errico(3/2/89):R.Loranger(3/3/89)

F. Kiss
1/5/89

INTERNATIONAL RESIDUE LIMIT STATUS

CHEMICAL Vinclozolin (Ronilan®)

CODEX NO. 159

CODEX STATUS:

☒ No Codex Proposal Step 6 or above

Residue(if Step 8): sum of Vinclozolin and Metabolites containing 3,5-dichloroaniline Moiety, expressed as Vinclozolin

Crop(s)	Limit (mg/kg)
tomato	3
cucumber	1

PROPOSED U.S. TOLERANCES:

Petition No. PP#8E3684/8H5566

DEB
Reviewer W. T. Chin

Residue: Ronilan (Vinclozolin) and metabolites

Crop(s)	Limit (mg/kg)
Tomatoes	2.0
Cucumbers	1.0
Tomato paste	6.0
Wet tomato pomace	22.0
Dry tomato pomace	67.0

CANADIAN LIMITS:

☒ No Canadian limit

Residue: _____

Crop(s)	Limit (mg/kg)

MEXICAN LIMITS:

☒ No Mexican limit

Residue: _____

Crop(s)	Limit (mg/kg)

NOTES:

Form revised 1986