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HEALTH EFFECTS DIVISION
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OFFICE OF
PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP #8F3674. (RCB # 4279) Propiconazole in/on Celery, Corn, Pineapples, and Legume Vegetables. Evaluation of the Analytical Methodology and Residue Data. MRID Nos. 407833-01 to 407833-10.

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Tolerance Petition Section 2
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Hazard Evaluation Division (TS-769)

THRU: Charles L. Trichilo, Ph.D., Chief
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TO: Lois Rossi, Product Manager No. 21
Registration Division (TS-767)

and

Toxicology Branch
Hazard Evaluation Division (TS-769)

Ciba-Geigy is proposing the establishment of tolerances for the fungicide 1-([2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl] methyl)-1H-1,2,4-triazole (also known as propiconazole or Tilt®) and its metabolites determined as 2,4-dichlorobenzoic acid and expressed as parent compound in or on the following commodities:

Commodities	PPM
Celery	5.0
Corn Forage	10.0
Corn Fodder	10.0
Corn Grain	0.1
Corn; Sweet (kernels plus cobs with husks removed)	0.1
Pineapples	0.1
Pineapple Fodder	0.1

Commodities	PPM
Legume Vegetables (succulent or dried)	0.5
Legume Vegetable Foliage	5.0

Tolerances have been established under 40 CFR 180.434 on barley, rice, rye, and wheat at 0.1 ppm, on the straws of these commodities at 1.5 ppm, on bananas at 0.2 ppm, on meat commodities (except liver and kidney) at 0.1 ppm, on liver and kidney at 0.2 ppm, on poultry commodities (except liver) at 0.1 ppm, on poultry liver at 0.2 ppm, and on milk at 0.05 ppm.

The petitioner has submitted an anticipated residue summary for each of the subject commodities.

Conclusions

1a. CA is the #2 producer of dry beans. Apparently Tilt is not intended for use on dry beans grown in CA, since it is not among the states listed on the label. DEB has no objection to this geographical restriction; however, adequate residue data from CA must be submitted to support the national tolerance.

1b. The petitioner will need to submit a revised label in which a treatment to foraging period is specified for legume foliage and corn forage. This interval should be supported by the residue data.

1c. The petitioner should submit a revised Section B/label in which the temperature is given in degrees Fahrenheit for the dip treatment use on pineapples in Hawaii.

2a. DEB concludes that the nature of the residue in plants is adequately understood. The residues of concern are the parent and metabolites determined as 2,4-dichlorobenzoic acid.

2b. The metabolic picture exhibited by ruminants is markedly different from that found in plants; in ruminants, there is extensive cleavage of the bridge connecting the triazole and phenyl rings. The olefin and the ketone, which are determined by the enforcement method, account for about 20% of the total radioactive residue (TRR) in milk and liver. It is particularly disturbing that >60% of the TRR is lost from milk and liver upon treatment with sulfuric acid. DEB is concerned that other residues of toxicological concern, such as chlorophenols, may occur.

The proposed use will substantially increase the dietary burden to at least 6.25 ppm and possibly up to 9-10 ppm.

DEB concludes that the nature of the residue in ruminants is not adequately understood for the proposed use. The petitioner needs to more adequately account for residues containing the

phenyl ring.

2c. The proposed use will result in residues of Tilt on poultry feed items. Until this current proposed use, no detectable residues of Tilt had actually been found on poultry feed items. Now that real residues of Tilt are expected to arise on soybeans, a poultry feed item, DEB concludes that a poultry metabolism study is needed. The label should be in the phenyl ring, since TOX has concluded that triazole moieties arising from Tilt are not of concern.

3a. DEB concludes that adequate analytical methodology is available to generate residue data on plants.

3b. DEB has questioned the adequacy of the ruminant metabolism studies. No poultry metabolism study has been submitted for review. Therefore, at this time DEB can make no judgment on the ability of the analytical methodology to determine residues of concern.

4. The petitioner needs to submit data to support the stability of the extracts, which could be strongly basic. The extracts were stored up to 4 months at some unspecified temperature. Without storage stability data on the extracts, DEB cannot judge the adequacy of the residue data on pineapples, celer y, corn, legume vegetables, and the foliage of legume vegetables.

5a. The petitioner will need to submit the standard curves which were used to generate the residue data for those commodities in which significant levels of propiconazole were found (corn forage and fodder, celery, legume vegetables, and legume vegetable foliage) in order to demonstrate the linearity of the detector response.

5b. The petitioner will need to specify whether any of the residue data on celery from CA reflect furrow irrigation. If no data reflecting the use of furrow irrigation have been submitted, the petitioner will need to submit residue data reflecting this use.

5c. Only 3 of the bean trials reflected PHI's of 28 days or less. The petitioner has the option of submitting additional residue data reflecting the proposed PHI of 28 days or of submitting a revised Section B/label in which a PHI of 50 days is proposed.

If the latter option is taken, further residue data on beans (other than soybeans) would not be needed, provided that the petitioner resolves the other deficiencies regarding the bean residue data; some of these deficiencies may require additional residue data (see Conclusion 5f).

5d. Soybean field trials were conducted in only 3 states. DEB

does not consider the results from 3 states to constitute an adequate data base on which to base a tolerance for this important crop, especially since the PHI's in these trials ranged from 64-105 days (proposed PHI, 28 days). The petitioner will need to submit additional residue data on soybeans reflecting the proposed use. Data from AR, MN, IA, MS, and OH should be included. In generating the requested residue data, PHI's reflecting the intended use should be employed; i.e., if the petitioner elects to lengthen the PHI for legume vegetables to 50 days, the additional residue data should reflect the revised PHI.

5e. The residue data on lima beans and canning peas give residue levels for pods (with PHI's of 7 and 14 days) and beans (PHI's of 28 days for peas and 48 days for lima beans). The petitioner will need to clarify whether the data on pods included the seed and whether the data on beans included the pods.

5f. Even though Tilt is not intended for use on dry beans grown in CA, adequate residue data from CA are needed to support the proposed national tolerance. Residue data from CA should include data reflecting furrow irrigation. If furrow irrigation was not used to generate the residue data, the petitioner will need to submit additional residue data generated from field trials employing furrow irrigation; the residue data should also cover forage and should reflect the intended PHI.

5g. The residue data for legume forage are sparse; data from 2 field trials were submitted. The petitioner will need to include forage residue data from the additional soybean field trials.

5h. Presently no treatment to foraging interval is specified on the label; therefore cattle may be permitted to graze directly after treatment. The petitioner has the option of generating 0-day residue data or submitting a revised label specifying a treatment to grazing interval. All future residue data on forage should reflect the proposed treatment to grazing interval.

5i. At this time, DEB can draw no conclusions on the adequacy of the proposed tolerances on legume vegetables and the foliage of legume vegetables for the reasons given in 5a, and 5c-h.

5j. A residue level of 9.30 ppm in corn forage was reported from a field corn trial with a PHI of 27 days. If the value of 9.30 ppm is corrected for the total dosage permitted (a factor of 200/175), the proposed tolerance of 10.0 ppm would not be adequate. Aside from the dosage consideration, the variation in recovery from forage and fodder, 71-125%, leads DEB to the conclusion that the proposed tolerance on corn forage is <u>not adequate</u>.

5k. No treatment to grazing interval was specified on the label for the proposed use on corn. Given the tendency of propicon-

azole residues to increase with shorter PHI's, DEB concludes that the available data do not support a treatment to grazing interval of less than about 30 days for field corn and 14 days for sweet corn forage. If the petitioner wishes to impose shorter treatment to grazing intervals, the corresponding residue data on corn forage would need to be submitted from the major corn-growing areas of the country.

51. Before DEB can estimate tolerances on forage and fodder arising from the proposed use, residue data are needed on field and sweet corn grown in CA and subjected to furrow irrigation. The data on corn foliage should reflect the petitioner's intended treatment to grazing interval.

5m. At this time, pending the review of the standard curves used to generate the residue data and residue data from furrow-irrigated corn grown in CA, DEB cannot judge the adequacy of the proposed tolerances on corn grain, sweet corn, and corn fodder.

6a. The petitioner has not described the soybean and corn processing studies. A detailed description of the processing studies should be submitted so that DEB can determine whether common commercial practices were followed. The description should include the temperatures used during the various steps and the duration of these periods.

6b. The petitioner will need to submit residue data from a corn wet milling processing study.

Residue data from the wet milling study should cover the fractions which travel through commercial channels, namely: starch, crude and refined oils, corn bran, and the feed co-products derived from wet milling. The four major feed products arising from wet milling are gluten feed, corn germ meal, gluten meal, and condensed fermented corn extractives (steep-water).

6c. At this time DEB cannot judge whether food additive tolerances are needed.

7. At a minimum, DEB can conclude that the residues in the liver and kidney of cattle, goats, hogs, horses, and sheep from the proposed uses will exceed the established 0.2 ppm tolerances. However, because the nature of the residue in animals is not adequately understood, DEB is unable to judge the adequacy of the established tolerances for meat, milk, poultry and eggs or to recommend tolerances to cover the proposed uses.

8a. Codex has established an MRL of 0.05 ppm on cereal grains (except rice). There are no Mexican or Canadian limits on the subject commodities. There will be a compatibility problem with Codex

if the tolerance on corn is established.

8b. DEB has no objection to lowering the proposed tolerance to 0.05 ppm, provided the residue data on corn grain from CA justify the lower tolerance. Lowering the tolerance to bring it into agreement with Codex is possible only because there were no detectable residues of propiconazole or any of its metabolites. The petitioner should be informed that he has the option of proposing a tolerance of 0.05 ppm to bring the US tolerance into agreement with Codex.

8c. DEB has been asked by the Science Analysis and Coordination Branch/HED to address the possibility of harmonizing the US definition with Codex. The US definition includes the parent and the metabolites containing the dichlorobenzyl moiety, whereas the Codex definition is in terms of parent only. Plant metabolism studies have shown that the parent constitutes a relatively minor portion of the total radioactive residue. The other metabolites as well as the parent are converted to dichlorobenzoic acid by the enforcement methodology. DEB believes that the US tolerance expression gives a truer picture of the residues of concern.

Recommendations

DEB recommends against the proposed tolerances for residues of propiconazole on celery, pineapples, pineapple fodder, legume vegetables, the foliage of legume vegetables, corn, corn fodder, and corn forage for the reasons given in Conclusions 1b, 1c, 2b, 2c, 3b, 4, 5a-m, 6a-c, and 7. DEB recommends that the petitioner be given a copy of this review.

Detailed Considerations

Manufacturing and Formulation

Ciba-Geigy has recently submitted additional information on the technical material (MRID Nos. 405837-01 to 405837-03). Updated submissions of registered active ingredients now fall under the purview of RD.

The 3.6 E formulation, which contains 3.6 lbs ai/gal, was used in the field trials.

The inerts in the formulation have been cleared under 40 CFR 180.1001.

Proposed Use

Celery

Propiconazole is to be applied to celery on a 7-day schedule by ground or aerial equipment; the treatment rate is 50 g ai/A. The propiconazole may be tank-mixed with an appropriate spreader-sticker. In California, a 14-day schedule should be followed.

Application is limited to 200 g ai/A (4 applications). A 14 day PHI is proposed.

Corn (Field Corn, Seed Corn, Sweet Corn and Popcorn)

Propiconazole is to be applied to corn with ground equipment at a rate of 25-50 g ai/A. A 7-14 day schedule is to be followed. Field corn or seed corn may not be treated after silking. A 14 day PHI is imposed for the use on sweet corn. No more than 200 g ai/A may be applied during the growing season.

Dry Beans (CO, MN, NE, ND, SD)

Beans are to be treated with propiconazole at a rate of 50 g ai/A with ground equipment on a 14-day schedule. Succulent varieties may not be treated, or crop injury may occur. No more than 3 applications may be made per season, and a 28 day PHI is imposed.

DEB's Comments/Conclusions, re: Proposed Use on Dry Beans

Apparently Tilt is not intended for use on dry beans grown in CA, which was the #2 producer of dry beans in 1985. DEB has no objection to this geographical restriction, provided that adequate residue data from CA is submitted to support the national tolerance (see the Residue Data section of this review on the possible need for additional residue data).

The petitioner will need to submit a revised label in which a treatment to foraging period is specified. This interval should be supported by the residue data.

Pineapples (Hawaii)

For the control of butt rot disease, pineapples are to be dipped into propiconazole solutions (0.33 g ai/100 gal water). Either a hot or cold dip treatment may be used. For a cold dip treatment, crowns are thoroughly immersed, removed, and allowed to drain. For a hot dip treatment, the water temperature should be maintained at 52°C. The crowns are to be soaked for 20-30 minutes, removed, and allowed to drain.

Treated crowns may not be used for food or feed. The plant may not be grazed while it is growing; tops may not be grazed until after the fruit is harvested.

DEB's Comments/Conclusions, re: Proposed Use on Pineapples

The petitioner should submit a revised Section B/label in which the temperature is given in degrees Fahrenheit for the use in Hawaii.

Soybeans

Soybeans are to be treated with propiconazole at a rate of 62.5 g

ai/A with ground equipment on a 14-21 day schedule. No more than 187.5 g ai/A may be made per season, and a 28 day PHI is imposed.

DEB's Comments/Conclusions, re: Proposed Use on Soybeans

The petitioner is seeking a crop group tolerance for legume vegetables. According to 40 CFR 180.34, the proposed use for all crops in the group must be similar before a group tolerance is established. Although the application rate is different for soybeans and dry beans (62.5 g ai/A vs 50 g ai/A) and the treatment schedule is different (14 days for beans vs 14-21 days for soybeans), DEB concludes that the regimens are similar enough for the purposes of a group tolerance. [The residue data reflect treatment rates of 62.5 g ai/A to 125 g ai/A.]

Nature of the Residue

Plants

The petitioner has submitted plant metabolism studies with PP #4F3007 and were reviewed in conjunction with that petition (memo of A. Smith, 5/15/84). The results of wheat, grape, and peanut metabolism studies are shown below. Structures are given in Attachment 2.

Wheat--^{14}C-Triazole Tilt

	% Total Radioactive Residue (TRR)					
		Hydroxy Metabolites and Glucosides				
	Tilt	Beta-hydroxy Tilt	Other Mono OH	Alkanol	Triazolyl Alanine	Percent Identified
Straw	12.7	32.3	10.4	10.6	--	56
Grain	0.5	1.2		0.1	70	72

Unidentified phenolic compounds accounted for about 2% of the TRR in straw. The petitioner demonstrated that the unidentified mono hydroxy compound is not the gamma isomer and postulates that the hydroxyl group is on the alpha carbon of the side chain or on the dioxolane ring. The metabolic pattern found in the corresponding phenyl labeled study is said to be similar to that described above, although, of course, no triazolyl alanine would be detected.

Grapes ^{14}C-Triazole Tilt

	% Total Radioactive Residue (TRR)					
		Hydroxy Metabolites and Glucosides				
	Tilt	Beta-hydroxy Tilt	Other Mono OH	Alkanol	Triazolyl Alanine	Percent Identified
Leaves	16	38.8	11.6	17.0	--	71.8
Pomace	21.1	23.3	10.4	14.1	--	58.5
Juice	2.0	16.3	15.1	7.6	29.5	55.4

The phenyl labeled study was reported to give "mostly" the same metabolites.

Peanuts

After cellulase treatment of the extract of peanut stalks from plants treated with ^{14}C-phenyl and ^{14}C-triazole Tilt, the following metabolic profile was delineated.

% Total Radioactive Residue (TRR)

	Tilt	Hydroxy Metabolites and Glucosides				Percent Identified
		Beta-hydroxy Tilt	Other OH	Mono Alkanol	Triazolyl Alanine	
^{14}C-Phenyl	16	31	—	16		63
^{14}C-Triazole	15	35	—	19	—	69

Seed Corn

The following study was submitted as an amendment to PP #4F3074 but was not reviewed in detail.

The purpose of the study was to mimic a seed corn operation and determine whether residues from treated plants (the F_1 generation) carried over into the F_2 generation grain or plant material.

Corn plants were injected 1-2 weeks before tassel formation with 10 mg of ^{14}C-phenyl Tilt; this occurred 49 days before harvest. The plants were harvested at the dent stage and separated into stalk, cob, and grain. Three days later, the treated grain was planted and allowed to grow to harvest at the dent stage, 108 days later.

At the time the experiment was conducted, the proposed use on seed corn was 125 g ai/A during the season; the presently proposed use for seed corn is 200 g ai/A during the season. The petitioner selected a dose of 10 mg by assuming that there are 12,500 plants per acre. Therefore the maximum dose to a plant would be 125,000 mg/12,500 plants = 10 mg.

The levels of radioactivity are shown below.

TRR (PPM, Tilt equivalents)

	Crop part	Stalks	Cob	Grain
Generation	F_1	18.23	2.65	0.28
	F_2	0.03	<0.04	<0.04

The petitioner has also submitted radiovalidation data which

demonstrate that the enforcement method extracted 91-93% of the TRR from soybeans, soybean stalks, and corn stalks; the method accounted for 80-115% of the TRR in these commodities.

DEB's Comments/Conclusions, re: Nature of the Residue in Plants

In its memo of 5/8/87, TOX concluded that triazole moieties contributed by Tilt are not of concern (PP #4F3074, memo of A. Katz). DEB concludes that the nature of the residue in plants is adequately understood. The residues of concern are the parent and metabolites determined as 2,4-dichlorobenzoic acid.

Animals

Ruminants

The metabolism of Tilt has been studied in goats in a study using ^{14}C-triazole Tilt only. Studies using phenyl and triazole labeled compounds were carried out using a similar compound, CGA-64251, which differs from Tilt in the presence of an ethyl group, instead of a propyl group, on the dioxolane ring. These studies were submitted with PP #4F3007. Structures are given in Attachment 2.

In the Tilt experiment, the goats were fed Tilt at a rate equivalent to 4.53 ppm in the diet for 10 days. In the CGA-64251 study, one goat was dosed with ^{14}C-triazole CGA-64251 at a rate equivalent to 41.9 ppm in the diet, and the other goat was fed ^{14}C-phenyl CGA-64251 at a rate equivalent to 43.7 ppm in the diet.

The radioactive residue levels in tissues are given below.

Matrix	^{14}C-Triazole Tilt (4.53 ppm) PPM	^{14}C-Phenyl CGA-64251 (43.7 ppm) PPM	^{14}C-Triazole CGA-64251 (41.9 ppm) PPM
Fat	<0.008	0.034	0.023
Muscle	0.011	0.015	0.058
Heart	0.014	0.019	0.059
Kidney	0.029	0.127	0.186
Liver	0.096	0.567	0.553
Milk	0.016	0.058	0.139

Treatment of the extracts with sulfuric acid converts the alkanol to an olefin, transforms residues containing all three rings to a ketone, and frees triazole conjugates (see Attachment 2).

The petitioner examined the radioactive components in liver and milk. The results are given below.

Goat Fed ^{14}C-Triazole Tilt (4.53 PPM)		Goat Fed ^{14}C-Triazole CGA-64251 (41.9 ppm)		Goat Fed ^{14}C-Phenyl CGA-64251 (43.7 PPM)	
% TRR Characterized		% TRR Characterized		% TRR Characterized	
Milk	Liver	Milk	Liver	Milk	Liver
(Olefin) 5.6%	3.0	(Olefin) 0.9	7.4	(Olefin)* 4.6	3.0
(Ketone) 12.8%	16.0	(Ketone) 4.9	4.5	(Ketone)* 14.7	17.4
(Triazole) 39%	--	(Triazole) 47.1	37.7	(Triazole) --	--

* The sulfuric acid treatment resulted in the loss of 60 and 66% of the TRR in liver and milk, respectively.

DEB's Comments/Conclusions, re: Nature of the Residue in Ruminants

DEB notes that the metabolic picture exhibited by ruminants is markedly different from that found in plants. In ruminants, there is extensive cleavage of the bridge connecting the triazole and phenyl rings. No radiovalidation data have been submitted for meat and milk. The olefin and the ketone, which are determined by the enforcement method, account for only 6-20% of the TRR in the Tilt and Tilt analog studies. It is particularly disturbing that >60% of the TRR is lost from milk and liver upon treatment with sulfuric acid. DEB is concerned that other residues of toxicological concern, such as chlorophenols, may occur.

The dietary burden imposed upon cattle by the established tolerances is very low, 0.19 ppm (see the Meat and Milk section of this review for details). However, the proposed use will substantially increase the dietary burden to at least 6.25 ppm and possibly up to 9-10 ppm.

DEB concludes that the nature of the residue in ruminants is not adequately understood for the proposed use, which includes corn, a major livestock feed item. The petitioner needs to more adequately account for residues containing the phenyl ring.

Poultry

No poultry metabolism studies have been submitted.

DEB's Comments/Conclusions, re: Nature of the Residue in Poultry

In addition to the goat metabolism studies, the petitioner has submitted a rat metabolism study, which also used ^{14}C-triazole Tilt. As in the goat studies, radioactive residue levels were

substantially higher in the liver than in any other matrix. The proposed use will result in residues of Tilt on poultry feed items. Until this current proposed use, no detectable residues of Tilt had actually been found on poultry feed items. The tolerances established on rice, wheat, barley, and rye were limit of determination tolerances. Now that real residues of Tilt are expected to arise on legumes, a poultry feed item, DEB concludes that a poultry metabolism study is needed. The label should be in the phenyl ring, since TOX has concluded that triazole moieties arising from Tilt are not of concern.

Analytical Methodology

Plants

Celery, corn, and legume vegetable samples were analyzed with Method AG-454, which is essentially the same as Method AG-454A, the enforcement method. Pineapples were analyzed by Method AG-448, a crop specific version of Method AG-454A. The description below applies to both methods.

Samples are extracted by refluxing with 20% concentrated ammonium hydroxide/methanol for one hour. After concentrating an aliquot of the extract to dryness, the residue is dissolved in NaOH and heated for one hour with potassium permanganate to convert propiconazole and its metabolites to 2,4-dichlorobenzoic acid (DCBA). The DCBA is partitioned into 20% ether/hexane, the organic phase is concentrated, and the residue is converted to the methyl ester of DCBA with diazomethane in the presence of dodecane, which serves as a keeper. The ester is cleaned up on an acidic alumina SepPak®, and analyzed by capillary GC with an electron capture detector.

Fortification/Recovery data are given below.

Matrix	Check (PPM)	Fortification Level (PPM)	% Recovery
Corn forage	<0.05-0.06	0.20-2.00	71-125
Corn fodder	0.01-0.10	0.20-2.00	74-120
Field corn	0.01-0.02	0.05-0.50	73-109
Sweet corn (K+CWHR)	<0.05-0.02	0.05-0.20	75-125
Solvent extracted meal	0.02	0.05-0.10	75-83
Soapstock	<0.05	0.05-0.20	70-82
Crude oil	0.01	0.05-0.20	91-108
Refined oil	<0.05	0.05	100
Refined, bleached deodorized oil	<0.05	0.05-0.10	65-98
Feed stock	0.01	0.05	75

Matrix	Check (PPM)	Fortification Level (PPM)	% Recovery
Coarse meal	0.02	0.05-0.50	90-92
Fine meal	0.02	0.05-0.20	94-146
Flour	<0.05	0.05-0.20	89-108
Legume hay	0.02-0.07	0.50-2.00	75-105
Legume stems	0.03-0.04	0.50-1.00	89-90
Legume pods	0.03	0.20-0.50	81-96
Canning peas	0.01	0.05	78
Lima beans	0.03	0.10	78
Beans	0.02-0.03	0.05-0.50	77-133
Soybeans	0.01-0.03	0.10-0.20	77-130
Soybean hulls	0.02	0.20	101
Meal	0.03	0.10	115
Crude soybean oil	<0.01	0.10	98
Refined oil	0.01	0.05	74
Refined, bleached hydrogenated oil	<0.01	0.10	77
Refined, bleached hydrogenated, deodorized oil	0.02	0.05	94
Soapstock	0.05	0.20	86
Celery	0.02-0.13	0.05-2.00	70-117
Pineapple core	<0.05	0.05-0.10	77-109
Pineapple fodder	<0.05-0.06	0.10-1.00	69-90
Pineapple shell	<0.05	0.05-0.20	67-98
Pineapple bran	<0.05-0.05	0.05-0.20	93-116

The petitioner has also submitted radiovalidation data to support Methods AG-448 and AG-454. The corn and soybean samples came from plants grown in soil treated with ^{14}C-phenyl Tilt. An earlier study, ABR-83078, had examined the efficiency of the extraction in removing radioactive residues from wheat straw and corn stalks. The present study, ABR-85055, also investigated the ability of the methods to account for levels or radioactivity in terms of DCBA.

The results are depicted below.

Matrix	% TRR Extracted	% TRR Determined by Analytical Method
Soybeans	91	78-83
Soybean Stalks	91	78-83
Corn Stalks	89-93	108-122
Wheat Straw	88	

The petitioner has also investigated the recovery of five metabolites after spiking at a 1 ppm level. The results are given below. The structures of the metabolites are given in Attachment 2.

Metabolite	% Recovery
Alkanol	101
Ketone	76
Olefin	105
Beta-hydroxy	89
A-Acid	93

DEB's Comments/Conclusions, re: Plant Analytical Methodology

DEB concludes that adequate analytical methodology is available to generate residue data on plants.

Meat and Milk

The methodology for livestock samples, Method AG-517, involves extraction with 20% water/acetonitrile. An aliquot of the extract is evaporated to dryness, and the residues are converted to DCBA with alkaline permanganate. DCBA is converted to the methyl ester with diazomethane; the determination of the residue levels is as described above for crops-capillary GC with electron capture detection.

DEB's Comments/Conclusions, re: Meat and Milk Analytical Methodology

DEB has questioned the adequacy of the animal metabolism studies. The goat study used a triazole label only. Another goat study, which used a phenyl and a triazole label of an analogous pesticide, satisfactorily accounted for only 20% of the TRR. No poultry metabolism study has been submitted for review. Therefore, at this time DEB can make no judgment on the ability of the analytical methodology to determine residues of concern.

Storage Stability

Storage stability data were submitted with PP #4F3007. One study involved soybean fodder and soybeans (fortification level, 0.4 ppm) and the other study involved field treated peanuts, fodder, and shells. The commodities were stored in a freezer during the course of the study. The results are shown below.

Matrix	Storage time	Corrected % Recovery or % Initial
Soybean fodder	1 month	87, 90
	4 months	66, 72
	6 months	93-104
Soybeans	1 month	76, 83

Matrix	Storage time	Corrected % Recovery or % Initial
Soybeans	4 months	87, 88
	6 months	65-80
Peanut fodder	25 months	98-146
Shells	25 months	95-147
Nutmeat	25 months	249-333

The petitioner attributed the higher rates after storage for 25 months to dehydration. In the peanut study, the samples were analyzed the same week that they were extracted.

The field samples from the present petition and their extracts were stored for the following periods of time. The field samples were stored frozen. The petitioner did not specify whether the extracts were frozen.

Commodity	Storage Period (Sample)	Storage Period (Extract)
Legumes	7-10 months	2 days-1 month
Celery	2 weeks-1 year	9 days-1 month
Pineapple	13-14 months	2-4 months
Corn	5-17 months	10 days-4 months

DEB's Comments/Conclusions, re: Storage Stability Data

In order to support the residue data, the petitioner will need to submit storage stability data for extracts stored under the same conditions that were used to generate the residue data. Although the petitioner has submitted data to support the stability of residues in crops under freezer storage conditions, corresponding data have not been submitted for the extracts, which could be strongly basic. The extraction involves refluxing the samples for one hour in 20% concentrated NH_4OH/MeOH. Even though an argument can be made that the residues will be stable for 4 months at some lower temperature because they are stable for one hour at reflux, DEB prefers to see the data.

Residue Data

Celery

Field trials were conducted in the states of FL, MI, CA, NY, and TX; these states produce 95% of the nation's celery. Application by ground and aerial equipment and the admixture of a sticker were represented in the residue data, in accordance with the proposed use. The 3.6 E formulation was applied at the 1X (50 g ai/A) and 2X rates (100 g ai/A). A total of 200-400 g ai/A were applied.

Seven or 14 day schedules were followed; 4-5 applications were applied. PHI's of 0, 7, and 14 days were observed. The results are depicted below.

Dose (q ai/A)	Method	Sticker	PHI	Residue level PPM Propiconazole
4-5 x 50	Ground	No	7	0.40-2.54
4-5 x 50	Ground	Yes	7	0.64-6.20
4 x 50	Aerial	Yes	7	0.63-0.73
4-5 x 50	Ground	No	14	0.28-2.61
4-5 x 50	Ground	Yes	14	0.27-4.98
4 x 50	Aerial	Yes	14	0.35-0.39
4 x 100	Ground	No	7	0.56-4.58
4 x 100	Ground	Yes	7	1.98
4 x 100	Ground	No	14	0.60-2.52
4 x 100	Ground	Yes	14	0.86

DEB's Comments, re: Celery Residue Data

Within each trial, residues tended to decrease with time. In 12 of the 14 trials, lower mean residue levels were reported after 14 day PHI's compared to levels after 7 day PHI's.

Whenever residue data from CA are submitted, data reflecting the use of furrow irrigation should be included. Furrow irrigation is commonly used to water vegetable crops in CA (V. Rubatzky, UC Davis) and may lead to higher residue levels. The petitioner will need to specify whether any of the residue data on celery from CA reflect furrow irrigation; if furrow irrigation was not used to generate the residue data, the petitioner will need to submit residue data from CA reflecting this use.

The petitioner will need to submit a standard curve to demonstrate the linearity of response for the celery analyses.

In order to support the residue data, the petitioner will need to demonstrate that residues in the extract are stable for periods of up to one month.

Pineapples

Three field trials were conducted in Kauai and Oahu. The 3.6 E formulation was used to make dip solutions of 0.5 oz ai/100 gal (1.5 X rate) and 1.0 oz ai/100 gal (3 X rate). The pineapples were harvested when mature, 532-594 days after planting. Pineapple shells and cores were analyzed separately; residue levels were reported as <0.05 ppm for all samples of shells and cores.

Residue data on the pineapple feed items (the bran and fodder)

were also submitted. Detectable residues, 0.07 ppm, were reported on one sample of bran treated at a 3 X rate. Upon reanalysis of this sample in triplicate, no detectable residues (<0.05 ppm) were reported.

Representative chromatograms and a standard curve were submitted.

DEB's Comments/Conclusions, re: Pineapple Residue Data

After the samples were extracted, the extracts were stored 2-4 months at some unspecified temperature before analysis. The petitioner will need to demonstrate that residues in plant extracts are stable under these conditions in order to support the residue data.

Legumes and Legume Vegetable Foliage

The petitioner points out that a group tolerance on legume vegetables is proposed, although the label specifically precludes the use on succulent varieties because of phytotoxicity.

Residue data were generated on lima beans, great northern beans, pinto beans, red kidney beans, and soybeans. There was also one field trial involving canning peas. The residue data from 2 trials reflected analyses of forage. The bean residue data (excluding soybeans) reflect field trials conducted in CA, NE, MN, MI. These states produce about 55% of the nation's dry beans; including the contiguous states, the residue data are representative of regions in which 86% of the nation's dry beans are grown (Agricultural Statistics, 1986). Residue data on soybeans were submitted from IA, SC, and MS. Including the contiguous states, the data are representative of 67% of the nation's soybeans (Agricultural Statistics, 1986). The pea trial was conducted in WI.

The field trials reflect 2-3 treatments at rates of 62.5 g ai/A (1 X rate), 75 g ai/A (1.2 X rate), and 125 g ai/A (2 X rate). Treatment intervals ranged from 6-31 days. PHI's ranged from 25-105 days; the proposed PHI is 28 days. Forage samples were analyzed 7 days after treatment.

The residue data are outlined below.

Commodity	Treatment Rate (g ai/A)	PHI (days)	PPM Propiconazole (PHI with highest residues)
Canning Peas (succulent)	3 x 62.5	28	0.14-0.25
Lima Beans	3 x 62.5	48	<0.05
Dry Beans (except soybeans)	3 x 62.5	25	0.08-0.14
	3 x 62.5	48-89	<0.05-0.14(81)

Commodity	Treatment Rate (g ai/A)	PHI (days)	PPM Propiconazole (PHI with highest residues)
Soybeans	3 x 62.5	64-90	0.15-0.41(64)
Dry Beans (except soybeans)	2 x 75	56-89	0.07-0.14(89)
Soybeans	2 x 75	71-105	0.10-0.43(86)
Dry Beans (except soybeans)	3 x 125	48-57	0.07-0.13(57)
Soybeans	3 x 125	64	0.61-0.74
Pea Pods (succulent)	3 x 62.5 3 x 62.5	7 14	0.28-0.31 0.18-0.22
Pea Stems (succulent)	3 x 62.5 3 x 62.5	7 14	4.08-4.50 4.71-4.92
Lima Bean Pods (succulent)	3 x 62.5 3 x 62.5	7 14	0.10 <0.05
Lima Bean Stems (succulent)	3 x 62.5 3 x 62.5	7 14	2.99 0.39
Pea Hay	3 x 62.5	28	3.77-4.74
Bean Hay	3 x 62.5 2 x 75 3 x 125	25-81 56-89 48-57	0.45-2.93(25) 0.24-0.59(56) 1.36-1.93(48)
Soybean Hay	3 x 62.5 2 x 75	77-90 86-105	0.77-3.92(90) 0.98-2.05(105)

DEB's Comments/Conclusions, re: Legume Residue Data

Only 3 of the bean trials reflected PHI's of 28 days or less. The petitioner has the option of submitting additional residue data reflecting the proposed PHI of 28 days or of submitting a revised Section B/label in which a PHI of 50 days is proposed.

If this latter option is taken, further residue data on beans (other than soybeans) would not be needed, provided that the petitioner resolves the other deficiencies regarding the bean residue data; some of these other deficiencies, such as the need for data reflecting furrow irrigation, may require additional residue data.

The PHI's in the soybean trials ranged from 64-105 days. The proposed PHI is 28 days. The metabolism and translocation

studies do not enable DEB to draw any conclusions on the dependence of total residues in bean seed with time. Two of the three trials resulted in residues of about 0.4 ppm (proposed tolerance, 0.5 ppm). One trial, in IA, used two applications at a 1.2 X rate for a total of 150 g ai/A and a PHI of 86 days. The proposed use would allow 3 x 62.5 g for a total of 187.5 g. The other field trial, in MS, reflected the proposed application rate and a PHI of 64 days.

Soybean field trials were conducted in only 3 states. Although trials were carried out in major soybean growing areas, DEB does not consider the results from 3 states to constitute an adequate data base on which to base a tolerance for this important crop, especially since the PHI's in these trials ranged from 64-105 days (proposed PHI, 28 days). The petitioner will need to submit additional residue data on soybeans reflecting the proposed use. Data from AR, MN, IA, MS, and OH should be included. In generating the requested residue data, PHI's reflecting the intended use should be employed; i.e., if the petitioner elects to lengthen the PHI for legume vegetables to 50 days, the additional residue data should reflect the revised PHI.

Analyses of succulent beans and peas should reflect analyses of the bean or pea with the pod. The residue data on lima beans and canning peas give residue levels for pods (with PHI's of 7 and 14 days) and beans (PHI's of 28 days for peas and 48 days for lima beans). The petitioner will need to clarify whether the data on pods included the seed and whether the data on beans included the pods.

Even though Tilt is not intended for use on dry beans grown in CA, adequate residue data from CA are needed to support the proposed national tolerance. Residue data from CA should include data reflecting furrow irrigation, a practice which is commonly followed in CA (V Rubatzky, UC Davis) which may lead to higher residue levels. The petitioner will need to specify whether furrow irrigation was used in the CA field trials. If furrow irrigation was not used, the petitioner will need to submit additional residue data generated from field trials employing furrow irrigation; the residue data should also cover forage and should reflect the proposed PHI.

The residue data for legume forage are sparse; data from 2 field trials were submitted. The petitioner will need to include forage residue data from the additional soybean field trials.

Presently no treatment to foraging interval is specified on the label; therefore cattle may be permitted to graze directly after treatment. The petitioner has the option of generating 0-day residue data or submitting a revised label specifying a treatment to grazing interval. The available residue data on forage reflect a minimum PHI of 7 days.

Although sample chromatograms were submitted, no standard curve was submitted for the legume analyses. The petitioner will need to submit a standard curve.

At this time, DEB can draw no conclusions on the adequacy of the proposed tolerance of 0.5 ppm propiconazole on legume vegetables and 5.0 ppm on the foliage of legume vegetables. Additional data on soybeans, soybean forage, and bean forage and dried beans which have been furrow irrigated are needed.

Soybean Processing

The petitioner has submitted residue data generated from soybean processing studies. The residue levels in the various fractions are shown below.

Matrix	Total Residues (ppm)	
Beans	0.40	0.61
Dry Beans	0.38	0.74
Hulls	0.26	0.31
Meal	0.40	0.75
Crude Oil	<0.05	<0.05
Refined Oil	<0.05	<0.05
Refined, bleached, hydrogenated oil	<0.05	<0.05
Refined, bleached, hydrogenated, deodorized oil	<0.05	<0.05
Soapstock	0.18	0.19

DEB's Comments/Conclusions, re: Processing Studies

The petitioner has not described the processing study. A detailed description of the processing study should be submitted so that DEB can determine whether the processing study conformed to common commercial practice. The description should include the temperatures used during the various steps and the duration of these periods.

At this time DEB cannot judge whether food additive tolerances are needed.

Corn

Field trials were carried out in the states of CA, NC, NE, IL, MS, ND, OH, FL, TX, NY, WI, and WA. These states produce 44% of the nation's corn and are located in regions which produce about 94% of the nation's corn (Agricultural Statistics, 1986).

Fourteen of the tests reflected 5 applications at rates of 25-50 g ai/A; the total amount applied was 175 g ai/A. Three tests reflected 5-8 applications at rates of 25-50 g ai/A and a total of 200 g ai/A. These three tests reflected the proposed application

rates. Seven trials used exaggerated rates of 50-100 g ai/A and a total of 400 g ai/A. All trials used the 3.6 E formulation.

The data are outlined below.

Grain (Field Corn)

Application rate g ai/A	Total Appl. g ai/A	PHI	PPM Propiconazole
25-50	175	56-78	<0.05
25-50	200	57	<0.05
8 x 25	200	21-36	<0.05
50-100	350	58-78	<0.05-0.06
50-100	400	57	<0.05
8 x 50	400	21-36	<0.05

Sweet Corn (Kernels + Cobs with Husks Removed)

Application rate g ai/A	Total Appl. g ai/A	PHI	PPM Propiconazole (PHI with highest residues)
25-50	175	13-38	<0.05-0.06 (14)
50-100	350	14-38	<0.05-0.05 (14)

Forage (Field Corn and Sweet Corn)

Application rate g ai/A	Total Appl. g ai/A	PHI	PPM Propiconazole (PHI with highest residues)
25-50 (Field corn)	175	26-43	0.12-9.30 (27)
25-50 (Sweet corn)	175	13-38	0.11-5.00 (14)
8 x 25 (Field Corn)	200	21-35	1.27-5.95 (21)
50-100 (Field Corn)	350	30-43	1.36-5.57 (30)
50-100 (Sweet Corn)	350	14-38	2.32-3.09 (38)
8 x 50 (Field Corn)	400	21-35	7.05-14.58 (21)

Fodder (Field Corn)

Application rate g ai/A	Total Appl. g ai/A	PHI	PPM Propiconazole (PHI with highest residues)
25-50	175	56-78	0.16-4.12 (56)
25-50	200	57	1.81-2.49
50-100	350	58-78	0.67-8.02 (58)
50-100	400	57	3.72

Representative chromatograms were submitted; standard curves were not submitted.

DEB's Comments/Conclusions, re: Corn Residue Data

The petitioner needs to submit standard curves used to determine residues in forage and fodder to demonstrate the linearity of the detector response.

A residue level of 9.30 ppm on forage was reported from a field corn trial with a PHI of 27 days. A total of 175 g ai/A was applied in this trial; the proposed use would permit a total of 200 g ai/A. The submitted residue data do not indicate a well behaved relationship between dose and residue levels, although the highest reported levels, 14.58 ppm, came from a trial with the highest total amount applied. If the value of 9.30 ppm is corrected for the total dosage permitted (a factor of 200/175), the proposed tolerance of 10.0 ppm would not be adequate. Aside from the dosage consideration, the variation in recovery from forage and fodder, 71-125%, leads DEB to the conclusion that the proposed tolerance is not adequate.

The petitioner has submitted residue data on forage sampled after PHI's of 13-43 days. The proposed Section B/label did not specify a treatment to grazing interval. The data on forage and fodder outlined on page 21-22 indicate that within each treatment regimen, the highest levels reported on field corn or sweet corn foliage came from the trials with the shortest PHI's or next to the shortest PHI's. A similar decline of residues with longer PHI's was noted with celery (see page 16). Residue data on field corn forage reflected PHI's of 26-43 days. Given the tendency of residues to increase with shorter PHI's, DEB concludes that the available data do not support a treatment to grazing interval of less than about 30 days for field corn and 14 days for sweet corn forage. If the petitioner wishes to impose shorter treatment to grazing intervals, the corresponding residue data on corn forage would need to be submitted from the major corn-growing areas of the country.

According to V.E. Rubatzky, UC Davis, corn in California is watered with furrow irrigation. This practice may lead to higher residue levels. Before DEB can estimate tolerances on forage and fodder arising from the proposed use, residue data on field and sweet corn grown in CA and subjected to furrow irrigation are needed. The data on corn foliage should reflect the petitioner's intended treatment to grazing interval.

At this time, pending the review of the standard curves used to generate the residue data and residue data from furrow-irrigated corn grown in CA, DEB cannot judge the adequacy of the proposed tolerances on corn and corn fodder.

Corn Processing Study

The petitioner has submitted the results from two corn processing studies. The corn had received 8 applications at rates of 25 g ai/A or 50 g ai/A. No detectable residues were found in/on the corn samples. The study appeared to reflect a dry milling study. The following fractions were analyzed: grain, solvent extracted meal, soapstock, crude oil, refined oil, refined, bleached, deodorized oil, feed stock, coarse meal, fine meal, and flour. No detectable residues (<0.05 ppm) were found in any of the fractions.

DEB's Comments/Conclusions, re: Corn Processing Studies

The petitioner has provided no description of the processing study. From the nature of the fractions derived from the processing, DEB assumes that dry milling studies were carried out. The petitioner will need to provide a detailed description of the processing study so that DEB can determine if the processing conformed to common commercial practice.

Wet milling accounts for the major portion of corn processing. In fact, about 90% of domestically produced corn oil is produced from wet milling (Corn Refiners Association). Therefore the petitioner will need to submit residue data from a wet milling processing study.

Residue data from the wet milling study should cover the fractions which travel through commercial channels, namely: starch, crude and refined oils, corn bran, and the feed co-products derived from wet milling. The four major feed products arising from wet milling are gluten feed, corn germ meal, gluten meal, and condensed fermented corn extractives (steepwater).

At this time DEB cannot determine whether food/feed additive tolerances are required. The petitioner needs to provide a description of the processing study upon which the submitted residue data were based and needs to submit residue data covering the fractions derived from wet milling.

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Meat, Milk, Poultry, and Eggs

Cattle

The current dietary burden imposed upon cattle by the established tolerances is quite low, 0.19 ppm. This estimate was computed from a diet consisting of 80% barley grain and 10% straw. Since no detectable residues were found on barley grain, the residue level used in the calculation was half the level of the limit of determination tolerance of 0.10 ppm. The dietary burden is therefore [(0.80 x 0.05 ppm) + (0.10 x 1.5 ppm)] = 0.19 ppm.

According to the Pesticide Assessment Guidelines, Subdivision O: Residue Chemistry, corn silage may account for 50% of the diet, and soybean meal for 25% of the diet. Therefore the dietary burden imposed upon cattle would be [(0.5 x 10) + (0.25 x 0.5)] = 6.25 ppm. (DEB does not estimate dietary burdens upon cattle by correcting for the percent of the cattle fed the treated commodities and for the percent crop treated.) As the petitioner points out, using the Guidelines leads to a conservative estimate of the dietary burden. Ciba-Geigy's sources indicate that corn forage could account for 100% of the cattle diet. According to Feeds & Nutrition--Complete (M.E. Ensminger and C.G. Olentine, Jr., Ensminger Publishing Co, Clovis, CA, 1978), corn fodder could comprise up to 90% of the diet without compromising nutritional requirements. Therefore, the dietary burden imposed cattle could be as high as 9-10 ppm.

A cattle feeding study had been submitted with PP #4F3074. The residue levels found in various matrices are shown below.

	Total Residues Found (PPM) Feeding Level (PPM)		
Matrix	15	75	150
Kidney	0.56-0.63	3.0-4.7	5.0-6.5
Liver	0.50-0.81	2.7-4.3	4.6-5.6
Fat	<0.05	0.07-0.23	0.13-0.26
Meats	<0.05	<0.05-0.11	<0.09-0.18
Milk	<0.05	<0.01-0.08	<0.01-0.11

The data indicate that there is a roughly linear relationship between dose and residue levels in kidney and liver. It is apparent that a dietary burden of up to 9 ppm could lead to secondary residues in liver and kidney that exceed the tolerance of 0.2 ppm.

DEB concludes that the established tolerances of 0.2 ppm in the liver and kidney of cattle, goats, hogs, horses, and sheep would not adequately cover secondary residues in these tissues arising from the proposed use. However, because the nature of the residue in ruminants is not adequately understood, DEB is unable to recommend tolerances in liver and kidney to cover the proposed uses or to judge the adequacy of the established tolerances for meat and milk.

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Poultry

Poultry feeding studies were submitted with PP #4F3074. The reported residue levels are tabulated below.

Feeding level (PPM)	Maximum Total Residues (PPM) Eggs	Meat	Fat	Skin	Liver
7.5	<0.05	<0.05	<0.05	<0.05	<0.10
37.5	0.18	<0.05	<0.05	0.05	0.16
75.0	0.37	0.07	0.11	0.07	0.47

DEB's Comments/Conclusions, re Poultry and Eggs

Up to 50% of the diet of a laying hen may consist of soybeans. Therefore the dietary burden imposed upon poultry by the proposed use is 0.25 ppm (0.5 x 0.5 ppm).

Although the dietary burden is quite low, no poultry metabolism studies have been submitted. The available metabolism studies with goats using a Tilt analog indicate that metabolic changes occur on the dichloro-phenyl ring, the moiety of concern; these metabolites may not be determined by the methodology used in the feeding studies.

At this time, DEB cannot judge whether the established tolerances on poultry commodities would cover secondary residues arising from the proposed uses.

Other Considerations

Codex has established an MRL of 0.05 ppm propiconazole on cereal grains (except rice). There are no Mexican or Canadian limits on the subject commodities. There will be a compatibility problem with Codex if the tolerance on corn is established.

The proposed tolerance of 0.10 ppm is twice the limit of determination. DEB has inspected the chromatograms of check samples and treated samples of corn grain. The levels in both check and treated samples appeared to be well below 0.05 ppm. DEB has no objection to lowering the proposed tolerance to 0.05 ppm, provided the residue data on corn grain from CA justify the lower tolerance. Lowering the tolerance to bring it into agreement with Codex is possible only because there were no detectable residues of propiconazole or any of its metabolites. The petitioner should be informed that he has the option of proposing a tolerance of 0.05 ppm to bring the US tolerance into agreement with Codex.

DEB has been asked by the Science Analysis and Coordination Branch/ HED to address the possibility of harmonizing the US definition with Codex. The US definition includes the parent and the metabolites containing the dichlorobenzyl moiety, whereas the Codex definition is in terms of parent only. Plant metabolism

studies have shown that the parent constitutes a relatively minor portion of the total radioactive residue. The other metabolites as well as the parent are converted to dichlorobenzoic acid by the enforcement methodology. DEB believes that the US tolerance expression gives a truer picture of the residues of concern.

Attachment 1: International Residue Limit Status Sheet
Attachment 2: Structures of Tilt and its Metabolites
Structure of CGA-64251
cc: PMSD/ISB, RF, Circu, Reviewer-Deyrup, PP#8F3674
RDI:J. Onley:12/9/88:R. A. Loranger:12/12/88
TS-769:CM#2:RM810:X7484:C. Deyrup:cd:12/13/88

Attachment #1

INTERNATIONAL RESIDUE LIMIT STATUS

Fred Suss 12/5/88

CHEMICAL Propiconazole

CODEX NO. 160

CODEX STATUS:

☑ No Codex Proposal Step 6 or above

Residue(if Step 8): propiconazole

Crop(s)	Limit (mg/kg)
Cereal grains (except rice)	0.05*

CANADIAN LIMITS:

☑ No Canadian limit

Residue: _____

Crop(s)	Limit (mg/kg)

PROPOSED U.S. TOLERANCES:

Petition No. 8F3674

RCB Reviewer C. Deyrup

Residue: propiconazole + metabolites containing dichlorobenzyl moiety, expressed as propiconazole

Crop(s)	Limit (mg/kg)
Celery	5.0
Corn Forage	10.0
Corn Fodder	10.0
Corn Grain	0.1
Corn, Sweet (K+CWHR)	0.1
Pineapples	0.1
Pineapple Fodder	0.1
Legume Vegetables (Succ or dried)	0.5
Legume Vegetable foliage	5.0

MEXICAN LIMITS:

☑ No Mexican limit

Residue: _____

Crop(s)	Limit (mg/kg)

NOTES: * Step 3 Codex proposal initially proposed at 0.1 ppm.

END OF DOCUMENT

13544

R062966

Chemical:	**Propiconazole**
PC Code:	**122101**
HED File Code	**11500 Petition Files Chemistry**
Memo Date:	**09/03/2003**
File ID:	**00000000**
Accession Number:	**412-04-0145**

HED Records Reference Center
07/02/2004