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

MAY 6 1993

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP#8F3674 -- Propiconazole (Tilt®) in/on Corn and Pineapple. Ciba-Geigy Amendment Dated 11/20/92.

DP Barcode: D185251. CB # 10974.
MRID # 425640-04 through -06.

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The present submission addresses deficiencies outlined in C3TS' 12/14/88 memo (C. Deyrup). Ciba-Geigy is withdrawing its requests for tolerances on legume vegetables and foliage and is proposing the following tolerances for residues of the fungicide propiconazole (1-{[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl}-1H-1,2,4-triazole) and its metabolites determined as 2,4-dichlorobenzoic acid and expressed as parent equivalents:

Commodity	Proposed Tolerance (ppm)
Corn forage	12.0
Corn fodder	12.0
Corn grain	0.1
Corn, Sweet (K+CWHR)	0.1
Cattle, kidney & liver	2.0
Goats, kidney & liver	2.0
Hogs, kidney & liver	2.0

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Sheep, kidney & liver	2.0
Pineapples	0.1
Pineapple fodder	0.1

Tolerances for corn forage and fodder had been previously proposed as 10 ppm. The tolerances on animal commodities are the current tolerances with an expiration date established under 40 CFR 180.434 as a result of PP#9F3706. The current expiration date for these tolerances is 6/21/93.

Summary of Deficiencies Remaining to Be Resolved

----- Metabolism (information on storage)

----- Processed Fractions (storage stability, examples of recovery calculations)

Conclusions

1a. The nature of the residue in plants is adequately understood. The residue to be regulated is propiconazole, per se, and its metabolites determined as 2,4-dichlorobenzoic acid.

1b. The nature of the residue in ruminants and poultry will be understood once details of sample handling and length of storage for animal commodities have been submitted (PP#1F3974, S. Willett, memo of 6/11/91). The residue to be regulated is, tentatively, parent propiconazole and its metabolites analyzed as 2,4-dichlorobenzoic acid.

2. Adequate enforcement methodology now exists to quantify propiconazole and its metabolites in crops and animal commodities (PP#4F3074, PP#4F3007, PP#4E3026, memo of S. Malak, 5/28/87).

3. Proposed Section 408 tolerances are appropriate.

4a. There are no storage stability data for residues of propiconazole and its metabolites in/on corn processed products (or any processed products). Stability in representative processed commodities should be demonstrated for periods up to 30 months. We suggest flour and refined oil.

4b. Examples of calculations used to determine percent recoveries in corn processed fractions should be

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submitted. See our comments on page 11 of this memo.

4c. Pending adequate response to deficiencies noted in the previous two conclusions, the processing studies are acceptable. The tolerance for field corn grain will not be exceeded by residues in any processed corn fraction.

5. Proposed tolerances for ruminant commodities are appropriate. The main dietary input for propiconazole in ruminants is from grass seed screenings (PP#1F3974). Measurable residues in poultry are not predicted from the proposed uses.

Recommendation

CBTS recommends against the proposed tolerances for reasons given in Conclusions 1b (nature of the residue in ruminants) and 4a and b (processed commodities).

Detailed Considerations

Deficiencies listed in C. Deyrup's 12/14/88 memo are listed with Ciba-Geigy's response and CBTS' comments. Because the registrant is withdrawing its proposed tolerances on legume vegetables, those conclusions/deficiencies pertaining to these raes in the 12/14/88 memo will not be listed.

CBTS Deficiency # 1b (Conclusion # 1b from our 12/14/88 memo)

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

Ciba-Geigy Response

A revised Section B has been submitted which specifies a treatment to grazing interval of 14 days for sweet corn and 30 days for field corn. The remainder of the label for corn is unchanged from that summarized in CBTS' earlier memo.

CBTS Comment

This part of the deficiency is resolved. Submitted residue data will be summarized below.

CBTS Deficiency #1c

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

Ciba-Geigy Response

A revised Section B has been submitted which specifies the temperature in degrees Fahrenheit for the dip treatment use. The remainder of the label for pineapple is unchanged from that summarized in CBTS' earlier memo.

CBTS Deficiency # 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 upon treatment with sulfuric acid. [CBTS] 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 to 9-10 ppm.
>
> [CBTS] 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.

Ciba-Geigy Response

Ciba-Geigy submitted a new goat metabolism study in support of PP# 1F3974. Two goats received a daily dose of 125 mg phenyl ^{14}C-propiconazole for four consecutive days, equivalent to 67-92 ppm in feed.....

Ciba-Geigy has developed residue data to support the use of propiconazole on grasses grown for seed, peanuts, and legume vegetables. Based on residue data for these crops, it is expected that an extreme worst case diet for cattle would contain up to 21 ppm propiconazole residues. This level of residue would still correspond to a dietary intake for which metabolite identification in goat kidney and liver is adequate. This is further supported by method validation data...In the validation study of Method AG-517, for the determination of total propiconazole residues in meat, milk and eggs, accountability of total radioactivity derived from ^{14}C-propiconazole residues in goat and poultry tissues, milk and eggs ranged from 74-111%. This demonstrated that the majority of residues of concern (those containing the 2,4-dichlorophenyl moiety) are accounted for by the accepted enforcement methodology.

Submitted in this petition is an addendum to the goat metabolism study ("Addendum 1 to Final Report," A.M. Doweyko, MRID # 425610-06). HPLC chromatograms taken from the day 4 urine (stored frozen) from one goat are shown from 8/30/89, 12/5/89 and 4/10/90.d No qualitative change in the urine profiles could be seen.

CBTS Comment

The new ruminant metabolism study was reviewed by S. Willett in her memo of 6/11/91 for PP#1F3974. Fifty-one percent (2.3 ppm) of the liver residue and 32% (0.84 ppm) of the kidney residue were identified. Ms. Willett concluded that "Additional characterization of residues in liver and kidney may be necessary if the residue levels in the feed items approach those used in the metabolism study...Additionally, no details on sample handling and length of storage were supplied, and no data from storage stability studies on animal commodities were submitted or referenced. This information is needed to insure sample integrity."

We tentatively conclude that the nature of the residue in ruminants is propiconazole and its metabolites analyzed as 2,4-dichlorobenzoic acid. However, storage stability considerations remain outstanding, so this deficiency is not resolved. The metabolism study addendum is useful is this regard, but data on sample handling and length of storage are not present. (We note that in its 7/13/90 Phase 3 response, Ciba-Geigy states that milk and tissue samples from the cattle feeding study were frozen immediately and stored frozen at approximately -15°C for 1 to 2 months until extraction and analysis.)

CBTS Deficiency # 2c

The proposed use will result in residues of Tilt on poultry feed items. Until this 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 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.

Ciba-Geigy Response

Ciba-Geigy submitted a new chicken metabolism study...in support of PP#1F3974...None of the poultry feed items derived from corn contain propiconazole residues, our request for a tolerance in soybeans (legume vegetables) is being withdrawn, and no poultry feed items are derived from pineapples. Therefore this conclusion does not affect the proposed use of propiconazole on corn or pineapples.

CBTS Comment

The poultry metabolism study was reviewed by S. Willett in her memo of 1/11/91 for PP#1F3974. She concluded that "The poultry metabolism study is generally acceptable. However, CBTS will withhold its final conclusions on the adequacy of the study until it can be considered in the context of the petitions to which it is relevant (i.e. tolerance petitions on corn and peanuts)." As in the ruminant study, questions were raised concerning storage stability of the metabolism samples.

So long as residues of propiconazole in corn grain remain negligible, a poultry feeding study will not be necessary to support this petition. The nature of the residue in poultry is tentatively understood. The residue to be regulated is propiconazole and its metabolites analyzed as 2,4-dichlorobenzoic acid. However, questions concerning the metabolism study must be resolved, i.e., details of sample handling and length of storage should be supplied with some data on storage stability in animal commodities. This deficiency remains. (In its Phase 3 response, dated 7/13/90, Ciba-Geigy reported that egg and tissue samples were frozen immediately and stored frozen at approximately -15°C for 3 to 4 months until extraction and analysis.)

CBTS Deficiency # 3b

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

Ciba-Geigy Response

EPA has since determined that the analytical methodology for ruminants and poultry is adequate for enforcement purposes as described in EPA's review of PP#1F3974....

CBTS Comment

S. Willett concluded in her 6/11/91 memo for PP#1F3974 that the enforcement methodology for crops and animal commodities was capable of quantifying propiconazole and its metabolites containing the 2,4-dichlorophenyl moiety. This deficiency is resolved.

CBTS Deficiency # 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, celery, corn, legume vegetables, and the foliage of legume vegetables.

Ciba-Geigy Response

An extract storage stability study was conducted and results were reported in ABR-90017....

CBTS Comment

The study (MRID # 414868-02) was reviewed by W.T. Chin (PP#0F3869, memo of 8/15/90). The reviewer concluded that propiconazole residues in extracts of silage-stage corn forage and soybeans are stable for at least 3 and 8 months, respectively, when stored at 4°C. This deficiency is resolved.

CBTS Deficiency # 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 vegetable foliage) in order to demonstrate the linearity of the detector response.

Ciba-Geigy Response

Standard curve data and resulting standard curves for the 2,4-dichlorobenzoic acid methyl ester standards injected with the corn forage and fodder samples reported in ABR-88054 are provided in Figures 1 to 43. These standards were injected with each set of corn residue samples such that residue samples were always bracketed with standard injections. Each analytical set of residue samples, as a rule, began and ended with a standard injection, and one standard was injected between each one to three residue samples. A linear regression calibration curve was then constructed for the analytical set....

CBTS Comment

The submitted calibration curves show that detector response is basically linear, although the data were best fit using a second order curve. Data points tagged as "outliers" were always used in constructing the standard curves. This deficiency is resolved.

CBTS Deficiency #5j

A residue level of 9.30 ppm in corn forage was reported from a field corn trial with a PHI or 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 [CBTS] to the conclusion that the proposed tolerance on corn forage is not adequate.

Ciba-Geigy Response

Adjusting the residue level of 9.30 ppm at 175 g ai/A to the maximum application level of 200 g. ai/A the residue would become 10.6 ppm. A revised Section F has been submitted in which the tolerance for corn forage and fodder is 12.0 ppm.

CBTS Comment

This deficiency is resolved.

CBTS Deficiency #5k

No treatment to grazing interval was specified on the label for the proposed use on corn. Given the tendency of propiconazole residues to increase with shorter PHI's, [CBTS] 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.

Ciba-Geigy Response

Revised labeling which specifies a treatment-to-grazing interval of 30 days for field corn and 14 days for sweet corn is included in the revised Section B for PP#8F3674 submitted with this study.

CBTS Comment

The proposed label change was noted previously in this memo. This deficiency is resolved.

CBTS Deficiency # 5i

Before [CBTS] 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.

Ciba-Geigy Response

The two California field tests reported in the original petition, one each for field corn and sweet corn, were both conducted using furrow irrigation. Updated reports for these tests, AG-A-8459 and AG-A-8304 are submitted with this report and describe the irrigation practices used...

CBTS Comment

This deficiency is resolved. We note that residues in grain, forage and fodder were not unusually different from corresponding residues found from other trials.

CBTS Deficiency # 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, [CBTS] cannot judge the adequacy of the proposed tolerances on corn grain, sweet corn, and corn fodder.

CBTS Comment

As noted above, these deficiencies have been resolved. Proposed tolerances are appropriate.

CBTS Deficiency # 6a

The petitioner has not described the soybean and corn processing studies. A detailed description of the processing studies should be submitted so that [CBTS] 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.

CBTS Deficiency # 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 (steepwater).

CBTS Deficiency # 6c

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

Ciba-Geigy Response

A description of the corn grain processing study is included in a letter dated 5/2/89 to Ciba-Geigy from the Food Protein Research and Development Center, Texas A & M University. This study, which included only dry milling, was conducted in a manner similar to commercial practice except for the milling procedure. Ciba-Geigy has since conducted a new corn grain processing study, which included both wet and dry milling.

CBTS Comment

Because the submitted dry milling processing study did not adequately simulate the production of corn milling fractions, that part of the study is invalid.

Ciba-Geigy has submitted new processing data in the following report:

"Magnitude of Residues of Propiconazole in Field Corn Forage and Grain and Processed Fractions Following Application of Tilt 3.6E Formulation to Field Corn," P.J. Manuli, 9/29/92, Lab. Project ID ABR-92047. (MRID # 425640-05)

Two corn field trials were conducted with Tilt 3.6E at 1X, 3X, and 5X the proposed rate. Insufficient corn grain sample was available from one of the trials, held in MS. Sufficient grain samples were obtained from the other field trial, held in IL, but in this test the last application was made at 60% silking, which is later than that allowed by the proposed label.

Harvested grain and forage were stored frozen for 29-32 months before analysis. Processing was done 2-3 months after sampling. Processed fractions were analyzed at the same time as were the raca. Storage stability data are available for peanut fodder, sheils and nutmeat for 25 months. A storage stability study for incurred residues of propiconazole in grass seed, straw, and forage is in progress and will be continued for at least three and one-half years. Residuec are reportedly stable through seventeen months. Additional data are necessary for processed commodities. Stability in representative processed commodities should be demonstrated for periods up to 30 months. We suggest flour and refined oil.

Residues of propiconazole and metabolites containing the 2,4-dichlorobenzyl moiety were determined by Analytical Method

AG-454B, which is essentially AG-454A, the regulatory enforcement method. Samples are extracted by refluxing with 20% concentrated ammonium hydroxide/methanol for one hour. An aliquot is concentrated and refluxed with potassium permanganate in sodium hydroxide to convert propiconazole and its metabolites to the 2,4-dichlorobenzoate salt. After acidification, the benzoic acid is partitioned into 10% diethyl ether/hexane and the organic phase taken to dryness. The acid is converted to the methyl ester with diazomethane and the methyl ester quantitated by capillary gas chromatography/electron capture detection. Recoveries from various processed corn commodities are given in the next table. The residue detected is 2,4-dichlorobenzoic acid methyl ester and converted to propiconazole equivalents using the factor 1.79.

Table 1

Recoveries of Propiconazole from Fortified Controls of Field Corn Grain Processed Fractions

Fraction	ppm Added	Percent Recovery
Dry Milling Fractions		
Whole Kernels	0.05	120
Large Grits	0.20	117
Small Grits	0.10	112
Meal	0.20	111
Flour	0.05	106
Crude Oil (Expeller)	0.50	101
Presscake (Solvent-Extracted)	0.10	71
Crude Oil (Solvent-Extracted)	0.20	68
Refined Oil	0.05	95
Wet Milling Fractions		
Whole Kernels	0.05	83
Steepwater Concentrate	0.10	81
Coarse Gluten Starch	0.20	103
Hulls	0.05	75
Gluten	0.50	101
Starch	0.20	101

Crude Oil (Expeller)	0.50	77
Presscake (Solvent-Extracted)	0.05	78
Crude Oil (Solvent-Extracted)	0.20	80
Refined Oil	0.10	61

Representative chromatograms from the various processed fractions are given. The petitioner should submit sample calculations which demonstrate how the recoveries in the previous table were calculated. For example, on page 54 (chromatograms from crude oil), No. 79, control + 0.2 ppm propiconazole -- 08 µg injected, 0.8 pg found, 0.1607 ppm; on page 55 (chromatograms from refined oil), No. 83, control + 0.1 ppm propiconazole -- 08 µg injected, 0.7 pg found, 0.0012 ppm. If identical quantities of extract are injected and the same quantity of analyte found, the concentrations should be identical, unless there has been some dilution factor.

Residues on the RACs from the two field trials are given in the following table. As noted, only the grain from the second trial was processed.

Table 2

Propiconazole Residues in Forage and Grain from Treatment at 1X, 3X and 5X with Tilt® 3.6E

State	RAC	Rate (lbs. ai/A)	PPM Propiconazole Equivalents
MS	Forage	0	<0.05
		50	1.6
		50	0.83
		150	0.91
		250	1.9
	Grain	0, 50, 50, 150, 250	<0.05
IL	Forage	0	<0.05
		50	0.24
		50	4.4
		150	12.2

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		250	17.5
	Grain	0	<0.05
		50	<0.05
		50	<0.05
		150	<0.05
		150	<0.05
		250	0.07
		250	0.08

* Four applications were made at these levels.

Dry Milling Processed Fractions

A description of the dry milling process is given in pp 82-83 of the report. Oil was refined by addition of NaOH, mixing at room temperature followed by settling at 60-65°C for one hour. The oil solution was refrigerated overnight and the precipitated soapstock removed. The refined oil was further bleached and deodorized, but these fractions were apparently not analyzed.

Propiconazole residues were non-detected (<0.05 ppm) in all controls and processed fractions from corn treated at 1X. Residues were detected in certain processed fractions from corn treated at 5X: meal, 0.06 ppm; flour, 0.06 ppm; and presscake (solvent extracted), 0.05 ppm. Residues found in grain and processed fractions from corn treated at 5X are given in the following table:

Table 3

Propiconazole Residues in Field Corn Grain and Dried Milled Processed Fractions from Treatment with Tilt® 3.6E at 5X

Commodity	Residue Found (ppm Propiconazole Equivalents)
Whole Kernels	0.06
Large Grits	0.05
Small Grits	0.08
Meal	0.08
Flour	0.08
Crude Oil (Expeller)	<0.05
Presscake (Solvent Extracted)	0.08
Crude Oil (Solvent Extracted)	<0.05
Refined Oil	<0.05

Processed dry milling fractions required by our Residue Chemistry Guidelines to be analyzed are grits, meal, flour, crude and refined oil.

Wet Milling Processed Fractions

The wet milling process is described on pp 84-87. Propiconazole residues were non-detected (<0.05 ppm) in controls and all processed fractions from corn treated at the 1X rate except hulls, where 0.09 ppm was observed. Residues were found in the following processed fractions from corn treated at 3X: coarse gluten starch, 0.06 ppm; hulls, 0.20 ppm; presscake (solvent extracted, 0.07 ppm). Residues found in grain and processed fractions from corn treated at 5X are given in the following table:

Table 4

Propiconazole Residues in Field Corn Grain
and Wet Milled Processed Fractions
from Treatment with Tilt® 3.6E at 5X

Commodity	Residue Found (ppm Propiconazole Equivalents)
Whole Kernels	0.07
Steepwater Concentrate	<0.05
Coarse Gluten Starch	0.09
Hulls	0.22
Gluten	<0.05
Starch	<0.05
Crude Oil (Expeller)	0.07
Presscake (Solvent Extracted)	0.05
Crude Oil (Solvent Extracted)	<0.05
Refined Oil	<0.05

Processed commodities required by our Guidelines to be analyzed are starch, crude oil and refined oil.

Comment

No concentration was observed in the (required) processed fractions obtained from the wet milling process.

Apparent concentration was observed in grits, meal and flour from dried-milled processed corn, but because the reported values are close to the quantitation limit of 0.05 ppm, it is not clear whether the observed values in processed fractions are significantly different from that in grain. Additionally, the registrant claims that the only reason residues were observed in/on grain in the first place was that the corn was treated after silking -- contrary to label instructions.

Because of analytical uncertainties and the fact that measurable residues in grain are not expected when Tilt® is applied according to the label, food additive tolerances are not warranted. The proposed tolerance of 0.1 ppm in/on grain will not be exceeded by concentrations in processed commodities. However, if the label is ever changed to permit applications such that measurable residues in/on grain are expected, this subject

may have to be revisited and additional processing studies carried out.

CBTS Deficiency #7

> At a minimum, DFS 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.

Ciba-Geigy Response

Ciba-Geigy has assumed an "extreme worst case" diet using proposed tolerances for grass seed screenings (PP#1F3974), corn forage and corn grain. The following diets are calculated for beef and dairy cattle:

Table 5a

Worst Case Diet for Beef Cattle

Commodity	Tolerance (ppm)	% Diet	Diet (ppm)
Grass, screenings	60	30*	18
Corn Forage	48**	30	14
Corn Grain	0.1	40	0.04
		TOTAL	32

* Ciba-Geigy's calculation included 20% contribution from grass seed screenings and a 50% contribution from grain. We have modified the dietary estimate so that the contribution of grass seed screenings is 30%. This point is discussed in our concurrent memo for PP#1F3974. The estimated dietary intake of seed screenings for dairy cattle remains unchanged.

** The proposed tolerance for corn forage of 12 ppm has been expressed on a dry weight basis as 48 ppm.

Table 5b

Worst Case Diet for Dairy Cattle

Commodity	Tolerance (ppm)	% Diet	Diet (ppm)
Grass, screenings	60	25	15
Corn Forage	48*	50	24
Corn Grain	0.1	25	0.03
		TOTAL	39

* Dry weight basis.

By using results from the 75 ppm dose level, required tolerances can be derived, as shown in tne following table.

Table 6

Required Tolerances for Meat and Milk

Cattle Sample	Residue @ 75 ppm	Est. Residue from Diets	Required Tolerance (ppm)
Milk	0.08	0.04	0.05
Kidney	4.7	2.0	2.0
Liver	4.3	1.8	2.0
Fat	0.23	0.10	0.1
Meat	0.11	0.05	0.1

CBTS Comment

Ciba-Geigy's proposed tolerances are appropriate. We note that the tolerance on grass seed screenings is pending.

Anticipated residues will not be determined in this memo. A discussion appears in PP#1F3974.

Other Considerations

Ciba-Geigy has also submitted results from a market basket survey of grass seed screening pellets. The maximum residue of propiconazole is 15 ppm, which could be used in anticipated residue calculations. These results will be discussed in our review of PP#1F3974.

Tolerances on pineapples and pineapple fodder are appropriate (C. Deyrup, PP#8F3674, memo of 12/14/88).

cc: RF, Circu., PP#1F3974, Mike Flood, E. Haeberer, J. Fleuchaus (LE-132P).

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RDI:SectionHead:ETHaeberer:5/4/93:BranchSeniorScientist:RALoranger: 5/5/93.