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

JUL 28 1993

MEMORANDUM

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

SUBJECT: Thiabendazole. Case No. 2670. Response to Phase IV Review: Residue Chemistry Data. MRID No. 42718401. CBRS No. 11792. DP Barcode:D190457.

FROM: Leung Cheng, Chemist
Special Review Section I
Chemistry Branch II - Reregistration Support
Health Effects Division (H7509C)

THROUGH: Edward Zager, Chief
Chemistry Branch II - Reregistration Support
Health Effects Division (H7509C)

TO: Frank Rubis, CRM # 51
Accelerated Reregistration Branch
Special Review/Reregistration Division (H7508W)

and

Andrew Rathman, Acting Chief
Chemical Coordination Branch
Health Effects Division (H7509C)

Attached is a review of wheat field residue and processing data submitted by Merck in response to the thiabendazole Phase IV review. This review was completed by Acurex Corporation under supervision of CBRS, HED. It has undergone secondary review and has been revised to reflect Branch policies.

The registrant needs to demonstrate that conjugates of benzimidazole (BNZ) are hydrolyzed under the method experimental conditions to BNZ and have been included in the reported BNZ levels. A revised tentative Residue Chemistry Data Summary sheet is attached. If you need additional input please advise.

Attachment: Thiabendazole Phase 5 - Reregistration Review Residue Chemistry

cc (without Attachment):RF
cc (with Attachment):Circ, SF, List B File, Cheng, Acurex
H7509C:CBRS:LCheng:CM#2:RM804/810D:7/22/93:03:THIABEND\WHEATRES

THIABENDAZOLE
(Chemical Codes 060101 & 060102)
(CBRS No. 11792; DP Barcode D190451)

TASK 2B

Phase 5 - Reregistration Review
Residue Chemistry

July 1, 1993

Contract No. 68-DO-0142

Submitted to:

U.S. Environmental Protection Agency
Arlington, VA 22202

Submitted by:

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THIABENDAZOLE

(Chemical Codes 060101 & 060102)

(CBRS No. 11792; DP Barcode D190451)

PHASE 5 - REREGISTRATION REVIEW RESIDUE CHEMISTRY

Task 2B

BACKGROUND

The Thiabendazole Phase 4 review dated 2/91 required data depicting residues of thiabendazole and its regulated metabolites in or on wheat grain, forage, and straw to support current label use directions for ground, aerial, and chemigation (sprinkler irrigation) applications of the flowable formulation. Data were also required depicting residues of thiabendazole and its regulated metabolites in wheat commodities processed from grain bearing measurable residues. In addition, the registrant was required to amend the flowable formulation label to include a PHI supported by the residue data.

In response, Merck & Co. Inc. (1993; MRID 42718401) submitted an analytical method description with method validation data, an independent laboratory method validation, storage stability data, and magnitude of the residue data for wheat grain, straw and processed commodities. These data are reviewed here to determine their adequacy in fulfilling residue chemistry data requirements. The Conclusions and Recommendations stated in this review pertain only to analytical methods, storage stability data, and thiabendazole residues in or on wheat grain and straw, and wheat processed commodities.

The nature of the residue in plants and animals is adequately understood. The residues of concern in plants are thiabendazole (TBZ), the degradate benzimidazole (BNZ), and its conjugates (L. Cheng; CBRS No. 8192, 3/11/92). The residues of concern in animals are thiabendazole, 5-OH thiabendazole and its conjugates, and BNZ (L. Cheng; CBRS Nos. 8719 and 8930, 3/2/92). Methods are available for determining residues of thiabendazole per se in or on plant commodities and are listed in PAM, Vol. II, as Methods I, A, B, and C. A method is available for determining residues of thiabendazole and 5-OH-thiabendazole in milk, and is listed in PAM, Vol. II, as Method D. In addition, the Agency (L. Cheng, CB No. 8192, 3/11/92) has requested that the registrant submit a residue analytical method for plant commodities that is capable

of determining all the residues of concern, including conjugates of BNZ.

The 1 ppm U.S. tolerance for residues of thiabendazole in or on wheat grain is not compatible with the 0.2 ppm Codex MRL (CXL) for residues of thiabendazole in or on cereal grains. In addition, once the U.S. tolerance expression for thiabendazole residues is expanded to include residues of BNZ and its conjugates, the U.S. and Codex MRL definitions will no longer be compatible.

Thiabendazole Benzimidazole (BNZ)

CONCLUSIONS/RECOMMENDATIONS

1a. The submitted residue analytical method (ABC Laboratories' HPLC spectrofluoro-metric method) does not contain an enzyme hydrolysis step. Previous plant metabolism data indicated that BNZ conjugates are stable towards hot methanolic KOH and are released as BNZ after glucosidase hydrolysis (L. Cheng, 3/11/92). The registrant needs to provide method validation data that reflect TBZ, BNZ, and BNZ conjugates.

1b. Personnel listings indicate that the laboratory personnel conducting the independent validation had previous experience with the method being validated. The guidelines in PR Notice 88-5 state that the laboratory conducting the independent validation must be unfamiliar with the method, both in its development and in its subsequent use in analyzing field samples. In addition, the method submitted for inclusion in PAM, Vol. II as an enforecment method must be capable of determining all residues of concern.

2. Residues of thiabendazole and BNZ were each <0.05 ppm in or on grain harvested 60-128 days following a single broadcast foliar early season application (at tillering) of thiabendazole (89% DF) at 0.67 lb ai/A (1x) using either aerial or ground equipment, and residues of thiabendazole and BNZ in or on wheat straw from the same treatment were <0.05-0.13 ppm and <0.1 ppm, respectively. If the

registrant intends to support uses for the two late season foliar applications at 0.36 lb ai/A/application, then data supporting these uses are required. Further, the registrant needs to demonstrate that conjugates of BNZ are hydrolyzed to BNZ under the residue method experimental conditions and have been included in the reported BNZ levels. Pending resolution of the analytical method used and assuming applications later in the season are no longer supported, no additional data on wheat grain and straw will be required,

and thiabendazole labels must be amended to exclude late season applications and include a PHI of 60 days.

3. Residues of thiabendazole and BNZ were each <0.05 ppm in wheat commodities processed from grain bearing nondetectable (<0.05 ppm) residues of thiabendazole and BNZ following a single foliar application of thiabendazole at tillering at 10x the maximum use rate. If the registrant intends to only support the single foliar application of thiabendazole at 0.67 lb ai/A (1x) at tillering, and pending resolution of the analytical method used, then the current data indicate that the established 3 ppm food/feed additive tolerances for milled wheat fractions are not necessary and should be deleted from the 40 CFR 185.5550 and 186.5550[a] entries.

4. Pending resolution of the analytical method used, the submitted storage stability data indicate that residues of thiabendazole and BNZ are stable in frozen storage at -15 C for up to 23 months in or on grain and straw, and for up to 18 months in or on bran and flour.

DETAILED CONSIDERATIONS

Residue Analytical Methods

Merck & Co. Inc. (1993; MRID 42718401) submitted a description of an analytical method for determining residues of thiabendazole and BNZ in or on wheat grain, straw, and processed products, along with method validation data. Residues of thiabendazole and BNZ were determined using an HPLC spectrofluorometric method developed by ABC Laboratories and described in ABC Laboratory Report #39296.

In brief, thiabendazole and BNZ are extracted from wheat commodities with methanol (MeOH) followed by refluxing in 3 N

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KOH/MeOH. The filtered extracts are combined, evaporated to a paste, diluted with water, and acidified with HCl. The residues are then partitioned with ethyl acetate (EtOAc), (the aqueous phase) adjusted to pH 9-12, and reextracted into EtOAc. Residues in the EtOAc fraction are diluted with 10% acetic acid in water and evaporated to near dryness. Prior to analysis, residues are reconstituted in 10% acetic acid. Residues of thiabendazole and BNZ are determined by reverse phase HPLC using spectrofluorometric detection. For thiabendazole analysis, the excitation wavelength is 300 nm and the emission wavelengths are 350 nm (grain and processed products) and 365 nm (straw). For BNZ analysis, the excitation wavelengths are 271 nm (grain and processed products) and 261 nm (straw), and the emission wavelength is 300 nm.

For method validation, 2-3 control samples each of wheat grain, bran, flour, and straw were fortified with thiabendazole and BNZ. Fortification levels and method recoveries are shown in Table 1. Sample calculations and chromatograms were provided. In two control samples per commodity, apparent residues of thiabendazole were <0.02 ppm in or on grain, bran, flour, and straw, and apparent residues of BNZ were <0.02 ppm in or on grain, bran, and flour, and <0.05 ppm in or on straw. These levels represent the registrant's reported limits of detection (LOD) for the method. The registrant stated that the limit of quantitation (LOQ) for thiabendazole was 0.05 ppm in wheat grain, straw, and processed products, and that the LOQ for BNZ was 0.05 ppm in wheat grain and processed products and 0.1 ppm in straw.

For wheat commodities fortified at 0.05-2 ppm, recoveries were 75-110% for thiabendazole and 77-109% for BNZ. However, the example chromatograms provided by the registrant for fortifications at 0.05 ppm in wheat grain and straw indicate that there is significant background interference at 0.05 ppm which may prevent adequate peak identification and therefore recovery calculation at this level. These chromatograms suggest that a higher threshold for the LOQ would be more appropriate. Furthermore, plant metabolism data showed that BNZ conjugates were stable towards hot methanolic KOH and were only released as BNZ after glucosidase hydrolysis (L. Cheng, 3/11/92). The registrant needs to submit recovery data which reflect TBZ, BNZ, and BNZ conjugates.

Table 1. Recoveries of thiabendazole and BNZ (free) from fortified samples of wheat commodities using ABC Laboratories' HPLC spectrofluorometric method.

Matrix	Fortification Level (ppm)	% Recovery Thiabendazole	% Recovery Benzimidazole
Grain	0.02	98, 108, 50	118, 114, 96
	0.05	82, 75, 84	78, 101, 105
	0.2	80, 81	97, 93, 95
	2.0	110, 109	102, 107, 105
Bran	0.05	79, 86, 90	94, 109, 77
	0.2	92, 95	88, 90, 89
	2	89, 93	85, 91, 88
Flour	0.05	91, 94, 103	101, 96, 102
	0.2	83, 81, 82	88, 96, 92
	2	84, 90	92, 92
Straw	0.05	103, 105, 109	91, 91, 85
	0.2	84, 85	78, 85

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The registrant also submitted (1993; MRID 42718401) an independent laboratory method validation for the above method in accordance with PR Notice 88-5 guidelines. Wheat grain and straw samples were fortified with thiabendazole at 1.0 ppm (established tolerance) and 5.0 ppm. Residues of thiabendazole were determined using the above HPLC spectrofluorometric method developed by ABC Laboratories. The independent laboratory validation was also conducted by ABC Laboratories. The conducting laboratory reported that the first trial of the method was successful and that no deviations from the method were required. Method recoveries from two samples at each fortification level were 78-96% from grain and 73-81% from straw. Representative chromatograms and sample calculations were provided. The independent validation report noted that there was no contact between the method validation team and the developers of the method until after the successful completion of the method. However, CBRS notes that seven of the eight project personnel listed (p. 1842) for the independent validation test (completed by 10/7/92) were also included as project personnel (p. 1761) on an earlier study (conducted 3/91-5/92) in which the same method was used to determine residues of thiabendazole and BNZ in treated wheat samples.

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The guidelines in PR Notice 88-5 specifically state that the laboratory conducting the independent validation must be unfamiliar with the method, both in its development and in its subsequent use in analyzing field samples. Because the personnel conducting the validation had previous experience with the method, this study cannot be considered an independent validation. In addition, the submitted method must be capable of determining all residues of concern (see above).

In conjunction with the submitted storage stability data (1993; MRID 42718401), the registrant provided method validation data and a method description for a modified version of the above method. For the storage stability analyses, residues were extracted in aqueous/MeOH (20/80, v/v), rather than in methanolic KOH. The extracts were filtered, diluted with 1.2 N phosphoric acid, partitioned with EtOAc, adjusted to pH 9-12 with 4 N sodium hydroxide, and reextracted into EtOAc. Residues in the EtOAc fraction were diluted with 10% acetic acid, concentrated, and

reconstituted in 10% acetic acid prior to analysis. Thiabendazole and BNZ were determined by reverse phase HPLC with spectrofluorometric detection as described above.

To validate the modified HPLC spectrofluorometric method used in the storage stability study, 2-3 control samples each of wheat grain, bran, flour, and straw were fortified with thiabendazole and BNZ. Fortification levels and method recoveries are shown in Table 2. Sample calculations were provided, but no chromatograms were included in the report. In the two control samples per commodity, apparent residues of thiabendazole and BNZ were <0.01 ppm in or on grain and <0.04 ppm in or on bran, flour, and straw. In addition to the method validation data, the registrant analyzed two freshly fortified control samples of each wheat commodity at each storage interval to determine concurrent method recoveries. The concurrent method recoveries for wheat commodities fortified at 0.2 ppm were 55-107% for thiabendazole and 69-110% for BNZ (see Table 3).

As indicated earlier, a method which is capable of quantifying BNZ conjugates must be used in a storage stability study of TBZ residues in wheat grain, bran, flour, and straw.

Table 2. Recoveries of thiabendazole and BNZ (free) from fortified samples of wheat commodities using a modified version of ABC Laboratories' HPLC spectrofluorometric method.

Matrix	Fortification Level (ppm)	% Recovery Thiabendazole	% Recovery Benzimidazole
Grain	0.01	78, 81, 84	74, 90, 114
	0.1	92, 90	93, 92

	1	87, 90	98, 91
Bran	0.04	77, 83, 78	98, 99, 79
	0.4	94, 88	93, 90
	4	88, 93	95, 111
Flour	0.04	84, 87, 82	90, 71, 91
	0.4	89, 92	95, 95
	4	84, 90	87, 92
Straw	0.04	83, 89, 95	101, 86, 102
	0.4	87, 81	90, 98
	4	72, 79	91, 85

Storage Stability Data

Merck & Co. Inc. (1993; MRID 42718401) submitted data depicting the stability of thiabendazole and BNZ in or on wheat grain, straw, bran, and flour. Control samples of each commodity were fortified with thiabendazole or BNZ each at 0.2 ppm and stored at -15 C for up to 23 months for wheat grain and straw and up to 18 months for bran and flour.

Two freshly fortified control samples, an unfortified control sample from storage, and two previously fortified control samples from storage were analyzed at each storage interval. Residues of thiabendazole and BNZ were determined using ABC Laboratories' modified HPLC spectrofluorometric method.

Apparent residues of thiabendazole and BNZ were each <0.01 ppm in or on control samples of grain and <0.04 ppm in or on control samples of straw and processed commoditites. Corrected recoveries of thiabendazole and BNZ from stored samples and concurrent method recovery samples are shown in Table 3. Recoveries of stored fortified samples were corrected by the registrant for the average concurrent method recovery at each interval for each analyte, whenever the average concurrent method

recovery was <100%. Recoveries of the stored fortified straw samples from the 17- and 23-month storage intervals were also corrected for apparent residues in the unfortified controls because significant background residues were found in the unfortified controls. Concurrent method recovery samples were also corrected by the registrant for apparent residues

(unreported) found in the stored unfortified controls.

These data indicate that residues of thiabendazole and BNZ are stable at -15 C for up to 23 months in or on grain and straw, and for up to 18 months in or on bran and flour. In the current residue studies, treated samples were stored frozen for 20-21 months (grain), 22-23 months (straw), and 18-21 months (processed fractions) prior to extraction. The temperatures at which samples were stored frozen prior to extraction were unspecified, although it was reported that the extracts were stored at -15 C until analysis. Pending resolution of the analytical method used, the available storage stability data for thiabendazole and BNZ adequately support the submitted magnitude of the residue data for wheat grain and straw and wheat processed commodities.

Table 3. Stability of thiabendazole and BNZ (free) in wheat grain, bran, flour and straw stored at -15 C, along with concurrent method recoveries.

		% Recovery			
	Storage interval	Thiabendazole		Benzimidazole	
Matrix	(months)	Stored samplesa	Concurrent method recovery	Stored samplesa	Concurrent method recovery
Grain	0	100, 120	105, 107	108, 99	91, 110
	1	--	--	--	--
	3	97, 106	79, 79	94, 83	80, 73
	6	106, 106	78, 90	103, 96	87, 91
	9	94, 96	89, 87	85, 102	87, 92
	12	--	--	--	--
	17	100, 107	66, 68	94, 98	93, 94
	23	97, 94	95, 99	92, 86	95, 93
Straw	0	88, 84	74, 88	105, 106	84, 81
	1	93, 96	83, 71	78, 79	98, 95
	3	99, 100	90, 87	72, 70	73, 69
	6	102, 156	61, 66	73, 69	72, 78
	9	99, 105	82, 80	80, 74	72, 81
	12	102, 119	70, 72	98, 82	82, 94
	17	98, 94	55, 64	102, 100	79, 81
	23	105, 100	63, 61	100, 94	84, 86
Bran	0	111, 107	91, 95	86, 92	92, 101
	1	102, 94	98, 94	99, 98	94, 90
	3	100, 104	91, 90	95, 90	98, 91
	6	81, 103	95, 95	91, 89	97, 97
	12	87, 90	64, 90	91, 96	79, 77
	18	98, 99	100, 88	89, 92	101, 95
Flour	0	100, 101	91, 96	92, 99	88, 92
	1	95, 92	92, 102	107, 103	103, 104
	3	88, 85	93, 88	109, 97	105, 82
	6	93, 100	94, 98	99, 104	98, 97
	12	93, 98	100, 84	95, 94	99, 99
	18	93, 87	90, 93	104, 101	94, 95

aRecoveries for stored samples were corrected by the registrant for the average of the two concurrent method recoveries. No corrections were made if the average concurrent method recovery was 100%.

Magnitude of the Residue in Plants

Wheat grain. A tolerance of 1 ppm has been established for residues of thiabendazole per se in or on wheat grain [40 CFR 180.242(a)].

A REFS search dated 5/27/93 listed three Merck and Co. Inc. products (3.8 lb/gal FlC, 2.7 lb/gal FlC, and 89% DF) registered for use on wheat. Use directions for the 3.8 lb/gal FlC formulation (dated 10/6/89, submitted in response to DCI) specify one application/season at 0.7 lb ai/A, made after development of 2-3 tillers but prior to first node, or two applications/season at 0.36 lb ai/A/application, made at flag leaf emergence and repeated 10-14 days later. Applications may be made using ground equipment (15-20 gal/A), aerial equipment (5 gal/A), or sprinkler (only) irrigation equipment (0.1-0.2 inches water/A). A feeding/grazing restriction is specified for green forage.

Merck and Co. Inc. (1993; MRID 42718401) submitted data from 14 tests conducted in CO, KS, MN, MO, ND, OK, PA, and TX (1 ground test each), and in ID, OR, and WA (one ground and one aerial test each), depicting the residues of thiabendazole and BNZ in or on mature wheat grain harvested 60-128 days following a single foliar broadcast application at tillering of thiabendazole (89% DF) at 0.67 lb ai/A (13 tests) or at 0.99 lb ai/A (1 test) in 9.8-13.6 gal/A using ground equipment (11 tests) or in 4.9-5.7 gal/A using aerial equipment (3 tests). Two of the 14 tests were conducted on spring wheat, and 12 tests were conducted on winter wheat. The registrant reported that the application made at 0.99 lb ai/A was erroneous; 0.67 lb ai/A reflects 1x the maximum application rate. The field portion of the study was conducted by Stewart Agricultural Research Services, Inc., Macon, MO, and the analytical portion of the study was conducted by ABC Laboratories, Inc., Columbia, MO. An unspecified number of control and treated samples were harvested from each site. Following collection, grain samples were frozen and stored at the test site for up to 35 days. Samples were transported over periods from 5-31 days on freezer trucks to Merck & Co. and were subsequently shipped frozen to ABC Laboratories, where they remained frozen until analysis. Samples were stored frozen for a total of 526-638 days from sampling until extraction for analysis. The freezer storage temperatures at the laboratory prior to extraction were not specified, although it was reported that the extracts were stored at temperatures below -15 C. Residues of thiabendazole and BNZ were determined using ABC Laboratories' HPLC spectrofluorometric method. Samples calculations were provided, but no sample chromatograms were included in the report.

Apparent residues of thiabendazole and BNZ were each <0.05 ppm in or on all control samples of grain. Residues of thiabendazole and BNZ were each <0.05 ppm in or on all treated grain samples

(4-5 samples analyzed from each test site). Residues were corrected by the registrant for average method recoveries that were <100%, and both uncorrected and corrected values were reported. Concurrent method recoveries from control wheat grain samples fortified with thiabendazole and BNZ each at 0.05-0.2 ppm were 69-103% for thiabendazole and 76-107% for BNZ.

Geographic representation is adequate. The test states of CO(3%), ID(4%), KS(17%), MN(5%), MO(3%), OK(7%), OR(2%), PA(0%), TX(5%), WA(5%), and ND(14%) accounted for approximately 65% of the 1990 U.S. wheat production (Agricultural Statistics 1991, p. 5).

Pending resolution of the analytical method used, the submitted residue data adequately support the established 1 ppm tolerance for wheat grain. Residues of thiabendazole and BNZ were each <0.05 ppm in or on all treated samples following an early season application (1x rate).

Wheat straw. A tolerance of 1 ppm has been established for residues of thiabendazole per se in or on wheat straw [40 CFR 180.242(a)].

Four to seven straw samples were analyzed from each of the 14 test sites (see under Wheat grain). Apparent residues of thiabendazole and BNZ were each <0.05 ppm in or on all untreated controls. Residues of thiabendazole were <0.05 ppm in or on all treated samples from 11 test sites, and ranged from <0.05-0.13 ppm on samples from 3 test sites. Residues of BNZ were <0.1 ppm in or on all treated samples analyzed from the 14 test sites. Residues were corrected by the registrant for average method recoveries that were <100%, and both uncorrected and corrected values were reported. Concurrent method recoveries from control wheat straw samples fortified with thiabendazole and BNZ each at 0.05-2 ppm were 61-94% for thiabendazole and 63-90% for BNZ.

Geographic representation is adequate. The test states of CO(3%), ID(4%), KS(17%), MN(5%), MO(3%), OK(7%), OR(2%), PA(0%), TX(5%), WA(5%), and ND(14%) accounted for approximately 65% of the 1990 U.S. wheat production (Agricultural Statistics 1991, p. 5).

Pending resolution of the analytical method used, the submitted residue data adequately support the established 1 ppm tolerance for wheat straw. Residues of thiabendazole and BNZ in or on wheat straw were <0.05-0.13 ppm and <0.1 ppm, respectively, following an early season application (1x rate).

Wheat processed commodities. Tolerances of 3 ppm have been established for the residues of thiabendazole per se in wheat milled products (except flour) [40 CFR 185.5550 and 186.5550(a)].

Merck and Co. Inc. (1993; MRID 42718401) submitted data from 2 tests conducted in ID and MO (1 test each) depicting the concentration of residues of thiabendazole and BNZ in wheat processed commodities (grain dust, bran, middlings, shorts, red dog, low grade flour and patent flour) processed from mature wheat grain harvested 101 (ID) and 97 (MO) days following a single foliar broadcast application of thiabendazole (89% DF) at 6.7 lb ai/A (10x) applied at tillering. A control and a treated sample were harvested from each site and processed using simulated commercial practices. Grain and processed fractions were stored frozen from 558-626 days prior to extraction for analysis. The storage temperatures prior to extraction were not specified, although it was reported that the extracts were stored at -15 C. Residues of thiabendazole and BNZ were determined using ABC Laboratories' HPLC spectrofluorometric method.

Apparent residues of thiabendazole and BNZ were <0.05 ppm in or on all untreated controls. Residues of thiabendazole and BNZ were also each <0.05 ppm in or on grain and in all processed fractions. Residues were corrected by the registrant for average method recoveries that were <100%, and both uncorrected and corrected values were reported.
Concurrent method recoveries from control samples of wheat processed commodities (red dog, bran, middling, flour, and grain dust) fortified with thiabendazole and BNZ at 0.05 and 0.2 ppm were 77-101% for thiabendazole and 76-100% for BNZ.

Although residues of thiabendazole and BNZ were both nondetectable (<0.05 ppm) in or on the treated grain used in the processing study, the application rate used was 10x the maximum application rate (earlier season use), and the maximum theoretical concentration factor for any wheat processed fraction is 9x (Maximum Theoretical Concentration Factors, CBRS/CBTS, dated 1/93).

If the registrant intends to only support the single foliar application of thiabendazole at 0.67 lb ai/A at tillering, and pending resolution of the analytical method used, then the current data indicate that the established 3 ppm food/feed additive tolerances for milled wheat fractions are not necessary and should be deleted from the 40 CFR 185.5550 and 186.5550[a] entries.

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References

42718401 Norton, J.; Armstrong, T. (1993) Determination of the Magnitude of the Residues of the Fungicide Thiabendazole in Wheat Treated with MERTECT DF: Lab Project Number: 93020: 3020: 001-90-3000R. Unpublished study prepared by Stewart Agricultural Research Services, Inc. in assistance with Merck Research Lab. 1857 p.

Agency Memoranda

CBRS No. 8192
Subject: Thiabendazole Phase V Review. Metabolism Studies: Wheat, Soybean, and Sugar Beet.
From: L. Cheng
To: F. Rubis
Dated: 3/11/92
MRID(s): 41872901, -02, and -03

CBRS Nos. 8719 and 8930
Subject: Thiabendazole. Phase V Review. Goat and Poultry Metabolism Studies. From: L. Cheng
To: F. Rubis
Dated: 3/2/92
MRID(s): 42057901, 42011701