UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES,
AND TOXIC SUBSTANCES

MEMORANDUM

Date: November 30, 2004

Subject: Fluometuron. Summary of Analytical Chemistry and Residue Data for the Reregistration Eligibility Decision (RED) Document.

DP Barcode: D300553
Case Number: 0040
40 CFR §: 180.229

PC Code: 035503
Chemical Class: Phenylurea

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This analytical chemistry and residue data summary document was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874). The summary document has been reviewed by the Health Effects Division (HED) and revised to reflect current Office of Pesticide Program (OPP) policies.

Executive Summary

Fluometuron, 1,1-dimethyl-3-(α,α,α-trifluoro-m-tolyl)urea, is a preplant, preemergence, and/or postemergence phenylurea herbicide manufactured by Agan Chemical Manufactures, Ltd. (Agan) under the trade name Cotoran® for the selective control of broadleaf weeds and annual grasses. The U.S. Agent for Agan is Makhteshim-Agan of North America, Inc. (MANA). A search of the OPPIN Query database conducted on April 5, 2004 indicated that fluometuron is currently registered for food/feed use on cotton. The fluometuron products registered for use on cotton include the dry flowable (DF), soluble concentrate (SC), wettable powder (WP), water-dispersible granules (WDG), flowable concentrate (FC), and emulsifiable concentrate (EC) formulations. These products may be applied as broadcast, band, over-the-top spray, semidirected, directed, preplant, preemergence, postemergence, or layby treatments. For application rates please refer to Appendix A.

Tolerances for residues of fluometuron in/on raw agricultural commodities can be found in 40 CFR §180.229. Tolerances are presently established only for cotton, undelinted seed, at 0.1 ppm. Adequate data suggest the existing tolerance of 0.1 ppm on cottonseed should be revised to 1.0 ppm and a tolerance be established for cotton gin byproducts at 3.5 ppm. Also, tolerances are needed to cover fluometuron residues of concern in/on the raw agricultural commodities and processed commodities of rotational crops and for livestock commodities.

The reregistration requirements for plant metabolism are fulfilled. An acceptable study, depicting the qualitative nature of the residue in cotton plants, has been submitted and evaluated. On February 22, 1996 the HED Metabolism Committee concluded that for plants, the residues of concern consist of fluometuron and its metabolites determined as trifluoromethyl aniline (TFMA), namely CGA-41685 and CGA-41686 (S. Funk, HED Metabolism Committee Memorandum, 2/22/1996). Acceptable studies depicting the qualitative nature of the residue in ruminants and poultry have been submitted and evaluated. Based on the results of these studies, it was determined that there is a potential for secondary transfer of fluometuron residues of concern to livestock commodities; therefore, tolerances for livestock commodities must be established. The HED Metabolism Committee has determined that the residues of concern in meat, milk, poultry, and eggs consist of fluometuron and its metabolites determined as TFMA, and the hydroxylated metabolites CGA-236431, CGA-236432, CGA-13211, and their conjugates (S. Funk, HED Metabolism Committee Memorandum, 2/22/1996).

There is no Agency-validated enforcement method published in the Pesticide Analytical Manual (PAM) Volume II. The PAM Volume II, lists a spectrophotometric method (designated as Method A) that determines residues of fluometuron and metabolites convertible to TFMA and is utilized for the enforcement of plant commodity tolerances. The reregistration requirements for residue analytical methods are partially fulfilled, pending validation of Methods AG-528, AG-529, and AG-678 by Agency laboratories for tolerance enforcement and submission of a revised or new method for livestock commodities. Acceptable data collection methods, capable of determining all fluometuron residues of concern in plant (gas chromatography [GC] Methods AG-528 and AG-529) and the hydroxylated metabolites in livestock (high performance liquid chromatography [HPLC] Method AG-678) commodities have been submitted. The validated limit of quantitation (LOQ) of Methods AG-528 and AG-529 is 0.05 ppm. The validated LOQs

of Method AG-678 are 0.02 ppm for tissues and 0.01 ppm for milk. Final decision as to adequacy will be withheld until successful method validation by the Biological and Economic Analysis Division's (BEAD) Analytical Chemistry Branch (ACB). HED has deemed GC Method AG-519A for the determination fluometuron residues that may be converted to TFMA in livestock commodities inadequate. The registrant must either improve Method AG-519A or develop a new method capable of determining fluometuron residues that may be converted to TFMA in livestock commodities.

The FDA PESTDATA database dated 10/1999 (PAM Volume I, Appendix I) indicates that fluometuron is completely recovered using Multiresidue Methods Section 403 (method for phenylurea herbicides).

The reregistration requirements for storage stability data are partially fulfilled. As a result of the HED Metabolism Committee's decision to regulate the hydroxylated metabolites in livestock commodities, storage stability data are now required for this metabolite group.

A general summary of residue chemistry deficiencies is listed below; details of data requirements are listed in Table 5.

Residue Chemistry Deficiencies and Regulatory Recommendations

The reregistration requirements for residue analytical methods (Office of Prevention, Pesticides, and Toxic Substances [OPPTS] Guideline Number 860.1340) are partially fulfilled, pending tolerance method validation of Methods AG-528, AG-529, and AG-678 by BEAD's ACB. HED has deemed GC Method AG-519A for the determination fluometuron residues that may be converted to TFMA in livestock commodities inadequate for data collection purposes. The registrant must either improve Method AG-519A or develop a new method capable of determining fluometuron residues that may be converted to TFMA in livestock commodities. The method should undergo an independent laboratory validation (ILV) as described in PR Notice 96-1 dated 2/7/1996 and OPPTS 860.1340. If the ILV is successful, then the proposed enforcement method will be subjected to additional validation by BEAD's ACB. In addition, data are required for storage stability (GLN 860.1380), and for magnitude of the residue in/on cottonseed from use of the DF formulation (GLN 860.1480). Certain label revisions are also required for cotton and rotational crops as indicated by Table 5 (GLN 860.1200). These data are considered confirmatory, because adequate data are available to reassess tolerances and to conduct a dietary risk analysis.

HED has no objection to the reregistration of fluometuron for use on cotton with respect to residue chemistry, provided the confirmatory data are submitted in a timely manner.

Background

The Fluometuron Reregistration Standard Guidance Document was issued December 12, 1985; the Residue Chemistry Chapter of the Guidance Document was completed April 19, 1985. Fluometuron was also the subject of a Residue Chemistry Chapter of the Reregistration Standard Update dated April 19, 1990. Fluometuron was also the subject of a Product Chemistry and

Residue Chemistry Chapter for the Reregistration Eligibility Decision Document dated December 20, 1996. These documents summarized regulatory conclusions based on the available residue chemistry data, and specified that additional data were required for reregistration purposes. Additional data have been received and evaluated since issuance of the Fluometuron Update. The information contained in this document outlines the current Residue Chemistry Science Assessments with respect to the reregistration of fluometuron. The nomenclature of fluometuron is listed below in Table 1 and the physicochemical properties are listed in Table 2. The chemical names and structures of fluometuron and its metabolites are listed in Table 3.

Table 1. Test Compound Nomenclature.

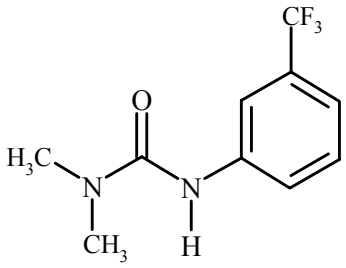
Chemical structure	
Common name	Fluometuron
Empirical formula	$C_{10}H_{11}F_3N_2O$
IUPAC name	1,1-dimethyl-3-(α,α,α-trifluoro-*m*-tolyl)urea
CAS name	*N*,*N*-dimethyl-*N*'-(3-(trifluoromethyl)phenyl)urea
CAS number	2164-17-2
PC Code	035503
End-use product (EP)	Cotoran® 4L, Cotoran® 80 DF, Fluometuron 80WP, Fluometuron 80DF, Fluometuron 4L, Fluometuron + MSMA, Drexel Creek™ Fluometuron + MSMA, Flo-Met 4L, Flo-Met 80DF, Cotoran® + MSMA with Surfactant, Cotoran® 80WP, Cotoran® 80W, Cotoran® 4L, Cotoran® DF, Cotoran® Accu-Pak

Table 2. Physicochemical Properties of the Technical Grade Test Compound.

Parameter	Value	Reference
Molecular weight	232.20	Merck Index
pH	Data Gap	
UV/visible absorption	Data Gap	
Melting point/melting range	163-164.5°C	MRID 00019017
Density	1.40 ± 0.02 g/cm^3 at 20°C	MRID 00019017
Dissociation constant in water	No dissociation	MRID 42017302
Octanol/water partition coefficient	242 (log P = 2.38)	MRID 00160757
Water solubility	105 ppm at 20°C	MRID 00152460
Solvent solubility	Acetone 15%, Chloroform 2%, Hexane <4%, Methanol 14%, Methylene 2% at 20°C	MRID 00019017

Table 2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	Reference
Vapor pressure	5 x 10^{-7} mm Hg at 20°C	MRID 00019017

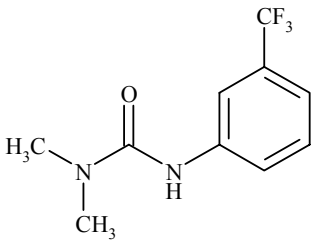
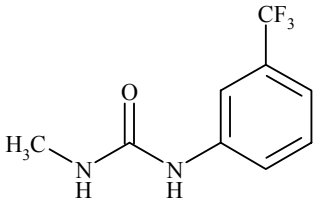
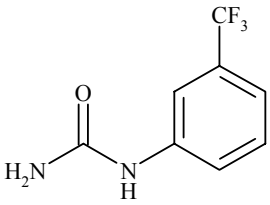
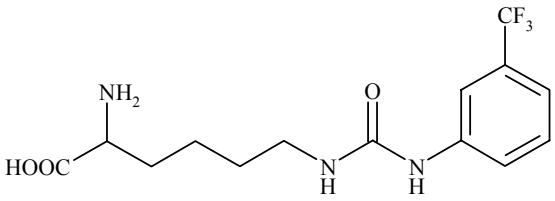
Table 3. Chemical Names and Structures of Fluometuron and Its Metabolites.	
Common Name Chemical Name	Chemical Structure
Fluometuron 1,1-dimethyl-3-(α,α,α-trifluoro-m-tolyl)urea	
CGA-41686 1-methyl-3-(α,α,α-trifluoro-m-tolyl)urea	
CGA-41685 1-(α,α,α-trifluoro-m-tolyl)urea	
Lysine Conjugate of CGA-41685	

Table 3. Chemical Names and Structures of Fluometuron and Its Metabolites.

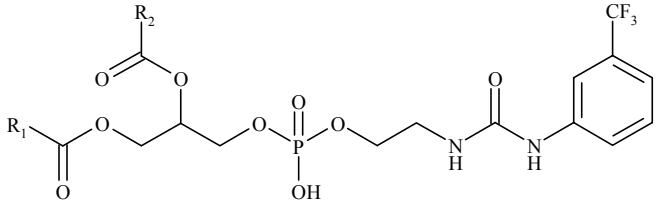
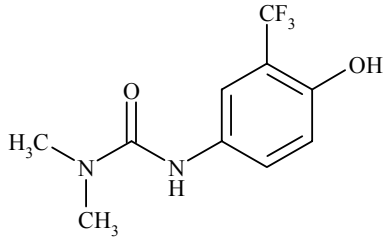
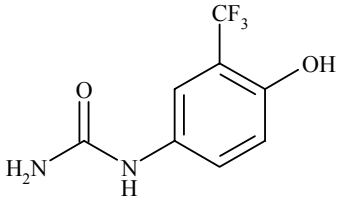
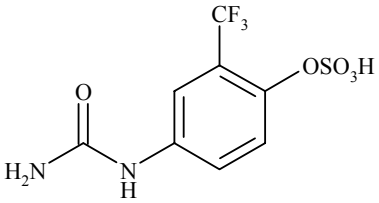
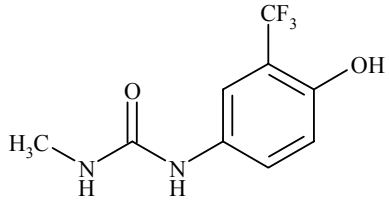
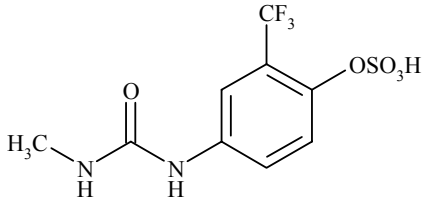
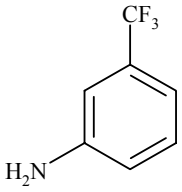
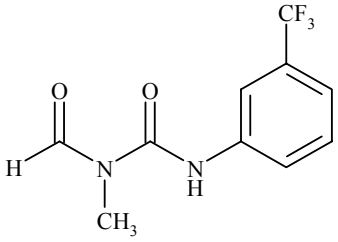
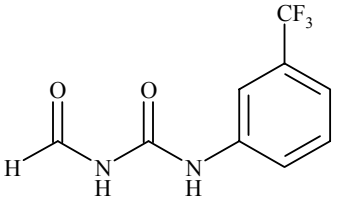
Common Name Chemical Name	Chemical Structure
Phospholipid Conjugate of CGA-41685	
CGA-13211 1,1-dimethyl-3-(4-hydroxy-3-trifluoro-methylphenyl)urea	
CGA-236431 1-(4-hydroxy-3-trifluoromethyl-phenyl)urea	
Sulfate Conjugate of CGA-236431	
CGA-236432 1-methyl-3-(4-hydroxy-3-trifluoro-methylphenyl)urea	

Table 3. Chemical Names and Structures of Fluometuron and Its Metabolites.	
Common Name Chemical Name	Chemical Structure
Sulfate Conjugate of CGA-236432	
CGA-72903 Trifluoromethyl aniline (TFMA)	
CGA-21835 1-formyl-1-methyl-3-(α,α,α-trifluoro-m-tolyl)urea	
N-demethylated CGA-21835 1-formyl-3-(α,α,α-trifluoro-m-tolyl)urea	

860.1200 Directions for Use

Product List

Currently, there are seventeen fluometuron end-use products (EPs) registered and currently active. Four are registered to Griffin, LLC (DuPont), one to Helena Chemical Co., three to Agriliance, LLC, one to Drexel Chemical Co., two to Micro-Flo Company, LLC, and six to Makhteshim-Agan of North America, Inc. These EPs are listed in Table 4.

Table 4. Registered Fluometuron EPs.			
EPA Reg. No.	Label Acceptance Date	Formulation[1]	Product Name
Griffin, LLC			
1812-285	10/13/93	41.2% DF	Meturon® 4L Herbicide
1812-323	07/29/03	80.0% WDG	Meturon® 80 DF Herbicide
1812-438	07/22/03	85.0% WDG	Cotoran® DF Herbicide
1812-439	06/1703	41.7% FC	Cotoran® 4L Herbicide
Helena Chemical Co.			
5905-494	06/04/03	80.0% WP	Fluometuron 80WP Herbicide
Agriliance, LLC			
9779-311	06/21/94	80.0% WDG	Fluometuron 80DF Herbicide
9779-312	06/17/94	41.7% EC	Fluometuron 4L Herbicide
9779-319	11/30/93	13.2% SC	Fluometuron + MSMA Herbicide
Drexel Chemical Co.			
19713-127	07/02/98	13.2% EC	Drexel Croak™ Fluometuron + MSMA Herbicide
Micro Flo Co., LLC			
51036-241	03/27/95	41.7% FC	Flo-Met 4L Herbicide
51036-242	03/27/95	80.0% WDG	Flo-Met 80DF Herbicide
Makhteshim-Agan of North America, Inc.			
66222-29	09/21/95	13.2% FC	Cotoran® + MSMA with Surfactant Herbicide
66222-30	11/29/01	80.0% WP	Cotoran® 80WP Herbicide
66222-31	09/21/95	80.0% WP	Cotoran® 80W Herbicide
66222-32	04/30/03	41.7% EC	Cotoran® 4L Herbicide
66222-33	09/21/95	85.0% WDG	Cotoran® DF Herbicide
66222-34	11/29/01	85.0% WDG	Cotoran® Accu-Pak Herbicide

1. DF = dry flowable; SC = soluble concentrate; WP = wettable powder; WDG = water-dispersible granules; FC = flowable concentrate; EC = emulsifiable concentrate.

Use Patterns

For purposes of reregistration, the registered food/feed uses of fluometuron have been re-evaluated. The registrant is supporting fluometuron uses on cotton. HED has determined that, based on the available field trial data for cotton, label revisions are required to specify the maximum application rate for each of the three application types (preemergence, early postemergence, and layby) included in the treatment program, as well as the maximum seasonal application rate. Because cotton gin byproducts are a significant livestock feed item, the feeding restriction must be removed from the product labels. Label revisions are also required to specify plantback intervals for rotational crops which are supported by the available data.

A comprehensive summary of cotton use patterns, based on the product labels registered is presented in Appendix A. A tabular summary of the residue chemistry science assessments for

the reregistration of fluometuron is presented in Table 5. The status of the reregistration requirements for each guideline topic listed in Table 5 is based on the use patterns registered by the basic producer. When end-use product DCIs are developed (e.g., at issuance of the RED), the Registration Division (RD) should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels.

Table 5. Residue Chemistry Science Assessment for Reregistration of Fluometuron.

OPPTS GLN: Data Requirements	Current Tolerances (ppm) [40 CFR]	Must Additional Data Be Submitted?	References[1]
860.1200 Directions for Use	N/A = Not applicable	Yes[2]	See Appendix A
860.1300 Nature of Residue - Plants	N/A	No	**40492411**, **40492412**, **40492413**, 43654402[3], 43654403[3], 43654404[3]
860.1300 Nature of Residue - Livestock	N/A	No	**40047401**, **40047402**, **40190704**, **40190706**, 43413403[4], 43413404[4]
860.1340 Residue Analytical Method - Plant Commodities	N/A	No	*00019009*, *00022940*, **40190714**, 40292001[5], 42017305[6], 42017306[7], 42498008[7], 43218104[8], 43654405[9], 44449401[10] & 44449402[10]
860.1340 Residue Analytical Method - Animal Commodities	N/A	Yes[11]	*00019014*, *00019160*, 40067501[12], 42017305[7], 42017306[4], 43413405[4], 44623201[21]
860.1360 Multiresidue Methods	N/A	No	42498008[13]
860.1380 Storage Stability Data	N/A	Yes[14,15,16]	*00019021, 00019099,* **41161903**, **41161904**, 42258701[17]
860.1400 Magnitude of Residue - Water, Fish, and Irrigated Crops	None established	No	
860.1460 Magnitude of Residue - Food Handling	None established	No	
860.1480 Magnitude of Residue - Meat, Milk, Poultry, and Eggs			
- Milk and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep	None established	No	**40190710**, 44623202[23]
- Eggs and the Fat, Meat, and Meat Byproducts of Poultry	None established	No	**40190711**

Table 5. Residue Chemistry Science Assessment for Reregistration of Fluometuron.			
OPPTS GLN: Data Requirements	Current Tolerances (ppm) [40 CFR]	Must Additional Data Be Submitted?	References[1]
860.1500 Crop Field Trials			
- Cottonseed and gin byproducts	0.1, cottonseed [§180.229]	Yes[2,18]	*00018930, 00018995, 00018997, 00019020, 00019022, 00019036, 00019085, 00019099, 00031739, 00034005, 00065048, 00106374*, 40190712[20], 43218101[9], 43218102[9], 44623203[19]
860.1520 Magnitude of Residue - Processed Food/Feed			
- Cottonseed processed commodities (meal, hulls, and refined oil)	None established	No	40292002[6], 43218102[9]
860.1650 Submittal of Analytical Reference Standards	N/A	No	
860.1850 Confined Rotational Crops	N/A	No	43654401[3], 43654402[3], 44084801[22]
860.1900 Field Rotational Crops	None established	Yes[2]	43218101[9], 43218102[9], 43218103[9]

1. *Italicized* references were reviewed in the Residue Chemistry Chapter of the Fluometuron Reregistration Standard dated 4/19/85. **Bolded** references were reviewed in the Residue Chemistry Chapter of the Fluometuron Reregistration Standard Update dated 4/19/90. All other references were reviewed as noted.
2. Label revisions are required for cotton and rotational crops.
Cotton: The registrant must amend fluometuron labels with registered uses on cotton to reflect the test parameters for which adequate data are available. Product labels should be amended to specify: one preemergence treatment at a maximum rate of 2.0 lb ai/A, one early postemergence treatment at a maximum rate of 1.6 lb ai/A, and one layby treatment at a maximum rate of 2.0 lb ai/A. A maximum seasonal rate of 5.6 lb ai/A should be established. In addition, because cotton gin trash is a livestock feed item not under control of the grower, the feeding restriction must be removed from the product labels.
Rotational Crops: Label amendments for all fluometuron end-use products are required to specify the appropriate plantback intervals for rotational crops. Adequate data are available to support the following intervals: three months for wheat; eight months for field corn, sweet corn, and peanuts; and nine months for rice, grain sorghum, and soybeans. If the registrant wishes to support rotational crops and plantback intervals other than those listed above, then additional rotational crop field trials must be conducted.
3. S. Funk, CBRS 15748, D216054, 2/15/96.
4. S. Funk, CBRS 14642, D208895, 2/23/96.
5. F. Griffith, CBRS 2685, 9/30/87.
6. D. McNeilly, CBRS 8619, D169105, 6/18/92.
7. D. McNeilly, CBRS 10812, D184013, 3/1/93.
8. S. Funk, CBRS 13747, D203563, 10/13/94 and 1/10/95 (Addendum).
9. S. Funk, CBRS 15749, D216055, 9/26/95.
10. K. Dockter, D241857, 9/24/99.
11. The registrant must either improve Method AG-519A or develop a new method capable of determining fluometuron residues that may be converted to TFMA in livestock commodities. The proposed enforcement method should undergo an independent laboratory validation according to PR Notice 96-1 dated 2/7/1996. Once a

successful independent laboratory validation has been completed, the proposed method will be subject to a method trial by the Agency.
12. F. Griffith, CBRS 2033, 5/28/87.
13. D. McNeilly, 1/1993. Forwarded to FDA for review.
14. Samples of cottonseed and cotton gin byproducts that are to be collected from the required field trials should be stored under frozen storage conditions and analyzed within the storage interval for which residues of fluometuron, determined as TFMA, have been found to be stable (ca. twenty months).
15. The egg and poultry tissue samples from an existing poultry feeding study were stored frozen for ca. four months. A study must be conducted investigating the stability of the hydroxylated metabolites (CGA-236431, CGA-436432, CGA-13211, and their conjugates) following storage under the same storage conditions and for the same interval.
16. Fluometuron was stable in beef muscle and in liver stored frozen for two years. Fluometuron was stable in milk stored frozen for up to one year. Additional data are required on the stability of the hydroxylated metabolites (CGA-236431, CGA-236432, CGA-13211) in milk and muscle. The storage intervals and conditions must be approximate to those of the ruminant feeding study.
17. F. Toghrol, CBRS 9698 and 9787, D176713 and D177413, 9/22/94.
18. Additional data depicting residues of fluometuron and its metabolites determined as TFMA and the hydroxylated metabolites in/on cottonseed are required. Cottonseed should be harvested/collected at normal maturity following applications of the DF formulation according to the following treatment schedule: one preemergence application at 2.0 lb ai/A, one early postemergence foliar application (when plants are 3-6 in high) at 1.6 lb ai/A, and one layby foliar application at 2.0 lb ai/A. A minimum of six trials must be conducted. The cotton plants must be harvested by commercial equipment (or similar thereof) to provide an adequate representation of plant residue from the ginning process. Stripper harvesting should be used for three trials and mechanical picker harvesting should be used for three trials. The six trials should represent the principal U.S. growing regions.
19. S. Ary, D311193, MRID 44623203, 11/11/04.
20. L. Propst, CBRS 3798, 5/18/88.
21. S. Ary, D249612, MRID 44623201, 11/11/04.
22. S. Funk, CBRS 17562, D229938, 3/18/97.
23. S. Ary, D304656, MRID 44623202, 11/11/04.

860.1300 Nature of the Residue - Plants

The qualitative nature of the residue in plants is adequately understood based on the available plant metabolism data. The reregistration requirements for plant metabolism are fulfilled and no additional data are required. Acceptable studies, depicting the qualitative nature of the residue in cotton plants, have been submitted and evaluated. On February 22, 1996 the HED Metabolism Committee concluded that for plants, the residues of concern consist of fluometuron and its metabolites determined as TFMA, namely CGA-41685 and CGA-41686 (S. Funk, HED Metabolism Committee Memorandum, 2/22/1996). See Table 3 for chemical structures.

Cotton (S. Funk, MRIDs 43654402, 43654403, and 43654403, 2/15/1996)

The field portion of the study was conducted in an acceptable manner, and adequate amounts of the radiolabeled residue were released. Fluometuron uniformly radiolabeled with ^{14}C on the phenyl ring was applied at a seasonal rate of 4.0 lbs ai/A (2.0 lbs. a.i./A preemergence plus 2.0 lbs a.i./A foliar). Combustion/Liquid Scintillation Counting (LSC) was used to determine the total radioactive residue (TRR) in immature cotton stalk (1.24 ppm), mature stalk (0.270 ppm), and seed (0.054 ppm).

Adequate amounts of the radiolabeled residue were released. Solvent extraction released significant portions of the residue from immature stalk (71% TRR), mature stalk (50% TRR),

and seed (44.9% TRR). The majority of the released radiolabeled residue was found in the aqueous fraction (48% TRR immature stalks, 45% mature stalks, 35% TRR seed). Additional residue was released from mature stalk post extraction solid (9% TRR) by acid/base hydrolysis (9%) and from seed by enzyme, acid, and base hydrolyses (45% TRR). Residual (not released) radiolabeled residue totaled 8% TRR in seed, 28% TRR in mature stalk, and 23% TRR in immature stalk.

Identification and characterization of the radiolabeled residues were adequate. The solvent extracts and hydrolysates were analyzed by Thin Layer Chromatography (TLC) and HPLC. The aqueous fractions were subjected to flash column chromatography and anion exchange chromatography, and isolates were analyzed by HPLC, TLC, Mass Spectrometry (MS), and Nuclear Magnetic Resonance (NMR). Co-chromatography and spectra comparisons were conducted with a series of standards. Table 6 lists the metabolites that were identified.

Table 6. Metabolites Identified in the Cotton Metabolism Studies.

Metabolite	Matrix	Concentration	
		% TRR	PPM
Trifluoroacetic Acid (TFAA)	Immature Stalk	20	0.25
	Mature Stalk	31	0.084
	Seed	22	0.016
CGA-41685	Immature Stalk	16	0.20
	Mature Stalk	<3[1]	<0.037
	Seed	<2[1]	<0.001
CGA-41685 Conjugate[2]	Immature Stalk	7.2	0.087
	Mature Stalk	1.8	0.005
	Seed	2.6	0.002
Fluometuron	Immature Stalk	0	ND[3]
	Mature Stalk	0	ND
	Seed	0	ND
Total Identified	Immature Stalk	43	
	Mature Stalk	36	
	Seed	24	

1. % TRR in chloroform extract; multiple peaks.
2. Conjugated via the amine, possibly a sugar conjugate.
3. ND = Not detected.

Additional residues were characterized. For immature stalk, 10% TRR from the hexane/heptane and chloroform extracts were isolated as non-polar HPLC components and were found not to be converted to trifluoromethyl aniline by base hydrolysis. Thus, 10% TRR is non-polar conjugates without the CF_3 and/or phenyl moieties. Fraction 3 from the flash chromatographic separation of

the aqueous extract may have contained CGA-13211 and CGA-41690 (HPLC), <6% TRR, but the identifications were tentative. The post extraction residue from immature stalk (24% TRR) did not contain radiolabeled residue incorporated into cellulose or protein, nor did it contain glucose conjugates or other conjugates that could be converted to TFMA. The post extraction residue of mature stalk did contain 9% TRR released as TFMA. The post extraction residue of cottonseed (40% TRR) was characterized as containing 15% TRR released by cellulase and 30% TRR (0.009 ppm) released by mild base and acid hydrolyses.

The metabolism of fluometuron is adequately understood in cotton. Fluometuron is completely degraded and converted to trifluoroacetic acid (TFAA) and to 3-trifluoromethylphenyl urea (CGA-41685) and conjugates thereof. Phenoxy compounds, such as CGA-236431, are not found, but could be intermediates in the formation of TFAA. The metabolite TFAA is excluded from the residue of concern in both cotton and rotational crops. About 25% TRR in seed is associated with cellulose, and about 30% TRR is conjugates or incorporated radiolabel released by mild acid and base hydrolysis.

860.1300 Nature of the Residue - Livestock

The reregistration requirements for livestock metabolism are fulfilled. Acceptable studies depicting the qualitative nature of the residue in ruminants and poultry have been submitted and evaluated. Based on the results of these studies, it was determined that there is a potential for secondary transfer of fluometuron residues of concern to livestock commodities; therefore, tolerances for livestock commodities must be established. The HED Metabolism Committee has determined that the residues of concern in meat, milk, poultry, and eggs consist of fluometuron and its metabolites determined as TFMA, and the hydroxylated metabolites CGA-236431, CGA-236432, CGA-13211, and their conjugates (S. Funk, HED Metabolism Committee Memorandum, 2/22/1996). See Table 3 for chemical structures.

Ruminant Metabolism (S. Funk, D208895, MRID 43413404, 2/23/1996):

The ruminant metabolism study is fully acceptable. Lactating goats were fed for four days a diet containing 75 ppm fluometuron ^{14}C-radiolabeled in the phenyl ring. The majority of the radioactivity was eliminated in the urine (88% of total administered dose). The appropriate tissues and milk were collected and radioassayed; and the radioactivity was recovered by a combination of solvent extraction and enzyme hydrolysis. Radioactivity in milk plateaued at about 0.32 ppm. The percentages of radioactivity recovered were 94% for milk, 66% for liver, 69% for kidney, 78% for muscle, and 93% for fat. About 46% TRR in liver, 56% TRR in kidney, and 67% TRR in milk were adequately identified. Radioactivity levels were too low in muscle and fat to confirm HPLC profile tentative identifications of about 65% TRR in muscle and 43% TRR in fat.

The major metabolites in liver (20% TRR), muscle (27% TRR), and fat (12% TRR) were CGA-41685, N-didemethylated fluometuron or trifluoromethyl-m-phenyl urea, and its phospholipid conjugate. The major metabolites in kidney (35% TRR) and milk (55% TRR) were para hydroxylated derivatives (CGA-236431, CGA-236432, and CGA-13211). This finding is corroborated by the 85% TRR in urine attributed to para hydroxylated compounds. Fluometuron

was not a major (>10% TRR) metabolite in any matrix.

Poultry Metabolism (S. Funk, D208895, MRID 43413403, 2/23/1996):

The poultry metabolism study is fully acceptable. Five hens were fed for eight days a diet containing 100 ppm fluometuron ^{14}C-radiolabeled in the phenyl ring. The majority of the radiolabeled residues were eliminated in the excreta (83% TRR). Appropriate matrices were sampled and radioassayed; the radioactive residue did not plateau in eggs over the eight days. The majority of the radiolabeled residue was recovered from tissues and eggs by a combination of solvent extraction, enzyme hydrolysis, and mild acid hydrolysis (liver only). The following percentages of radiolabeled residues were recovered: muscle, 95%; fat, 74%; liver, 81%; and eggs, 97%. Approximately 92% TRR in muscle, 69% TRR in fat, 65% TRR in liver, and 87% TRR in eggs were adequately identified.

The major metabolites in muscle (54% TRR), liver (40% TRR), and eggs (79% TRR) were CGA-41685 and its lysine and phospholipid conjugates. The major metabolite in peritoneal fat was fluometuron (42% TRR), although CGA-41685 was present at a significant concentration (18% TRR). Fluometuron was 12% TRR in muscle and 3% and 1% in liver and eggs, respectively. The para hydroxylated metabolites (CGA-236432, CGA-236432, CGA-13211, sulfate conjugates) were found at the following concentrations: muscle, 13.5% TRR; fat, 2% TRR; liver, 20% TRR; eggs, 2.8% TRR. The hydroxlyated metabolites were the main radiolabeled components of the excreta (76% TRR). Kidney samples were not analyzed.

860.1340 Residue Analytical Methods

The reregistration requirements for residue analytical methods are partially fulfilled, pending validation of Methods AG-528, AG-529, and AG-678 by Agency laboratories for tolerance enforcement and submission of a revised or new method for livestock commodities. Acceptable data collection methods, capable of determining all fluometuron residues of concern in plant (GC Methods AG-528 and AG-529) and the hydroxylated metabolites in livestock (HPLC Method AG-678) commodities have been submitted. HED has deemed GC Method AG-519A for the determination fluometuron residues that may be converted to TFMA in livestock commodities inadequate for data collection purposes because of unacceptable radiovalidation recoveries. The registrant must either improve Method AG-519A or develop a new method capable of determining fluometuron residues that may be converted to TFMA in livestock commodities.

Methods for determination of residues in/on plant commodities: The PAM Volume II, presently lists a spectrophotometric method, designated as Method A, for the determination of residues of fluometuron and its metabolites that are convertible to TFMA. Method A has not been subjected to an Agency method validation.

The registrant has submitted descriptions and provided recovery data for GC Methods AG-528 and AG-529 for the determination of fluometuron residues which are convertible to TFMA in/on raw agricultural and processed commodities, respectively. These methods differ in that AG-529 includes an acetonitrile extraction step for oily matrices. Methods AG-528 and AG-529 determine residues of fluometuron and its plant metabolites of concern as TFMA by GC using a

DB-17 capillary column and nitrogen/phosphorous detector (NPD).

HED has deemed Methods AG-528 and AG-529 to be adequate for data collection purposes; the available radiovalidation data for Method AG-528, using cottonseed samples from the plant metabolism study, have been upgraded to acceptable status. ILVs of GC Methods AG-528 and AG-529 were performed by Central California Research Laboratories (Fresno, CA) using cottonseed, cotton fodder, cotton gin trash, and cotton processed commodities as matrices. The ILVs produced acceptable method recoveries (70.4-123%). The validated limit of quantitation (LOQ) is 0.05 ppm for each analyte (K. Dockter, D241857, 9/24/1999). Final decision as to adequacy of the methods for tolerance enforcement will be withheld until successful method validation by BEAD's ACB.

Methods for determination of residues in livestock commodities: The registrant has submitted descriptions and provided recovery data for GC Method AG-519A for the determination of fluometuron residues that may be converted to TFMA in meat, milk, and eggs. HED has deemed Method AG-519A to be inadequate for data collection purposes because of unacceptable radiovalidation recoveries in eggs and milk (S. Funk, D208895, MRID 43413405, 2/23/1996). To fully satisfy reregistration requirements, the registrant must improve Method AG-519A or develop a new method capable of determining fluometuron residues that may be converted to TFMA.

As requested by HED (S. Funk, D208895, 2/23/1996), the registrant developed HPLC Method AG-678 for the determination of the residues of three para-phenyl hydroxylated metabolites of fluometuron (CGA-13211, CGA-236432, and CGA-236431) in milk and animal tissues (S. Ary, D249612, MRID 44623201, 11/11/2004). The LOQ was determined at 0.02 ppm for animal tissues and 0.01 ppm for milk.

In the proposed method, milk and tissue samples are homogenized with a mixture of MeOH/H_2O (MeOH only for milk samples); liver samples are refluxed with 80/20 MeOH/acetic acid (5%). Following filtration, a 50 mL aliquot of the extract is evaporated to remove the organic solvent and diluted with water. The aqueous solution is then hydrolyzed with enzymes to convert the conjugates to the free para-hydroxylated residues and the solution is cleaned up on a C_{18} solid phase extraction (SPE) column, if necessary. The hydrolyzed sample is partitioned twice into a mixture of ethyl acetate/hexane and the resulting organic phase is purified with a silica gel column. The collected fraction is evaporated to near dryness and redissolved in a mixture of acetic acid (0.1%) and MeOH to yield the final fraction. An aliquot of the final fraction is injected into an HPLC system for quantitation of residues by fluorescence detection.

Method validation data have been submitted for HPLC Method AG-678. The recoveries obtained for three hydroxylated metabolites of fluometuron, CGA-13211, CGA-236432, and CGA-236431, in milk and animal tissues, using the proposed method appear to be adequate even though the recovery values were corrected for apparent residues in control samples. Satisfactory radiovalidation data have been submitted for liver, kidney, and milk samples.

A successful ILV for HPLC/Ultraviolet (UV) Method AG-678 has been completed with samples of milk and beef liver (MRID 44808801). Final decision as to adequacy of the method for

tolerance enforcement will be withheld until successful method validation by BEAD's ACB.

860.1360 Multiresidue Residue Methods

The FDA PESTDATA database dated 10/1999 (PAM Volume I, Appendix I) indicates that fluometuron is completely recovered using Multiresidue Methods Section 403 (method for phenylurea herbicides). According to the PESTDATA database, the retention time of fluometuron using an OV-17 GLC (gas liquid chromatography) column is 0.14 ng (relative to chlorpyrifos).

860.1380 Storage Stability Data

The reregistration requirements for storage stability data are partially fulfilled. As a result of the HED Metabolism Committee's decision to regulate the hydroxylated metabolites in animal commodities, storage stability data are now required for this metabolite group.

The available storage stability data indicate that residues of fluometuron, determined as TFMA, are stable under frozen storage conditions for an interval of approximately 20 months in/on cottonseed, cotton fodder, and refined oil, and for an interval of approximately 24 months in eggs, milk, and beef tissues. These data sufficiently validate the storage conditions and intervals of samples from the cotton field trials, cotton processing study, and rotational crop trials. In the absence of storage stability data for the hydroxylated metabolites, these data only partially validate the storage conditions/intervals of samples collected from the ruminant and poultry feeding studies.

860.1400 Water, Fish, and Irrigated Crops

Fluometuron is presently not registered for direct use on water and aquatic food and feed crops; therefore, no residue chemistry data are required under these guideline topics.

860.1460 Food Handling

Fluometuron is presently not registered for use in food-handling establishments; therefore, no residue chemistry data are required under this guideline topic.

860.1480 Meat, Milk, Poultry, and Eggs

The reregistration requirements for magnitude of the residue in meat, milk, poultry, and eggs are fulfilled. The registrant previously failed to determine the hydroxylated metabolites (CGA-13211, CGA-236432, CGA-236431, and conjugates) in ruminant feeding studies, and these hydroxylated metabolites were the major components of the radiolabeled residue for milk in the nature of the residue study. A ruminant feeding study with the hydroxylated metabolites has been submitted, reviewed, and found acceptable (S. Ary, D304656, MRID 44623202, 11/11/2004). Additional storage stability data for the hydroxylated metabolites are needed for ruminant commodities. The storage stability data should reflect the conditions of the submitted ruminant feeding study (MRID 44623202).

Data from the ruminant and poultry feeding studies were used as the basis for reassessing tolerances. As feeding studies are not available for swine, the ruminant feeding studies were used to reassess tolerances on hog commodities. The theoretical dietary burdens (TDBs) of fluometuron residues for livestock are calculated below in Table 7. Based on the reassessed tolerances for livestock feed items, the TDB is 2.68 ppm for beef cattle, 2.45 ppm for dairy cattle, 0.63 ppm for poultry, and 0.455 ppm for swine. The TDBs of fluometuron to livestock are presented in Table 7. The livestock diets were determined by using cotton and rotational crops as feed items.

Table 7. Calculation of Dietary Burdens of Fluometuron to Livestock.

Feed Commodity	% Dry Matter[1]	% Diet[1]	Reassessed Tolerance (ppm)[2]	Dietary Contribution (ppm)[3]
Beef Cattle				
corn, field, grain	88	35	0.50	0.20
corn, field, stover	83	20	6.0	1.4
cotton, gin byproducts	90	5	3.5	0.19
cotton, undelinted seed	88	10	1.0	0.11
peanut, meal	85	10	0.20	0.024
soybean, hay	85	20	3.0	0.71
TOTAL BURDEN	N/A[4]	100	N/A	**2.6**
Dairy Cattle				
corn, field, forage	40	15	3.0	1.1
corn, field, grain	88	30	0.50	0.17
cotton, gin byproducts	90	5	3.5	0.19
cotton, undelinted seed	88	20	1.0	0.23
peanut, meal	85	10	0.20	0.024
soybean, hay	85	20	3.0	0.71
TOTAL BURDEN	N/A	100	N/A	**2.4**
Poultry				
corn, field, grain	N/A	50	0.50	0.25
wheat, milled byproducts	N/A	35	1.0	0.35
peanut, meal	N/A	15	0.20	0.030
TOTAL BURDEN	N/A	100	N/A	**0.63**
Swine				
corn, field, grain	N/A	85	0.50	0.43
peanut, meal	N/A	15	0.20	0.030
TOTAL BURDEN	N/A	100	N/A	**0.46**

1. OPPTS Guideline 860.1200, Table 1 (August 1996).
2. Reassessed tolerances from Table 14.
3. Contribution = (reassessed tolerance) / (% dry matter) x (% diet).
4. N/A = Not applicable.

Cattle. The initial ruminant feeding study (S. Funk, D208895, MRID 40190710, 2/23/1996)

was conducted at rates of 0.75x (2 ppm), 4x (10 ppm) and 7.5x (20 ppm) feeding levels for the determination of fluometuron and metabolites that may be determined as TFMA. The second ruminant feeding study (S. Ary, D304656, MRID 44623202, 11/11/2004) submitted was conducted at rates of 4x (11 ppm), 12x (33 ppm), and 41x (110 ppm) feeding levels for determination of the hydroxylated metabolites (CGA-13211, CGA-236432, and CGA-236431).

Based on the ruminant feeding studies and the TDB of 2.4 ppm for dairy cattle, the maximum expected residues for fluometuron would be 0.0040 ppm in whole milk. Based on the ruminant feeding studies and the TDB of 2.6 ppm for beef cattle, the maximum expected residues for fluometuron would be 0.051 ppm in meat byproducts. Fluometuron residues were not detected in muscle or fat in both of the feeding studies.

Swine. A hog feeding study is not available; therefore, maximum potential residues resulting from dietary exposure were estimated using data from the above ruminant feeding study. The 10 ppm feeding level in the ruminant feeding study is approximately 22x the TDB for swine. The maximum expected residues for fluometuron in hogs would be <0.1 ppm for fluometuron and metabolites that can be converted to TFMA and <0.02 for the hydroxylated metabolites in meat, meat byproducts, and in fat.

Poultry. Based on the 2 ppm feeding study and the TDB of 0.63 ppm for poultry, the maximum potential residues of fluometuron would be 0.032 ppm in eggs and tissues.

Table 8. Estimation of Potential Fluometuron Residues in Milk and Tissues Using Data from Ruminant Feeding Studies.[1]

Matrix	Estimated TFMA (ppm) from feeding study[2]		Estimated TFMA residues at 1x TDB using 10 ppm feeding level[4]	Estimated TFMA residues at 1x TDB using 20 ppm feeding level[4]	Hydroxylated metabolites (ppm) from feeding study[3]			Estimated hydroxylated metabolite residues at 1x TDB using 33 ppm feeding level[4]	Estimated hydroxylated metabolites residues at 1x TDB using 110 ppm feeding level[4]	Estimated total fluometuron residues at 1x TDB[7]
	10 ppm	20 ppm			11 ppm	33 ppm	110 ppm			
Whole Milk	<0.02	<0.02	ND[5]	0.0012[6]	<0.01	0.023	0.13	0.0017	0.0028	0.0040
Muscle	<0.1	<0.1	ND	ND	<0.02	<0.02	<0.02	ND	ND	ND
Fat	<0.1	<0.1	ND	ND	<0.02	<0.02	<0.02	ND	ND	ND
Liver	0.15	0.28	0.039	0.036	<0.02	0.042	0.054	0.0033	0.0013	0.042
Kidney	<0.1	<0.1	ND	0.0065[6]	<0.02	<0.02	0.12	ND	0.0028	0.0093

1. All values reported as "<" were not detected above the method(s) limit of quantitation (LOQ).
2. Data are from livestock feeding study with fluometuron and metabolites determined as TFMA, MRID 40190710.
3. Data are from livestock feeding study with hydroxylated metabolites, MRID 44623202.
4. Estimated fluometuron residues = (total dietary contribution, Table 7) / (feeding level) x (residue from feeding studies). Whole milk was calculated using TDB from dairy cattle. Muscle, fat, liver, and kidney were calculated using TDB from beef cattle.
5. ND = Not determined. Residue levels were below the method limit of quantitation.
6. One-half LOQ was used to calculate estimated TFMA residues at 1x TDB.
7. Estimated total fluometuron residues = TFMA + hydroxylated metabolites.

Table 9. Estimation of Potential Fluometuron Residues in Eggs and Tissues Using Data from Poultry Feeding Studies.[1]

Matrix	TFMA (ppm) from feeding study[2]	Estimated hydroxylated metabolites[3]	Estimated total fluometuron residues at 1x TDB using 2 ppm feeding level[4]
	2 ppm	N/A	2 ppm (3x)
Eggs	<0.1	<0.1	0.032
Tissues	<0.1	<0.1	0.032

1. All values reported as "<" were not detected above the method(s) limit of quantitation (LOQ).
2. Data are from poultry feeding study with fluometuron and TFMA metabolites, MRID 40190711.
3. The registrant did not analyze for the hydroxylated metabolites in the poultry feeding study, however, the hydroxylated metabolites may be estimated using the poultry metabolism study (MRID 43413403; 13% in muscle, 2.2% in fat, 20% in liver, and 3% in eggs) and the poultry feeding study (MRID 40190711).
4. Estimated fluometuron residues = (total dietary contribution, Table 7) / (feeding level) x (residue from feeding studies). One-half the LOQ was used to calculate the estimated fluometuron residues.

The reregistration requirements for magnitude of the residue in livestock commodities are fulfilled pending submission of additional storage stability data for the hydroxylated metabolites. HED has determined that the aggregate of existing data from poultry metabolism and poultry feeding studies may be used to estimate an appropriate tolerance level for eggs, poultry fat, poultry meat, and poultry meat byproducts.

Refer to the "860.1550 Proposed Tolerances" section for tolerance recommendations.

860.1500 Crop Field Trials

The reregistration requirements for magnitude of the residue in/on cottonseed and gin byproducts are partially fulfilled. Adequate data suggest the existing tolerance of 0.1 ppm on cottonseed be revised to 1.0 ppm and a tolerance be established for cotton gin byproducts at 3.5 ppm. The registrant must amend fluometuron labels with registered uses on cotton to reflect the test parameters for which adequate data are available. Product labels should be amended to specify: one preemergence treatment at a maximum rate of 2.0 lb ai/A, one early postemergence treatment at a maximum rate of 1.6 lb ai/A, and one layby treatment at a maximum rate of 2.0 lb ai/A. A maximum seasonal rate of 5.6 lb ai/A should be established. Additional data depicting residues of fluometuron and its metabolites determined as TFMA in/on cottonseed using the DF formulation are required. Cottonseed should be harvested/collected at normal maturity following applications of the DF formulation according to the following treatment schedule: one preemergence application at 2.0 lb ai/A, one early postemergence foliar application (when plants are 3-6 in high) at 1.6 lb ai/A, and one layby foliar application at 2.0 lb ai/A. A minimum of six trials must be conducted. The cotton plants must be harvested by commercial equipment (or similar thereof) to provide an adequate representation of plant residue from the ginning process. Stripper harvesting should be used for three trials and mechanical picker harvesting should be used for three trials. The six trials should represent the principal U.S. growing regions.

Cottonseed (S. Funk, D203563, MRIDs 43218101 and 43218102, 10/13/1994):

The registrant submitted data from 25 tests conducted in AL (one), AZ (one), AR (three), CA (one), FL (two), GA (four), LA (one), MS (two), MO (two), NC (two), OK (two), and TX (four) depicting fluometuron residues in/on cottonseed harvested 58-83 days following a 1x or 2x application schedule using the 4 lb/gal EC formulation. Fifteen tests covering all the test states were conducted at the 1x rate (one preemergence application at 2.0 lb ai/A, one early postemergence application at 1.6 lb ai/A, and one layby application at 2.0 lb ai/A). Samples were stored frozen for up to 22 months between harvest and analysis. Cottonseed samples were analyzed using Method AG-528.

The residue data are summarized in Table 10. The data were corrected for concurrent method recoveries. The maximum total TFMA residue in/on cottonseed was 0.58 ppm. The registrant suggests that the established tolerance 0.1 ppm for fluometuron residues in/on cottonseed be revised to 1.0 ppm.

Table 10. Fluometuron Residues in/on Mature Cottonseed Harvested 56-83 Days Following 1x or 2x Treatment Using the 4 lb/gal EC Formulation.

Location	Rate	Residues (ppm)	Control (ppm)
CA	1x	<0.05, <0.05	<0.05
MS	1x	<0.05, <0.05	<0.05
	2x	<0.05[1]	
AR	1x	<0.05, <0.05	<0.05
TN	1x	<0.05, <0.05	<0.05
MO	1x	<0.05, <0.05	<0.05
	2x	<0.07	
AR	1x	0.08 (0.06)[2], 0.08 (0.05)	<0.05
	2x	0.24 (0.16)	
TX	1x	0.13, 0.20	<0.05
	2x	0.32	
TX	1x	0.34 (0.11, 0.11), 0.16 (0.12, 0.11)	<0.05
OK	1x	0.07, 0.07	<0.05
	2x	0.09	
NC	1x	<0.05, <0.05	<0.05
	2x	<0.05	
GA	1x	0.09, 0.10	<0.05
	2x	0.14	
GA	1x	<0.05, <0.05	<0.05
	2x	<0.05	
AL	1x	0.05, 0.07	<0.05
FL	1x	<0.05, <0.05	<0.05
	2x	<0.05	
LA	1x	0.06, <0.05	<0.05
AZ	1x	0.58 (0.48, 0.54), 0.44 (0.41, 0.30)	<0.05 (<0.05)

1. Immature seed bore residues of <0.05 ppm (1x) and 0.08 ppm (2x).

2. Values in parentheses represent reanalysis of sample.

Cotton Gin Byproducts (S. Ary, D311193, MRID 44623203, 11/11/04):

Novartis Crop Protection, Inc. (Novartis) has submitted field trial data for fluometuron on cotton gin byproducts. Five trials were conducted encompassing Regions 2 (AL, one trial), 4 (MS, one trial), 6 (TX, one trial), 8 (OK, one trial) and 10 (CA, one trial) during the 1997 growing season. An additional field trial in Region 6 was started; however, the trial was lost due to crop injury.

According to OPPTS Guideline 860.1500, six field trials are required for cotton gin byproducts; however, the study author indicated that the EPA has agreed to allow data from only the five completed trials (S. Funk, D203563, 10/13/1994). Each test location consisted of one untreated plot (control), one plot treated with Cotoran 4L (41.8% fluometuron a.i.), and one plot treated with Cotoran DF (84.6% fluometuron a.i.). At each treated plot, three applications were made at nominal rates of 2.0 lb a.i./A, 1.6 lb a.i./A, and 2.0 lb a.i./A, for a total rate of 5.6 lb a.i./A. The three applications were made as a broadcast preemergence treatment after planting, as an over-the-top postemergence treatment at 3 to 6 inches high, and as a directed postemergence treatment at layby, respectively. An adjuvant was added to the spray mixture for the last two applications at each plot. Samples were harvested 60-66 days after the last application. Three of the plots were harvested using picker equipment and two of the plots were harvested using stripper equipment.

Residues of fluometuron, as the moiety TFMA, were determined by capillary gas chromatography and expressed as fluometuron equivalents. According to the analytical method (AG-529), the limit of quantitation (LOQ) was 0.05 ppm. This method is adequate for data collection based on acceptable concurrent method recovery data. The maximum storage interval of cotton gin byproduct samples from harvest to analysis was 7.7 months. Adequate storage stability data are available for cottonseed, cotton forage, and refined oil, but no storage stability data are available for cotton gin byproducts. The available storage stability data (MRID 41161903) demonstrate that residues of fluometuron are stable for approximately 20 months in these substrates. In the absence of specific storage stability for cotton gin byproducts, HED has assumed that residues will behave similarly in cotton gin byproducts and cottonseed.

At a total application rate of 5.6 lb a.i./A and a preharvest interval (PHI) range of 60-66 days, fluometuron residues in cotton gin byproducts ranged from 0.18 ppm to 2.7 ppm following application of Cotoran 4L and from 0.37 ppm to 3.1 ppm following application of Cotoran DF. Residue data from the cotton field trials with fluometuron are reported in Table 11.

Table 11. Residue Data from Crop Field Trials with Fluometuron.

Trial ID (City, State/Year)	Region	Crop/Variety	Commodity	Total Rate, (lb a.i./A)	PHI (days)	Formulation Applied	Residues from Sample 1 (ppm)	Residues from Sample 2 (ppm)
0S-HR-857-97 (Macon County, AL/1997)	2	Cotton/ Paymaster 1220	Cotton gin byproducts	5.6	62	Cotoran 4L	0.87	0.92
						Cotoran DF	0.42	0.59
03-HR-005-97 (Washington County, MS/1997)	4	Cotton/ Suregrow 125	Cotton gin byproducts	5.6	62	Cotoran 4L	1.73	2.73
						Cotoran DF	2.68	3.1
0S-HR-204-97 (Burleson County, TX/1997)	6	Cotton/ Helena 336	Cotton gin byproducts	5.6	66	Cotoran 4L	0.18	0.22
						Cotoran DF	0.38	0.37
0S-HR-714-97 (Washita County, OK/1997)	8	Cotton/ Paymaster HS 200	Cotton gin byproducts	5.6	61	Cotoran 4L	0.51	0.48
						Cotoran DF	0.78	0.9
0W-HR-451-97 (Tulare County, CA/1997)	10	Cotton/ Phytogen 33	Cotton gin byproducts	5.6	60	Cotoran 4L	1.5	1.37
						Cotoran DF	1.88	1.73

The cotton gin trash field trial data are acceptable and reflect the use of fluometuron for applications at a total rate of 5.6 lb ai/A and a PHI of 60-66 days. With these use patterns, residues of fluometuron are not expected to exceed 3.1 ppm. The results from the concurrent method recovery data support the validity of the data generated under this experiment design.

860.1520 Processed Food/Feed

Cotton (F.D. Griffith, MRID 40292002, 9/30/1987):

The reregistration requirements for magnitude of the residue in processed cottonseed commodities are fulfilled. An acceptable cottonseed processing study has been submitted and evaluated. Cottonseed were treated at 1x (5.6 lb ai/A) or 2x (11.2 lb ai/A) using the 4 lb/gal EC formulation and were processed at Texas A&M University. Processed fractions were analyzed using Method AG-529. Fluometuron residues of concern concentrated slightly in cottonseed meal (1.2x), but did not concentrate in cottonseed hulls or refined oil. Therefore, tolerances for cotton processed fractions are not required.

Rotational Crops (S. Funk, D203563, MRIDs 43218101, -02, and -03, 10/13/1994):

Grain and seed samples from the rotated field corn, rice, sorghum, winter wheat, and peanut studies were processed at Texas A&M University. The processing procedures simulated commercial practices, except that samples were batch processed rather than continuously, as in

industry. A mass balance was provided for wheat grain processing. The processed fractions were analyzed using Method AG-529.

A tolerance of 1.0 ppm in rice hulls should be established based on the average processing factor of 3.2x and the maximum average field trial residue of 0.25 ppm (1x use rate; MRID 43218101). A tolerance of 1.0 ppm in wheat milled fractions (excluding flour) should be established based on an average processing factor for bran, rough, and shorts/germ of 1.8x and the maximum average field trial residue of 0.38 ppm (1x use rate; MRID 43218101). A tolerance of 0.2 ppm in peanut meal should be established based on the average processing factor of 1.7x and the maximum average field trial residue of 0.10 ppm (1x use rate; MRID 43218101).

An apparent concentration of fluometuron on light impurities resulted for both wheat and rice. HED has determined that a tolerance is not needed for aspirated grain fractions processed from rotational grain crops. Although processing studies showed a concentration factor for fluometuron in "grain dust" of rice and wheat, the inadvertent residues on rotational crops do not result from late season or postharvest application of fluometuron to the crops, and the "light impurities" encountered in the processing of rice and wheat may not be typical of the aspirated grain fractions that result from handling and storage of grains in elevators (Pesticide Reregistration Rejection Rate Analysis Residue Chemistry: Follow-up Guidance for Aspirated Grain Fractions [Grain Dust]: A Tolerance Perspective [EPA 738-K-94-001, 6/1994]).

860.1650 Submittal of Analytical Reference Standards

An analytical reference standard for fluometuron was submitted by Agan in August of 2004 and expires December of 2007. The standard is available at the EPA National Pesticide Standards Repository.

860.1850 Confined Accumulation in Rotational Crops

The reregistration requirements for accumulation in rotational crops are fulfilled (S. Funk, D229938, 03/18/1997). HED concludes that the metabolism of fluometuron in rotational crops (root crop, leafy vegetable, and grain crop) is consistent with the metabolism investigated in the primary crop, cotton.

860.1900 Field Accumulation in Rotational Crops

The reregistration requirements for field accumulation in rotational crops are fulfilled, pending label amendments of all fluometuron end-use products to specify the appropriate plantback intervals on rotational crops for which adequate data are available, namely, corn, rice, sorghum, wheat, peanuts, and soybeans. Refer to Table 5 for details of the required label amendments and to section “860.1550 Proposed Tolerances” for tolerance recommendations. If the registrant wishes to support additional rotational crops and plantback intervals, then additional rotational field trials must be conducted.

Rotational Crops (S. Funk, 203563, MRIDs 43218101 and 43218102, 1/10/1995):

The registrant submitted field accumulation in rotational crop studies (1990) with cereal grains, peanuts, and soybeans rotated following treated cotton. The target crop cotton was treated using the 2 lb/gal EC formulation at 1x (5.6 lb ai/A) or 2x (11.2 lb ai/A) use rate. Winter wheat (five tests) was planted 79-127 days plant-back interval (PBI) after the last cotton treatment. Sweet corn (five tests), field corn (nine tests), rice (six tests), sorghum (eight tests), peanuts (seven tests), and soybeans (nine tests) were planted after 235-336 days PBI. Raw agricultural commodities (RACs) were harvested at the appropriate growth stages (for forage) or at maturity. Residues were determined using Method AG-528, which measures fluometuron and its metabolites of concern as TFMA. The limit of quantitation was stated as 0.05 ppm.

Summary results were also submitted from field accumulation in rotational crop studies conducted in 1986 (MRID 43218101). Crops were rotated with cotton that had been treated at the 1x (5.6 lb ai/A) use rate with either the 80% WP formulation or the 2 lbs/gal EC formulation. The studies were described in detail in a previous submission (MRID 41161901). Field corn studies were conducted in AR (one; 278 day PBI), LA (one; 239 day PBI), MS (one; 278 day PBI); SC (one; 263 day PBI), TN (one; 280 day PBI), and TX (one; 319 day PBI). Grain sorghum trials were conducted in LA (one; 266 day PBI), MS (one; 278 day PBI), SC (one; 287 day PBI), and TX (one; 319 day PBI). Peanut field trials were conducted in AL (one; 319 day PBI) and SC (one; 287 day PBI). Soybean rotational crop field trials were reported for AL (one; 319 day PBI), AR (one; 308 day PBI), LA (one; 285 day PBI), MS (one; 323 day PBI), and TN (one; 307 day PBI). Winter wheat studies were conducted in AL (one; 125 day PBI), AR (one; 108 day PBI), AZ (two; 127 day PBI), CA (one; 117 day PBI), GA (one; 104 day PBI), LA (one; 102 day PBI), MS (one; 100 day PBI), SC (one; 116 day PBI), TN (one; 79 day PBI); and TX (one; 105 day PBI). Residues were determined by Method AG-528, and the limits of quantitation are stated as 0.05 ppm for grains and seeds and as 0.10 ppm for straw, forage, and hay.

The residues in rotational crop RACs are summarized in Table 12. The data were corrected for concurrent method recoveries.

Table 12. Total Fluometuron Residues Determined as TFMA in/on Cereal Grains, Peanuts, and Soybeans.

Crop	PBI (days)	Range of Total Fluometuron Residues (ppm)
Cereal Grains		
Field Corn Grain	235-319 (ca. 8 months)	<0.05-0.16
Sweet Corn Ears	238-259 (ca. 8 months)	<0.05
Rice Grain	265-282 (ca. 9 months)	<0.05-0.26
Sorghum Grain	265-319 (ca. 9 months)	<0.05-0.08
Wheat Grain	79-127 (ca. 3 months)	<0.05-0.45

Table 12. Total Fluometuron Residues Determined as TFMA in/on Cereal Grains, Peanuts, and Soybeans.		
Crop	PBI (days)	Range of Total Fluometuron Residues (ppm)
Cereal Forage		
Field Corn Forage	235-319 (ca. 8 months)	<0.05-1.8
Field Corn Silage-Stage Forage	235-319 (ca. 8 months)	<0.05-0.65
Sweet Corn Forage	238-259 (ca. 8 months)	<0.05-0.49
Grain Sorghum Forage	265-319 (ca. 9 months)	<0.05-1.0
Grain Sorghum Hay	265-319 (ca. 9 months)	<0.05-0.58
Grain Sorghum Silage-Stage Forage	365-319 (ca. 12 months)	<0.05-0.45
Winter Wheat Forage	79-127 (ca. 3 months)	0.19-2.8
Winter Wheat Spring Forage	79-127 (ca. 3 months)	0.10-2.4
Cereal Fodder		
Field Corn Fodder	235-319 (ca. 8 months)	<0.05-0.57
Rice Straw	265-282 (ca. 9 months)	0.23-2.7
Grain Sorghum Fodder	265-319 (ca. 9 months)	<0.05-0.28
Winter Wheat Straw	79-127 (ca. 3 months)	0.14-7.2
Peanuts		
Peanut Hay	238-319 (ca. 8 months)	0.34-3.4
Peanut Nutmeat	238-319 (ca. 8 months	<0.05-0.10
Soybeans		
Soybean Beans	265-336 (ca. 9 months)	0.17-4.2
Soybean Forage	265-336 (ca. 9 months)	0.15-2.4
Soybean Hay	265-336 (ca. 9 months)	0.41-2.7

Based on these studies the registrant suggests plant-back intervals of 3 months for wheat; 8 months for field corn, sweet corn, and peanuts; and 9 months for rice grain sorghum, and soybeans. Adequate data were submitted to assess these plant-back intervals.

Based on the residue data from tests following 1x treatment to cotton, the registrant suggests the following tolerances for rotational crop groups: 0.50 ppm for cereal grains, 4.0 ppm for forage and hay of cereal grains, and 8.0 ppm for fodder and straw of cereal grains. The registrant also suggests tolerances for peanuts: 5.0 ppm for hay and 0.10 ppm for peanut nutmeats. For soybeans, tolerances of 5.0 ppm each are suggested for forage and hay and soybean seed.

The residue data indicate that the tolerance levels suggested for cereal grains (0.50 ppm) and for

peanut nutmeats (0.10 ppm) would be appropriate. The suggested tolerance for peanut hay should be 4.0 ppm, based upon the maximum residue found in peanut hay of 3.4 ppm. Tolerances of 3.0 and 6.0 ppm would be more appropriate for cereal grain forage/hay and fodder/straw, respectively, based upon the maximum level of residues found in winter wheat fall forage (2.8 ppm) and winter wheat straw (5.8 ppm; re-analysis of AZ sample [7.2 ppm] found a residue of 3.7 ppm). As the maximum levels of residues found in soybean forage and hay were 2.4 ppm and 2.7 ppm, appropriate tolerances for soybean forage and hay would be 3.0 ppm each. For soybean seeds, the maximum level of residues found were 3.8 and 4.2 ppm in samples from LA (1x); however, reanalyses of these samples found residues of 1.4 and 1.7 ppm, respectively. These data together with the other soybean seed data indicate that a tolerance of 2.0 ppm would be more appropriate.

Tolerance Reassessment Summary

A tolerance is established for negligible residues of the herbicide fluometuron (1,1-dimethyl-3-(α,α,α-trifluoro-m-tolyl)urea) in or on the raw agricultural commodity cotton, undelinted seed (40 CFR §180.229).

The tolerances listed in 40 CFR must be reorganized in order to: (i) incorporate the recommendations made by the HED Metabolism Committee concerning the fluometuron residues of concern that need to be regulated for plant and animal commodities; (ii) include tolerances that are needed to cover fluometuron residues of concern in/on the raw agricultural commodities and processed commodities of rotational crops; and (iii) conform with the requirements of the Food Quality Protection Act (FQPA). The FQPA amends the FFDCA to bring all EPA pesticide tolerance-setting activities under a single section of the statute, Section 408. The FQPA authorizes the conversion of all existing Section 409 tolerances for pesticide residues in processed food/feed into Section 408 tolerances. The reorganization of fluometuron tolerances should be conducted as depicted below in Table 13. A summary of fluometuron tolerance reassessments is presented in Table 14.

Table 13. Reorganization of Fluometuron Tolerances Required Under 40 CFR.

40 CFR Section	Section Reserved For	Tolerance Expression
§180.229 (a)	Plant commodities	Fluometuron and its metabolites determined as TFMA.
§180.229 (b)	Livestock commodities	Fluometuron and its metabolites determined as TFMA, and the hydroxylated metabolites CGA-236431, CGA-436432, CGA-13211, and their conjugates.
§180.229 (c)	Rotational crop commodities	Fluometuron and its metabolites determined as TFMA.
§180.229 (d)	Food/feed commodities processed from rotational crops	Fluometuron and its metabolites determined as TFMA.

Tolerances Required Under 40 CFR §180.229 (a):

The cottonseed field trial data suggest that the established 0.10 ppm tolerance for cottonseed is too low to adequately cover fluometuron residues of concern that may result following applications of WP and EC formulations according to the maximum use pattern eligible for reregistration. The existing data indicate that an appropriate tolerance would be 1.0 ppm. However, additional field trial data reflecting use of the DF formulation are required, and these data may indicate a need to further adjust the tolerance. Furthermore, label revisions are required. An adequate cotton gin byproducts field trial study has been submitted and reviewed. Residues of fluometuron are not expected to exceed 3.1 ppm in cotton gin byproducts, therefore, an appropriate tolerance value would be 3.5 ppm.

Tolerances Required Under 40 CFR §180.229 (b):

The data from ruminant feeding studies suggest that an appropriate tolerance level of 0.10 ppm should be established for milk and 0.10 ppm for ruminant and hog meat byproducts. This recommendation is tentative pending submission and evaluation of the requested storage stability data for the hydroxylated metabolites (CGA-236431, CGA-436432, CGA-13211, and their conjugates).

The aggregate of data from poultry metabolism and poultry feeding studies suggest that an appropriate tolerance level of 0.10 ppm should each be established for eggs, poultry fat, poultry meat, and poultry meat byproducts. This recommendation is tentative pending submission and evaluation of the requested storage stability data for the hydroxylated metabolites (CGA-236431, CGA-436432, CGA-13211, and their conjugates).

Tolerances Required Under 40 CFR §180.229 (c):

Data from extensive field rotational trials suggest the need for tolerances for fluometuron residues of concern in/on several raw agricultural commodities of rotational crops. The recommended tolerances are listed below in Table 14.

Tolerances Required Under 40 CFR §180.229 (d):

Data from processing studies on rotational crops suggest the need for tolerances for fluometuron residues of concern in/on several processed commodities; the recommended tolerances are listed below in Table 14.

Table 14. Tolerance Reassessment Summary for Fluometuron.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments
Tolerances Required Under 40 CFR §180.229 (a)			
Cotton, gin byproducts	None	3.5	None
Cotton, undelinted seed	0.1	1.0[1]	None

Table 14. Tolerance Reassessment Summary for Fluometuron.			
Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments
Tolerances Required Under 40 CFR §180.229 (b)			
Cattle, meat byproducts	None	0.10	These recommendations are tentative pending submission of supporting storage stability data for the hydroxylated metabolites.
Goat, meat byproducts	None	0.10	
Hog, meat byproducts	None	0.10	
Horse, meat byproducts	None	0.10	
Sheep, meat byproducts	None	0.10	
Milk	None	0.02	
Egg	None	0.10	
Poultry, fat	None	0.10	
Poultry, meat	None	0.10	
Poultry, meat byproducts	None	0.10	
Tolerances Required Under 40 CFR §180.229 (c):			
Grain, cereal, group 15	None	0.50	None
Grain, cereal, forage, group 16	None	3.0	
Grain, cereal, fodder, and straw, group 16	None	6.0	
Peanut	None	0.10	
Peanut, hay	None	4.0	
Soybean, seed	None	2.0	
Soybean, forage	None	3.0	
Soybean, hay	None	3.0	
Tolerances Required Under 40 CFR §180.229 (d):			
Peanut, meal	None	0.20	None
Rice, hulls	None	1.0	
Wheat, milled byproducts	None	1.0	

1. Additional data are required for the DF formulation. These data may indicate the need for additional tolerance reevaluation.

Codex/International Harmonization

There are no Codex, Canadian, or Mexican maximum residue limits (MRLs) for fluometuron;

therefore, no questions of compatibility with U.S. tolerances exist.

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Agency Memoranda Citations

Table 12. Agency Memoranda Citations.

Date	Barcode	CBRS	From	To	MRID	Subject
5/28/1987	None	2033	F. Griffith	R. Taylor	40067501	Fluometuron Registration Standard - Response to Data Call-In for Residue Data on Cotton and Pineapple.
9/30/1987	None	2685	F. Griffith	R. Taylor and Toxicology Branch	40292001 40292002 40292003	Fluometuron Registration Standard - Response to Data Call-In for Residue Data on Cottonseed Fractions and Analytical Method.
5/18/1988	None	3798	L. Propst	R. Taylor	40190712	EPA Reg. 100-561. Notification of Adverse Findings Pursuant to Section 6(a)(2) of FIFRA. Residues that Exceed Established Tolerances for Fluometuron in Cottonseed.
6/18/1992	D169105	8619	D. McNeilly	A. Ertman	42017305 42017306	Fluometuron; Analytical Method Validation.
9/22/1992	D176713 D177413	9698 9787	F. Toghrol	W. Waldrop A. Ertman	42258701	Fluometuron Reregistration. CIBA-GEIGY Response to Fluometuron Residue Chemistry Registration Standard Update (Dated 4/19/90) Data Requirements. Comments Regarding Time Extension for Metabolism, Analytical Methods, and Tolerance Petition Studies; Sample Storage Conditions and Intervals to Support Storage Stability Data.
1/1993	None	None	D. McNeilly	L. Sawyer	42498008	Testing of Fluometuron through U.S. FDA Multiresidue Methods.
3/1/1993	D184013	10812	D. McNeilly	A. Ertman	42498008	Fluometuron; Response to CBRS Review Concerning Analytical Methods and FDA Multiresidue Analytical Method Testing.
10/13/1994 01/10/1995 Addendum	D203563	13747	S. Funk	L. Propst A. Ertman	43218101 43218102 43218103 43218104	Fluometuron: Response to the Registration Standard Update (Chemical 035503, Case 0049, List A). Addendum to Cotton Field Trials and to Rotational Crop Field Trials.
9/26/1995	D216055	15749	S. Funk	L. Propst A. Ertman	43654405	Fluometuron: Response to the Registration Standard Update (Chemical 035503, Case 0049, List A). Validation of the Analytical Method for Rotational Crops (GLN 171-4(c)). Rotational Crop/Processed Commodities (GLN 171-4(k)/(l)).
11/14/1995	None	None	S. Funk	HED Metabolism Committee	None	Fluometuron (List A, Case 0049, Chemical 35503). Metabolism in Plants and Animals. Issues to Be Presented to the HED Metabolism Committee on November 16, 1995.
2/15/1996	D216054	15748	S. Funk	L. Propst A. Ertman	43654401 43654402 43654403 43654404	Fluometuron: Response to the Registration Standard Update (Chemical 035503, Case 0049, List A). Nature of the Residue in Cotton (171-4(a)). Nature of the Residue in Rotational Crops (165-1).
2/20/1996	None	None	S. Funk	HED Metabolism Committee	None	Fluometuron: 1,1-Dimethyl-3-(α,α,α-trifluoro-m-tolyl)urea (List A, Case 0049, Chemical 35503). Metabolism in Plants and Animals. The Metabolism Committee Meetings Held on January 16 and January 25, 1996.

Table 12. Agency Memoranda Citations.						
Date	Barcode	CBRS	From	To	MRID	Subject
2/23/1996	D208895	14642	S. Funk	L. Propst A. Ertman	43413403 43413404 43413405	Fluometuron: Response to the Registration Standard Update (Chemical 035503, Case 0049, List A). Nature of the Residue in Animals (171-4(b)). Analytical Method for Animal Commodities (171-4(d)). Ciba-Geigy Corpo-ration.
3/18/1997	D229938	17562	S. Funk	P. Lewis	44084801	Fluometuron (List A, Case 0049, Chemical 033503). Nature of the Residue in Rotational Crops, Additional Data (OPPTS 860.1850). Ciba-Geigy Corp.
9/24/1999	D241857	None	K. Dockter	B. Shackleford	44449701 44449702	Fluometuron. Rereg Case 0049. ILV for Analytical Methods in Cotton.
12/20/1996	D230109	17565	S. Funk	P. Deschamp	None	Fluometuron (List A, Case 0049, Chemical 035503). Product Chemistry and Residue Chemistry Chapters for the Reregistration Eligibility Decision Document.
11/11/2004	D249612	None	S. Ary	A. Nielsen	44623201 44808801	DER: Residue Analytical Method - Livestock
11/11/2004	D304656	None	S. Ary	A. Nielsen	44623202	DER: Livestock Feeding Study - Dairy Cattle
11/11/2004	D304656	None	S. Ary	A. Nielsen	44623203	DER: Crop Field Trial - Cotton

RDI: S. Ary (10/26/04); P. Barnes (10/28/04); ChemSAC (11/17/04); A. Nielsen (11/31/04).

Appendix A. Food/Feed Use Patterns of Fluometuron.
This document was originally prepared by the Biological and Economic Analysis Division (BEAD).
Current as of: 04/06/2004

SITE NAME	LIMITATIONS				
Application Timing (for any Reg.# at any rate) Application Type (for any Reg.# at any rate) Application Equipment (for any Reg.# at any rate)	Max. Single Appl. Rate to a Single Site	Max. Seasonal Rate	Max. # Apps/ cc & yr	M R I	R E I
COTTON (UNSPECIFIED)	60 day(s) preharvest interval. Cattle may not be fed forage. Do not apply directly to water, or to areas where surface water is p intertidal areas below the mean high water mark. Do not apply directly to water. Do not apply through any type of irrigation system. Do not apply when drift is likely to occur. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of Do not contaminate water intended for irrigation or domestic purp Do not contaminate water, food or feed. Do not contaminate water, food, or feed by storage or disposal. Do not enter treated areas without protective clothing until sprays Do not feed gin trash or treated foliage to livestock.				

SITE/PEST	LIMIT	Max seed trt	Max #/s & yr	MRI	REI	PHI
	Do not feed treated foliage to livestock or graze treated areas. Do not graze treated areas or feed crop refuse to livestock. Do not make more than 3 applications per year. Groundwater restriction. Rotational/plant back crop restriction. Geographic disallowable: Other					
Early bloom Broadcast Sprayer	0.8118 lb A	NS	NS NS	NS	24 h	
Foliar Band treatment/Basal spray treatment Sprayer	(L) 1 lb A	NS	NS 2/1 yr	NS	24 h	Do not apply to plant foliage.
Layby Broadcast/Directed spray/Soil band treatment Band sprayer/Sprayer	(L) 0.206 gal A 2 lb A	NS	NS 3/1 yr	NS	24 h	
Postemergence Band treatment/Broadcast/Directed spray/Low volume spray (concentrate)/Soil band treatment Aircraft/Band sprayer/Ground/Soil incorporation equipment/Sprayer	(L) 0.206 gal A 2.04 lb A	NS	1/cc 3/1 yr	NS	24 h	Geographic allowable: AR AZ LA MS NM
Prebloom Band treatment/Directed spray Sprayer	(L) 1 lb A	NS	NS 2/1 yr	NS	24 h	
Preemergence Band treatment/Broadcast/Low volume spray (concentrate)/ Soil band treatment/Soil incorporated treatment/Soil treatment Aircraft/Band sprayer/Ground/Sprayer	(L) 0.206 gal A 2.04 lb A	NS	NS 3/1 yr	NS	24 h	Geographic allowable: AZ NM
Preplant Band treatment/Broadcast/Low volume spray (concentrate)/	(L) 0.1648 gal A	NS	NS 3/1 yr	NS	24 h	Geographic allowable: AR AZ

SITE NAME	LIMITATIONS	Max. Single Appl. Rate to a Single Site	Max Seasonal Rate	Max. # Apps/cc & yr	M R I	R E I	PHI/PGI/PSI Use Limitations (May not apply to all Reg.#s)
Soil band treatment/Soil incorporated treatment Aircraft/Band sprayer/Ground/Soil incorporation Equipment/Sprayer		lb A					A NM

PRODUCT NUMBERS CONTAINED IN THIS REPORT
001812-00285, 001812-00323, 001812-00438, 001812-00439, 005905-00494, 009779-00311, 009779-00312, 009779-00319, 019713-00127, 051036-00241, 051036-00242, 066222-00029, 066222-00030, 066222-00031, 066222-00032, 066222-00033, 066222-00034

HOMEOWNER PRODUCTS CONTAINED IN THIS REPORT
None

HEADER ABBREVIATIONS
Site Name - The site name refers to the entity (crop, building, surface or article) where a pesticide is applied and/or which is being protected.
Limitations - Precautionary statements related to the use of the product(s).
Application Timing - The timing of pesticide application and is the primary application sort (not aggregated).
Application Type - The type of pesticide application (aggregated).
Application Equipment - The equipment used to apply pesticide (aggregated).
Max. Single Appl. Rate to a Single Site - Maximum Dose for a single application to a single site. System calculated.
Max Seasonal Rate - The maximum amount of pesticide that can be applied to a site in one growing season (/cc) and during the span of one year (/yr).
Max. # Apps/cc & yr - Maximum Number of Applications per crop cycle and per year.
M R I - Minimum Retreatment Interval (days) (at any rate). The minimum interval between pesticide application (days).
R E I - ReEntry Interval - The minimum amount of time that must elapse before workers can reenter a treated area.
PHI/PGI/PSI Use Limitations (May not apply to all Reg.#s) - Preharvest/Pregrazing/Preslaughter Interval use limitations pertinent to the application.
Current As Of: - The label data for the listed products in this report is current of this date.

ABBREVIATIONS
AN - As needed
NA - Not Applicable
NS - Not Specified (on label)
(L) - The dosage information provided is from the label in terms of product (e.g., ounces, gallons, or pounds of the product) because there was insufficient information (e.g., missing density, area, or active ingredient percentages) to provide converted dosage information. This report provides active ingredient percentage in the product for the reported chemical for all unconverted label dosage information if this information is available. This active ingredient percentage information is displayed next to the form code abbreviations (e.g., 80% WP).

APPLICATION RATE

cwt : Hundred Weight
nnE-xx : nn times (10 power -xx), for instance, "1.234E-04" is equivalent to ".0001234"