4/93

4-15-93

Attachment 1

METOLACHLOR

(Chemical Code 108801)

(CBRS No. 10305, 10787; DP Barcode D181006, D183896)

REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY REQUIREMENTS

Task 3

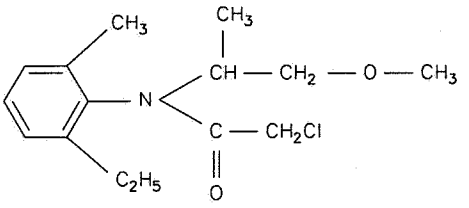
BACKGROUND

The Metolachlor Guidance Document dated 1/87 required that residue data supporting established tolerances must be accompanied by information on the duration and conditions of sample storage prior to residue analysis, and by data depicting the stability of metolachlor residues under the conditions and for the time intervals specified. In response, Ciba-Geigy Corporation (1990; MRIDs 41425502 and 41506401) submitted 2-year storage stability data pertaining to the frozen storage stability of metolachlor residue hydrolysates, 2-[(2-ethyl-6-methylphenyl)amino]-1-propanol (CGA-37913) and 4-(2-ethyl-6-methylphenyl)-2-hydroxy-5-methyl-3-morpholinone (CGA-49751), in fortified samples of potatoes, peanut nutmeats, corn grain, oil, and forage, beef muscle, beef liver, milk, and eggs. The Agency review (B. Cropp-Kohlligian, CBRS No. 8317, 4/16/92) of storage stability data for plant commodities concluded that CGA-37913 and CGA-49751 are stable in storage at -15 °C for up to 25 months in potatoes, peanut nutmeats, and corn grain and forage. Metolachlor metabolite hydrolysate CGA-49751 was also stable in corn oil at -15 °C for up to 25 months; however, the metolachlor metabolite hydrolysate CGA-37913 was stable in corn oil for only up to 102 days (3+ months) under the same conditions. The Agency review (S. Funk, CBRS No. 9261, 8/6/92) of storage stability data for animal commodities concluded that CGA-49751 is stable in beef muscle, beef liver, milk, and eggs stored at -15 °C for up to 25 months, and that CGA-37913 is stable at -15 °C in milk and eggs for up to 25 months, in beef muscle for up to 2 months, and in beef liver for up to 12 months. Due to the unstable nature of CGA-37913 in corn oil beyond 3 months, CBRS recommended that the registrant submit additional information concerning corn oil fractions from a corn grain processing study (1989; MRID 40980705) previously reviewed in the Metolachlor Reregistration Standard Follow-up (R. Quick, CB No. 4931, 6/14/89). Both reviews reiterated the requirement for information concerning the storage intervals and storage conditions of samples used to support established tolerances.

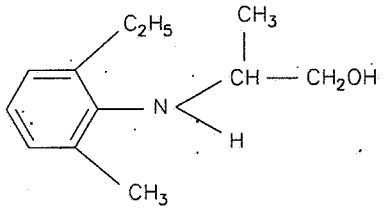
1

In response, Ciba-Geigy Corp. (1992; MRID 42502901) submitted data on the sample storage conditions and intervals for residue samples used to support tolerances of metolachlor in plant and animal commodities, and information (1992; MRID 42384401) pertaining to the processing, storage, and analysis of samples from the corn grain processing study. These submissions are reviewed here to determine their adequacy in fulfilling residue chemistry data requirements. The Conclusions and Recommendations stated in this review pertain only to storage stability of metolachlor residues and the magnitude of residues in corn oil.

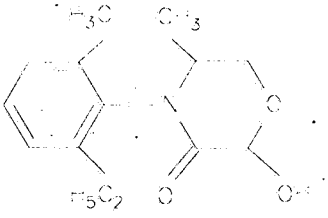
The qualitative nature of the residue in plants is not adequately understood. Data on the metabolism of metolachlor in potatoes are under review. The qualitative nature of the residue in animals is adequately understood. Tolerances for residues of metolachlor (2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide) in or on raw agricultural commodities are currently expressed in terms of the combined residues (free and bound) of metolachlor and its metabolites, determined as the derivatives, CGA-37913 and CGA-49751, each expressed as metolachlor [40 CFR §180.368(a), (b), and (c)]. Adequate analytical methods are available for enforcing tolerances of metolachlor and its free and bound metabolites in or on plant and animal commodities. The currently preferred method for plant matrices is listed as Method I in PAM, Vol. II and the preferred method for animal matrices is listed as Method II in PAM, Vol. II. As there are no Codex MRLs for residues of metolachlor, there is no question with respect to Codex/U.S. tolerance compatibility.



Metolachlor



CGA-37913



CGA-49751

CONCLUSIONS/RECOMMENDATIONS

1. Storage Stability studies have been conducted on the metolachlor metabolite hydrolysates, i.e., those compounds produced by acid reflux during the metolachlor enforcement method. Storage stability studies have been conducted for the metolaclor

metabolite hydrolysates, CGA-37913 and CGA-49751, in corn grain, oil, forage; peanuts; potatoes; beef muscle and liver; milk; and eggs. Studies cited for Bell pepper and cabbage petitions indicate that the metolachlor metabolite hydrolysates were spiked just before extraction, and thus only measured stability of the hydrolysate extract at refrigerator temperatures. CGA-37913 was stable for 2 yr. in corn grain and forage, peanuts, potatoes, milk, and eggs; 1 yr. in beef liver; for the 5 mo. tested in bell peppers; 102 days in corn oil (corn oil samples stored 98 days); and 2 mo. in beef muscle (< 10% remaining at 109 days). CGA-49751 was stable for 2 yr. in corn grain, oil, forage; peanuts; potatoes; beef muscle and liver; milk; and eggs. No storage stability studies were conducted for stone fruits.

2a. The submitted storage interval report is adequate for all data cited in the 1987 Guidance Document. Although storage intervals for were not reported for all Guidance Document-cited studies on soybean, corn, sorghum, cotton, and animal commodities, we can conclude that no further storage information for these studies is needed. Storage information was included with the soybean, peanut, and cottonseed processing studies submitted in response to the Guidance Document.

2b. Information on sample storage conditions and intervals is required for all studies submitted to replace data generated by Craven Laboratories for cottonseed, alfalfa and clover, corn, peanuts, beans, safflower, and soybeans (S. Koepke; CBTS No. 8398, 10/10/91).

2d. Although metolachlor metabolite hydrolysates were not stable in corn oil, we have little concern because metolachlor residues are unlikely to concentrate in oils. The submitted information (1992; MRID 42384401) adequately resolves CBRS concerns regarding residue data for corn oil from a previously reviewed corn grain processing study (1989; MRID 40980705). Storage stability data indicate that metolachlor metabolite hydrolysate residues are stable at -15 °C for up to 102 days in corn oil, and the maximum storage interval for corn oil in the processing study was actually 98 days at ≤-15 °C.

2e. No storage stability data have been submitted for processed products of soybeans/ peanuts, and potatoes. These data are needed because these matrices are significantly different than those of the raw agricultural commodities studied.

3a. The available storage stability data (S. Funk, CBRS No. 9261, 8/6/92) on metolachlor residues in animal commodities support the sample storage intervals (139-292 days) reported for residue samples from animal feeding studies, with the exception of meat (muscle) samples. The storage stability studies in animal commodities were conducted using the metolachlor metabolite hydrolysates, CGA-37913 and CGA-49751. Use of these test compounds was accepted in a protocol review (M. Nelson, RCB No. 2028,

3

3/11/87). The available storage stability data for metolachlor metabolite hydrolysates in animal products are summarized in our review of 8/6/92 (S. Funk, CB# 9261).

3b. Samples of meat from dairy cattle and poultry were stored at -15 °C for 139-275 days (5 to 9 months) prior to analysis, which is longer than the 2 months for which CGA-37913 is stable in muscle. Metolachlor residue levels in muscle will be adjusted to reflect the loss of CGA-37913 in frozen storage.

In summary, storage information is needed for all new studies, including new studies required to replace Craven data. Additional storage stability data are needed for peanut or soybean processed commodities, and potato processed commodities. Residue levels in muscle will be corrected for the 80% loss of CGA-37913 in frozen storage.

We recommend that the registrant receive a complete copy of this review.

DETAILED CONSIDERATIONS

Storage Stability Data

Storage Stability studies have been conducted using the metolachlor metabolite hydrolysates, i.e., those compounds produced by acid reflux during the metolachlor enforcement method.

The Chemistry Branches have recently updated their Guidance for Storage Stability Studies. Generally, at least five diverse crops need to be tested. If a pesticide is to be applied to all types of crops, suggested crops for a storage stability study are (1) an oilseed (or soybean or nut), (2) a non-oily grain (or corn), (3) a leafy vegetable, (4) a root crop, and (5) an acidic fruit or fruiting vegetable (e.g., citrus or tomatoes). The crop parts to be examined in these studies are those used for food and food (the same plant parts on which residue data are generated and tolerances established). If residues are found to be stable in all five diverse crops, then no additional storage stability data will be needed for racs. If, however, residues are found to be unstable, then storage stability data will be needed on at least one crop from each crop group for which the pesticide is registered.

Metolachlor is registered for use on oily crops (soybeans and peanuts), grain (corn, sorghum), leafy crops (cabbage), root crops (potatoes), and fruits and fruiting vegetables (stone fruits and bell peppers). Metolachlor storage stability data, spiking with the metolachlor metabolite hydrolysates, have been submitted for peanuts, corn grain and forage, and potatoes. Studies on the stability of the metolachlor metabolite hydrolysates in sample extracts have been submitted for cabbage and bell peppers, see PP#8E3837 and PP#5E3616, respectively. These storage stability data are considered adequate to support existing uses of metolachlor.

4

However, if additional tolerances are sought on leafy crops or fruits of fruiting vegetables, then additional storage stability data will be required.

There are three major types of crops for which processing studies are required: oilseeds, grains, and fruits/fruiting vegetables (citrus, apples, and tomatoes). Storage stability data will be required for all processed commodities for one crop of each of these three types. If residues are stable in processed commodities of these three types of crops, then no additional storage stability data will generally be required for processed commodities. If the pesticide is not registered for use on these three types of crops, but is registered for use on root crops, then storage stability data for processed commodities of root crops (potatoes or sugar beets) will be required.

The only processed commodity for which storage stability data (using metolachlor metabolite hydrolysates) have been submitted is corn oil, and residues were found to be stable for only 3 months. Storage stability data will be needed for all soybean or peanut commodities, and all potato commodities.

For livestock feeding studies, storage stability data are required for muscle (cattle or poultry), liver (cattle or poultry), milk, and eggs. If residues are stable in these matrices, analyses of other tissues (fat, kidney) will not be needed. Storage stability data, using the metolachlor metabolite hydrolysates, have been submitted for muscle, liver, milk, and eggs.

In the current submission, Ciba-Geigy Corp. (1992; MRID 42502901) submitted supplemental data (storage information) from metolachlor RAC and processing residue studies conducted between 1974 and 1983 on the following commodities: potatoes, beans (succulent and dried), soybeans, corn, sorghum, cotton, peanuts, safflower, dairy cows, and poultry. The registrant provided the dates of sampling, extraction, and analysis for each residue sample accompanied by the MRID number, and stated that all samples were stored at approximately -15 °C. A summary of sample storage intervals for each commodity is presented in Table 1. A summary of the MRID numbers for the studies for which storage information was submitted is presented in Table 2, and a summary of the MRID Numbers for which no storage information was submitted is presented in Table 3.

The available storage stability data (B. Cropp-Kohlligian, CBRS No. 8317, 4/16/92) on potatoes, peanut nutmeats, and corn grain and forage indicate that CGA-37913 and CGA-49751 are stable at -15 °C for up to 25 months. In corn oil stored at -15 °C, CGA-49751 was also stable for at least 25 months, but CGA-37913 was only stable for up to 102 days (3+ months) and declined to 54-58% by 193 days. The existing storage stability data are summarized in Table 4. With the exception of crude and refined oil fractions, these data support the sample storage intervals ranging from 3-782 days for the plant commodities listed in Table 1. Processed fractions are discussed further below under Storage Stability Data: Processed Food/Feed.

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6

Table 1. Storage intervals for plant and animal residues samples used to support metolachlor tolerances[a].

Crop	Commodity	Storage Interval (days)
Potatoes	tubers	168-408
Beans[b]	succulent beans	399-437
	dried beans	259-413
	pods (succulent and dried)	268-496
	forage	402-498
Soybeans	beans	87-401
	hulls	222-262
	meal	202-262
	crude oil	204-225
	refine oil	204-233
	soapstock	202-233
	forage	3-454
	fodder/hay	87-391
Corn	grain	7-538
	ears	110-522
	forage	5-782
	fodder/stover	5-782
	silage	99-245
Sorghum	grain	23-451
	forage	6-182
	fodder	27-299
	flour	412-429
	bran	414-431
	shorts	412-429
Cotton	seed	147-464
	hulls	342-467
	meal	349-467
	crude oil	349-464
	refined oils	460-464
	soapstock	357-464

(continued)

Table 1. (continued)

Crop	Commodity	Storage Interval (days)
Peanuts	whole nuts	32-477
	nutmeats	60-512
	hulls	130-506
	meal	503-537
	crude oil	505-533
	refined oil	513-533
	soapstock	510-530
	forage	103-579
	hay	475-506
Safflower	seed	294-300
	meal	299-300
	hulls	299-300
	crude oil	299-300
	refined oil	299-300
	soapstock	299-300
Dairy cows	meat	261-275
	liver	261-275
	kidney	259-273
	blood	260-274
	milk	264-292
	fat	259-276
Poultry	meat	139-160
	liver	139-160
	fat	142-160
	egg white	139-168
	egg yolk	140-269

[a]All samples were stored at approximately -15 °C. [b]Residue studies on bean included the following varieties: snap, lima, kidney, navy, pinto, southern, and unspecified.

Table 2. MRID numbers for interval information reported in Table 1.

Crop	MRID Number(s)
Potatoes	00105957, 00106191, 00109613
Soybeans	00015399, 00015400, 00015401, 00015402, 00015403, 00015404, 00015405, 00015407, 00015408, 00015409, 00015410, 00015411, 00015540, 00015541, 00015542, 00015575, 00015706, 00015723, 00015731, 00015726, 00015727, 00015729, 00015732, 00015733, 00015734, 00015736, 00015737, 00015761, 00015762, 00015763, 00015764, 00015765, 00015767, 00015768, 00015769, 00015770, 00015771, 00015772, 00015773, 00015774, 00015776, 00015777, 00015778, 00015779, 00015780, 00016427, 00016248, 00016604, 00039174
Soybeans (processing) and processed commodities	00015400, 00015401, 00015402, 00039174, 00039471
Soybean forage and fodder	00015399, 00015400, 00015401, 00015402, 00015403, 00015404, 00015405, 00015407, 00015408, 00015409, 00015410, 00015411, 00015468, 00015540, 00015541, 00015542, 00015575, 00015706, 00015719, 00015721, 00015722, 00015723, 00015725, 00015726, 00015727, 00015728, 00015729, 00015731, 00015732, 00015733, 00015734, 00015736, 00015737, 00015761, 00015762, 00015763, 00015764, 00015765, 00015767, 00015768, 00015769, 00015770, 00015771, 00015772, 00015773, 00015774, 00015776, 00015777, 00015778, 00015779, 00015780, 00016247, 00016248, 00016604, 00039174
Beans (succulent/dry/forage)	00064182, 00128731
Corn grain	00015429, 00015570, 00015571, 00015586, 00015587, 00015599, 00015600, 00015601, 00015602, 00015676, 00015677, 00015678, 00015681, 00015682, 00015683, 00015684, 00015686, 00015704, 00015705, 00015707, 00015739, 00015741, 00015745, 00015746, 00015750, 00015752, 00015753, 00015755, 00015786, 00015787, 00015950, 00016292, 00016392, 00016394, 00016395, 00016397, 00016398, 00016435, 00016440, 00016441, 00016442, 00016443, 00016596, 00017699, 00017700, 00105956, 00109612, 00125227
Corn ears	00015430, 00015597, 00015679, 00015680, 00015685, 00015687, 00015714, 00015715, 00015716, 00015717, 00015718, 00015742, 00015743, 00015744, 00015748, 00015749, 00015750, 00105956, 00109612

(Continued)

9

Table 2. *(Continued)*.

Crop	MRID Number(s)
Corn forage and fodder	00015428, 00015429, 00015430, 00015570, 00015571, 00015572, 00015586, 00015587, 00015597, 00015599, 00015600, 00015601, 00015602, 00015604, 00015676, 00015677, 00015678, 00015679, 00015680, 00015681, 00015682, 00015683, 00015684, 00015685, 00015686, 00015687, 00015689, 00015690, 00015691, 00015692, 00015693, 00015694, 00015704, 00015705, 00015707, 00015708, 00015709, 00015710, 00015712, 00015713, 00015714, 00015715, 00015716, 00015717, 00015718, 00015739, 00015741, 00015742, 00015743, 00015744, 00015745, 00015746, 00015747, 00015748, 00015749, 00015750, 00015752, 00015753, 00015786, 00015787, 00015950, 00015955, 00016392, 00016394, 00016395, 00016397, 00016398, 00016435, 00016596, 00016640, 00016644, 00017699, 00017700, 00105956, 00109612, 00125227
Sorghum grain	00015549, 00015550, 00015551, 00015552, 00016607, 00016608, 00016610, 00016690, 00016991, 00016992, 00111693
Sorghum forage and fodder	00015549, 00015550, 00015551, 00015552, 00016607, 00016608, 00016609, 00016610, 00111693
Sorghum processed commodities	00111693
Cottonseed	00065047, 00065048
Cottonseed processed commodities	00065047, 00065048
Peanuts (nuts/hulls/ processed commodities)	00015553, 00015555, 00015556, 00015557, 00106041
Peanut forage and hay	00015553, 00015554, 00015555, 00015556, 00015557, 00106041
Safflower processed commodities	00084006
Cattle tissues and milk	00015413, 00015695, 00015696
Poultry tissues and eggs	00015413, 00015695, 00015697

Table 3. Residue data cited in the Guidance Document for which storage interval information was not reported.

Crop	MRID Numbers
Soybeans	00015406 00015760 00015721 00015766 00015722 00016248
Chili peppers	00150180
Corn	00015588 00015688 00015589 00015711 00015590 00015954 00015591 00016393 00015592 00016396 00015593 00016399 00015594 00016436 00015595 00016437 00015598 00016438 00015740 00016445 00015751 00016598 00015754 00078942 00015756 00115206 00015757
Sorghum	00015548 00016609
Cotton	00129058

The available data on storage stability in animal commodities (S. Funk, CBRS No. 9261, 8/6/92) indicate that CGA-49751 is stable in beef muscle, beef liver, milk, and eggs stored at -15 °C for up to 25 months, and that CGA-37913 is stable at -15 °C in milk and eggs for up to 25 months, in beef muscle for up to 2 months, and in beef liver for up to 12 months. The storage intervals listed in Table 1 indicate that residues of metolachlor were stable in residue samples of animal commodities, with the exception of ruminant and poultry meat. Samples of meat from dairy cattle and poultry were stored at -15 °C for 139-275 days prior to analysis, which is longer than the 2 months for which CGA-37913 is stable in muscle. Therefore, residues of CGA-37913 determined in the existing feeding studies may not represent actual residue levels in the muscle tissues. The impact of these data on the adequacy of existing animal feeding studies is discussed under Magnitude of the Residues in Meat, Milk, Poultry, and Eggs.

The submitted storage interval report (1992; MRID 42502901) is adequate for the bean, potato, peanut, and safflower data cited in the Guidance Document. However, storage intervals for all data on soybean, corn, sorghum, cotton, and animal commodities were not reported. (See Table 3). All submissions made in response to data requirements, including data called to replace Craven data, should include information on sample storage conditions and intervals.

Regarding the soybean studies for which storage intervals were not reported, two are tank mix studies and 4 are single ai studies. Four of the 23 studies with a single application do not have storage information. If tank mix studies are considered as well, 6 or the 68 studies are missing storage information. For corn, all studies missing storage information are for a single preplant incorporated or preemergence application. Layby uses are now registered (3+3 use), based on

11

data submitted by Craven. The Craven data must be replaced and the new studies must contain storage information. For the sorghum studies missing storage information in this submission, one study had samples stored about 1 year (PP#2G2019, R. Hummel, 5/4/78), which leaves storage information unreported for 1 sample out of 49. According to the FRSTR Residue Chemistry Chapter, the cotton study listed in Table 3 had samples stored frozen for 2 months. No additional storage information is needed for the studies cited in the FRSTR.

Storage Stability Data: Processed Food/Feed

In the older processing studies for which the storage intervals were reported, residues of the metolachlor metabolite hydrolysates, CGA-37913 and CGA-49751, were non-detectable in crude and refined oil samples processed from soybeans, cottonseeds, peanuts, and safflower seeds. In addition, residues were non-detectable in or on the soybeans, cottonseeds, and safflower seeds from which the oil fractions were obtained, and residues in whole peanuts were below or just above the detection limit. Because CGA-37913 yielding residues were non-detectable in the oil fractions, no decline factor can be applied in order to estimate residue levels.

Although storage intervals for oil fractions in these studies exceeded the interval for which CGA-37913 is stable in oil, CBRS can determine if residues concentrate in these oil fractions based on other available data. The available plant metabolism data indicate that the majority of metolachlor residues are aqueous soluble and would not be expected to concentrate in an oil fraction. Data from corn, soybean, lettuce, and potato metabolism studies indicate that approximately 60-70% of the total residues are aqueous soluble, whereas approximately 10-20% are organic soluble. In addition, more recent processing studies (1989; MRIDs 40980705 through 40980708) containing oil fractions indicate that metolachlor residues do not concentrate in crude and refined oils.

Processing studies using corn grain (1989; MRID 40980705), soybeans (1989; MRID 40980706), cottonseed (1989; MRID 40980707), and peanuts (1989; MRID 40980708) were reviewed in the Reregistration Standard Follow-up (R. Quick, CB No. 4931, 6/14/89). CGA-37913 and CGA-49751 yielding residues were non-detectable in RACs and oil fractions of corn grain and cottonseed. Soybeans containing measurable residues of CGA-37913 yielding residues showed no concentration of CGA-37913 yielding residues in crude and refined oils, but had a 1.3-1.7x concentration of CGA-37913 yielding residues in hulls. The processing study on peanuts (which contained the highest level of combined metolachlor residues of any of the RACs used for processing) indicated that residues of both CGA-37913 and CGA-49751 yielding residues concentrated in meal (1.1-3x) rather than in crude or refined oil. Actual storage intervals for oil samples were not reported in these processing studies. Storage temperatures were reported and storage times were estimated in the FRSTR Followup (R. Quick, 6/14/89). However, the relative concentration of residues in peanut meal, along with the percentage of oil and meal accounted for in the RAC, precluded any concentration of residues in peanut oil.

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Table 4. Summary of Storage stability data for Metolachlor Metabolite Hydrolysates.

Substrate	Storage Interval (months)	Percent Recovery CGA-37913	CGA-49751
Corn Grain	0	70, 82	96, 108
	1	72, 82	94, 96
	3	74, 100	98, 100
	6	72, 72	84, 118
	12	104, 104	98, 100
	25	66, 68	104, 104
Corn Oil	0	94, 106	90, 116
	1	102, 106	78, 118
	3	76, 102	108, 116
	6	54, 58	144, 144
	12	50, <10	90, 98
	25	46, 64	102, 98
Corn Forage	0	84, 106	116, 134
	1	94, 104	106, 108
	3	122, 122	90, 102
	6	70, 162	60, 66
	12	98, 122	98, 110
	25	76, 82	114, 124
Peanuts	0	90, 98	88, 116
	1	82, 90	90, 100
	3	62, 66	106, 110
	6	98, 102	98, 106
	12	70, 98	74, 90
	25	76, 86	126, 112
Potatoes	0	106, 116	94, 96
	1	66, 70	76, 84
	3	82, 94	118, 130
	7	62, 66	98, 106
	12	98, 106	76, 76
	25	70, 72	96, 100

Note: Residues were corrected for apparent residues in control samples and for procedural recoveries <100%

Table 4. Summary of Storage stability data for Metolachlor Metabolite Hydrolysates.

Substrate	Storage Interval (months)	Percent Recovery CGA-37913	CGA-49751
Cabbage*	0	100, 100	55, 72
	17	53, 75	76, 82
Bell Pepper*	0	87-100	63-110
	5.5	81	94
Beef Muscle	0	114, 106	94, 94
	2	114, 122	102, 102
	3	18,16, < 10,36	96, 82
	7	16,32,18,18	96, 68
	12	16, 32	112, 90
	25	26, 18	138, 126
Beef Liver	0	96, 78	96, 94
	2	108, 92	102, 102
	3	120, 112	80, 84
	7	88, 72	102, 110
	12	90, 54	110, 66
	25	34, 28	88, 88
Milk	0	96, 88	80, 120
	1	92, 68	
	2		82, 90
	3	104, 102	120, 92
	7	84, 58	90, 94
	12	110, 100	120, 104
	25	102, 90	106, 118
Eggs	0	112, 122	134, 110
	2	104, 84	92, 98
	4	122, 112	116, 88
	7	96, 92	74, 78
	12	102, 172	72, 98
	25	92, 66	102, 110

* Cabbage and Bell pepper samples were fortified with CGA-37913 and CGA-49751 just before hydrolysis, and the hydrolysates stored at +4C.

Based on the above data, CBRS concludes that residues of metolachlor are unlikely to concentrate in plant oil fractions and that the oil samples from the earlier (1974-1983) processing studies are not essential for tolerance reassessment. For the same reason, we can conclude that analysis of oil samples within the time period oil residues are stable is not essential. However, we cannot conclude that the metolachlor residues in other processed products will be stable.

The Agency review (B. Crop-Kohlligian, CBRS No. 8317, 4/16/92) of a two year storage stability study on metolachlor residues in plant commodities concluded that the metolachlor metabolite hydrolysates CGA-37913 and CGA-49751 are stable in storage at -15 °C for up to 25 months in potatoes, peanut nutmeats, and corn grain and forage. Metolachlor metabolite hydrolysate CGA-49751 was also stable in corn oil at -15 °C for up to 25 months; however, metolachlor metabolite hydrolysate CGA-37913 was stable in corn oil for only up to 102 days (3+ months) at -15 °C. Because the exact storage intervals for corn oil samples were not provided in the previously reviewed (R. Quick, CB No. 4931, 6/14/89) corn processing study (1989; MRID 40980705) and may have exceeded 102 days, CBRS requested exact information on the handling, processing, and storage of corn grain and processed corn fractions from the time of harvest to analysis.

Ciba-Geigy Corp. (1992; MRID 42384401) submitted supplemental information on the storage, handling, and processing of samples from the dry- and wet-milling corn processing study. The report included a chronology of events from harvest of the corn grain, through processing, and up to extraction and analysis of samples; a flow sheet describing the dry- and wet-milling procedures used; and the storage interval for each sample analyzed. Storage intervals for each commodity are summarized in Table 5. In the transmittal document (1992; MRID 42384400) accompanying the above submission, the registrant also indicated that all samples were stored at -18 °C (Food Protein R&D Center, Texas A&M Univ.) or -15 °C (Ciba-Geigy, Greensboro, NC) except during processing, shipping (frozen), or analysis.

These data indicate that the residue data (1989; MRID 40980705) on corn processed fractions are adequately supported by the available storage stability data on corn grain and oil. Residues of metolachlor metabolite hydrolysates are stable up to 102 days in corn oil, and the maximum storage interval for corn oil in the processing study was 98 days.

Magnitude of the Residue in Meat, Milk, Poultry, and Eggs

Samples of meat from dairy cattle and poultry feeding studies (Table 1) were stored longer than the 2 months for which the metolachlor metabolite hydrolysate CGA-37913 is stable in muscle. Therefore, residues of CGA-37913 yielding residues determined in the existing

feeding studies may not represent actual residue levels in the muscle tissues. These data indicate that metolachlor residues in ruminant and poultry and muscle must be adjusted to reflect the 80% loss of CGA-37913 residues in frozen storage.

17

Table 4. Storage intervals for corn grain and dry- and wet-milled processed fractions stored at ≤ 15 °C.

Commodity	Storage interval (days)	
	Dry-milling	Wet-Milling
Whole grain	336	381
Broken kernels	56	122
Small grits	49-53	NA[a]
Meal	51-55	NA
Flour	51-55	NA
Starch	NA	75-82
Gluten	NA	75-82
Hulls	55-59	69-75
Germ	55-59	69-75
Press cake[b]	57-58	44-68
Crude oil[b]	62-98	40-55
Refined oil	62-91[c]	47
Soapstock	52	45

[a]Not applicable. [b]Includes expeller and solvent extracted fractions. [c]Includes refined oil, refined bleached oil, and refined bleached deodorized oil.

References

Citations for the MRID documents referenced in this review are presented below. Submissions reviewed in this document are indicated by shaded type.

40980705 Cheung, M. (1989) Residue Summary--Metolachlor Corn Processed Fractions (Dry and Wet Milling): Project ID: ABR-88168. Unpublished study prepared by Ciba-Geigy Corp. 87 p.

40980706 Cheung, M. (1989) Residue Summary--Metolachlor Soybean Processed Fractions: Project ID: ABR-88169. Unpublished study prepared by Ciba-Geigy Corp. 71 p.

40980707 Cheung, M. (1989) Residue Summary--Metolachlor Cotton Processed Fractions: Project ID: ABR-88170. Unpublished study prepared by Ciba-Geigy Corp. 73 p.

40980708 Cheung, M. (1989) Residue Summary--Metolachlor Peanut Processed Fractions: Project ID: ABR-88171. Unpublished study prepared by Ciba-Geigy Corp. 72 p.

41425502 Cheung, M. (1990) Metolachlor: Residue Stability Study of CGA-37913 and CGA-49751 (Metolachlor Residue Hydrolysates) in Crops and Crop Fractions Under Freezer Storage Conditions: Final Report: Lab Project Number: ABR-89090. Unpublished study prepared by Ciba-Geigy Corp. 75 p.

41506401 Cheung, M.W. (1990) Residue Stability Study of CGA-37913 and CGA-49751 (Metolachlor Residues Hydrolysates) in Beef Muscle, Beef Liver, Dairy Milk, and Poultry Eggs under Freezer Storage Conditions (Final Report): Laboratory Project ID. ABR-89089. Unpublished study prepared by CIBA-GEIGY Corp. 86 p.

42384400 Ciba-Geigy Corp. (1992) Submission of supplementary residue data to support the Metolachlor registration standard. Transmittal of 1 study. Ciba Geigy Letter of 7/1/92

42384401 Cheung, M. (1992) Metolachlor: Supplement to Residue Summary-Metolachlor-Corn Processed Fractions (Dry and Wet Milling): Lab Project Number: ABR 88168. Unpublished study prepared by Ciba-Geigy Corp. 13 p.

42502901 Senzel, A. (1992) Metolachlor: Sample Storage Interval Summary: Lab Project Number: ABR-92042. Unpublished study prepared by CIBA-GEIGY Corp. 470 p.

Agency Memoranda

CB No.:	4931
Subject:	Metolachlor Registration Standard Follow-up.
From:	R. Quick
To:	L. Schnaubelt
Date	6/14/89
MRID(s):	40980702 to 40980708 and 40766601 and 40766602

CBRS No.:	8317
Subject:	Soybean Hull Chromatograms and Storage Stability Data Submissions in Response to the Metolachlor Final Reregistration Standard and Tolerance Reassessment (FRSTR) follow-up (6/14/89).
From:	B. Cropp-Kohlligian
To:	W. Waldrop
Date	4/16/92
MRID(s):	41506501 and 41425502

CBTS No.:	8398
Subject:	Metolachlor. Impact of Craven Analytical Data on Registrations.
From:	S. Koepke
To:	J. Miller
Date	10/10/91
MRID(s):	None

CBRS No.:	9261
Subject:	Reregistration of Metolachlor. Storage Stability of Metolachlor Metabolites in Animal Commodities.
From:	S. Funk
To:	C. Childress
Date	8/6/92
MRID:	41506401

4/93

MEMORANDUM

SUBJECT: Metolachlor (108801) Ciba Geigy Responses to Residue Chemistry Reregistration Requirements Storage Stability Data and Storage Information [MRID Nos. 42384401, 42502901; CB Nos. 10305, 10787; DPBarcodes D181006, D183896]

FROM: Francis B. Suhre, Section Head
Special Review Section II
Chemistry Branch II-Reregistration Support
Health Effects Division (H7509C)

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

TO: Jane Mitchell/W. Waldrop, PM#71
Reregistration Branch
Special Review and Reregistration Division (H7508W)

Ciba Geigy Corporation has submitted several responses to Residue Chemistry Reregistration Data requirements, in response to the Metolachlor Registration Standard Followup of 6/89. Ciba Geigy's earlier responses to the Storage stability data requirements in the Followup were reviewed in our memo of 4/6/92 (B. Cropp-Koholligian, CB No. 8317), and 8/6/92 (S. Funk, CB No. 9261). Subsequent to the Followup, the Agency determined that some of the metolachlor residue data were generated at Craven Laboratories. The Agency will not use Craven data for regulatory purposes until the issues surrounding Craven data are resolved. Craven data for metolachlor must be replaced. We note that a submission regarding replacement of Craven data has recently been received.

Metolachlor is on List A. The structure of metolachlor is shown in Figure 1 on page 2 of the attachment. A Registration Standard was completed 9/80, and the FRSTR 1/87 (Residue Chemistry Chapter 6/13/86). A Registration Standard Followup (Update) was completed 6/14/89.

The submissions and accompanying data have been reviewed by Acurex Environmental Corporation under contract to EPA. The review, found as an attachment to this cover memo, has been corrected to reflect Branch policies. Several additional submissions pertaining to plant metabolism have been received and are under reveiw.

Attachment 1: Metolachlor: Ciba Geigy Response to Residue Chemistry Reregistration data requirements - Storage Stability (CB Nos. 10305, 10787)

cc w/ attachment: addressee, R.F., circu, S.F., S. Hummel, Metolachlor Reg. Std. F.
RDI:FBS:04/12/93:MM:4/14/93:EZ:04/15/93
H7509C:CBII:SVH:svh:RM:804:CM#2:04/15/93