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Shaughnessey No. 121601

Date Out EFB: 25 JAN 1984

To: Taylor/Walters
Product Manager 25
Registration Division (TS-767)

From: Samuel Creeger, Chief
Review Section No. 1
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No: 524-GUI

Chemical: Acetochlor

Type Product: Herbicide

Product Name: Harness

Company Name: Monsanto

Submission Purpose: registration data for corn, soybeans, peanuts and sorghum grain

ZBB Code: 3(c)(5)

Date in: 10/7/83

Date completed: 1/24/84

ACTION CODE: 110

EFB # 4006

Tais (level II)	Days
61	4.5

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

4.3 Uptake and Characterization of Acetochlor [2-chloro-N-ethoxymethyl-N-(2-ethyl-6-methylphenyl)acetamide] Residues in Primary, Emergency Replant and Rotational Crops. C.L. Livingston. Report No. MSL-2988. May 1982. Acc. No. 071961.

Procedure:

Plastic pots of Spinks sandy loam soil were placed in 2 greenhouses and amended with either acetochlor-phenyl-^{14}C (an isotopic mixture with acetochlor which was ^{13}C-enriched at the C-2 position and the mixture ratio adjusted such that the $^{12}C/^{13}C$ ration was 50/50) at 1.3 lb/A or acetochlor-carbonyl-^{14}C at 1.4 lb/A. Soybeans were planted in the pots immediately prior to the addition of the acetochlor. Half of the pots were designated controls and no acetochlor was added. Half of each treated or control group were designated for an emergency replant study and half for a rotational crop study.

Immature soybean plants were harvested from 3 pots on day 30 and analyzed. Emergency replant crops of either barley, cabbage, or radish were planted in these pots and grown to maturity, harvested and analyzed. Subsequent rotational crops were then planted in the pots and grown to maturity.

Soybeans in the other pots were grown to maturity, harvested, separated into beans and foliage and analyzed. Rotational crops were then planted in the pots.

Plant residues were analyzed by combustion and LSC for radioactivity. Barley was separated into straw and grain and radishes were separated into bulbs and greens. Soil residues were taken 485 days from the initial treatment and analyzed for radioactivity by combustion/LSC.

Homogenized plant parts were extracted with acetone/water (60:40, v/v) followed by further homogenation (4 times). The filter cake from the extraction was analyzed for radioactivity by combustion/LSC. The extract was concentrated by rotary evaporation. The concentrated aqueous extracts and the evaporation distillates were analyzed by LSC.

The aqueous extracts were chromatographed on an AG 1-X2 resin column and aliquots taken from each of the fractions for LSC. Major fractions thus identified were pooled and concentrated by rotary evaporation and assayed by LSC.

Crop residues were also subjected to acid hydrolysis followed by methylene chloride extraction. The extract was then chromatographed on HPLC/LSC to assay for the presence of possible substituted N-phenylacetamide hydrolysis products.

Results:

The tables on pages 5A-5L and the figure on page 5M summarize the results.

Uptake of acetochlor into primary crop (soybeans) was 1.2 ppm in foliage and .2 ppm in grain when harvested at maturity. When harvested at 30 days residues in the forage were 13.2 ppm from the carbonyl-labeled acetochlor and 1.99 ppm from the phenyl-labeled.

Residues in follow crops were 0.2 ppm and 0.4-1.13 ppm in barley grain and straw, respectively; 0.09-0.2 in cabbage; and 0.03-0.04 ppm and 0.16-0.18 ppm in radishes and radish greens, respectively, in normal crop rotation. When planted after premature harvesting of the primary crop, residues were 0.22-0.94 ppm in barley grain, 1.64-2.38 ppm in barley straw, 0.16-0.38 ppm in cabbage, 0.07-0.14 ppm in radishes and 0.38-0.65 in radish greens. With increasing time of planting after application, the amount of acetochlor taken up decreases. Five month rotation crops have residues which range from 0.03 to 1.13 ppm from all experiments, while those from the 1 year rotation crops ranged from 0.01 to 0.63 ppm.

Conclusions:

It is hard to determine from the label what the application rates are. We are therefore not able to determine that the application rates used in this study are normal rates.

Soil residues were only taken for analysis at the time of harvest of the last crop. The data on the analysis of these samples was only displayed in a graph; no raw data was given. Soil residues should be taken at the time of treatment, at time of planting of rotational crops and at the time of harvest of the rotational crops. We can make no judgement about the residues of acetochlor in soil during the rotational crop cycle, from the data given.

This study does not completely satisfy the EAB confined rotational crop data requirement.

4.4 Applicator Exposure Studies with HARNESS® Herbicide Under Actual Field Use Conditions. D.D. Arras. Report No. MSL-2887. April 1983. Acc. No. 071974.

This is not a first tier data requirement in EAB. Therefore, it was not reviewed at this time. However, if the study needs to be reviewed to support assessments by other branches in HED, the study should be resubmitted.

5.0 CONCLUSIONS

5.1 The following data requirements have been satisfied previously (review of 3/9/81): hydrolysis and aerobic soil metabolism.

5.2 The following studies were submitted with the previous submission, but not reviewed at that time: adsorption/desorption, leaching, and anaerobic soil metabolism.

5.3 No supporting data was given for the assertion that all dichloromethane soluble radioactivity in the aqueous and soil photodegradation studies was attributable to acetochlor. We could conclude that acetochlor is stable to both aqueous and soil photolysis if this were shown to be true.

5.4 Acetochlor does not accumulate in fish.

5.5 The confined rotational crop study lacked adequate soil residue data. We could, however, use data from the aerobic soil metabolism study. It was also unclear that the application rates used were label rates.

The following residues were found in crops:

Crop	Interval (appn to planting)	Total ^{14}C residues (ppm)
Barley grain	1 month	0.22 - 0.94
	5 months	0.14 - 0.30
	1 year	0.10 - 0.26
Barley straw	1 month	1.64 - 2.38
	5 months	0.41 - 1.13
	1 year	0.23 - 0.63
Cabbage	1 month	0.16 - 0.38
	5 months	0.09 - 0.22
	1 year	0.08 - 0.21
Radishes	1 month	0.07 - 0.14
	5 months	0.02 - 0.13
	1 year	0.01 - 0.08
Radish greens	1 month	0.38 - 0.65
	5 months	0.15 - 0.29
	1 year	0.07 - 0.14

These data do not support any rotational crop restriction.

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5.6 The applicator exposure study is not a first tier data requirement in EAB. Therefore, it was not reviewed at this time. However, if the study needs to be reviewed to support assessments by other branches in HED, the study should be resubmitted.

6.0 RECOMMENDATIONS

Hydrolysis, aerobic soil metabolism, and fish accumulation data requirements have been satisfied for acetochlor. Registrant should be advised to submit the documentation requested in 5.3 above to satisfy the photodegradation data requirement and in 5.5 above to satisfy completely the confined rotational crop data requirement.

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The adsorption/desorption, leaching, anaerobic soil metabolism and field dissipation data requirements are outstanding. These studies should be submitted for review.

Until registrant has submitted the information requested and it has been reviewed and accepted, the EAB data requirements for terrestrial crop use have not been satisfied.

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January 24, 1984
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