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

SEP 8 1989

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Pendimethalin Registration Standard Followup: Response to Residue Chemistry Data Requirements [DEB Nos. 5494 and 5495, HED Project No. 9-1682, RD Record Nos. 247260 and -61, MRID Nos. 40185101 and 40185102]

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Attached is a review of a followup to the Pendimethalin Registration Standard prepared by the Dynamac Corp. under supervision of the Dietary Exposure Branch (DEB). This review has undergone secondary review in the Dietary Exposure Branch and has been revised to reflect current Branch policies.

If you need additional input, please advise us.

cc with Attachment: PMSD/ISB, RF, Circu, Pendimethalin Standard File (Boodee), D. Edwards (DEB)

H7509C:DEB:Edwards:9/89:RM:810:CM#2:557-7484

RDI:R. Loranger, 9/89

Final Report

PENDIMETHALIN
Task 4: Registrant's Response to
Residue Chemistry Data Requirements

August 25, 1989

Contract No. 68-D8-0080

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
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PENDIMETHALIN

REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY DATA REQUIREMENTS

Task - 4

BACKGROUND

The Pendimethalin Guidance Document dated 3/85 concludes that additional data are required on plant and animal metabolism and residues in or on soybean foliage. The Guidance Document also stated that the need for processing data would be determined following receipt of the requested plant metabolism data and that when necessary, data from a soybean processing study could be extrapolated to the other oil-seed crops.

In a letter dated 6/28/85, American Cyanamid Co. responded to these data requirements by asserting that the available data demonstrate that essentially no pendimethalin is taken up by plants and that the level of radioactive residues in samples from the existing plant metabolism studies is too low to allow characterization of metabolites; thus, they concluded that additional plant metabolism data are unnecessary. In addition, the registrant contends that the previously submitted animal metabolism data demonstrate that no residues will occur in meat or milk as a result of livestock ingesting treated forage commodities. With regard to the need for processing studies, the registrant argues against the requirement for additional data based on low residue levels in treated oil seeds (0.01-0.016 ppm) and the contention that only in corn is there a potential for concentration of residues in oil (25x based on the percent oil in the grain) to a level exceeding the established tolerance for residues in or on the grain (0.1 ppm); they added that residues in or on corn grain at or near the tolerance cannot be obtained from less than phytotoxic treatment levels.

The Agency, in turn, reiterated the need for additional plant metabolism data, recommending more rigorous hydrolysis steps to release unextractable residues and stating the need for characterization of these residues or demonstrating unequivocally that unextractable radioactivity is incorporated into natural plant products (R.J. Taylor in a letter to American Cyanamid dated 4/16/86). The letter also restated the requirement for additional animal metabolism data based on the presence of uncharacterized radioactive residues in the liver and kidney of ruminants. Citing the presence of detectable residues in oil seeds and the nonpolar nature of pendimethalin, the Agency concluded that a potential for concentration in oil exists and stated that a processing study is required.

American Cyanamid, in a letter dated 5/14/86, restated their argument against the need for additional data on plant and animal metabolism and indicated the intent to submit residue data on

soybean foliage. With respect to the required processing study, the registrant proposed to submit residue data on corn grain generated using an analytical method sensitive enough to demonstrate that residues in or on corn grain treated at 1x would be lower than a level necessary to result in residues in oil greater than the tolerance for corn grain (0.1 ppm), assuming a concentration factor of 25x and that all of the residues concentrated in oil.

The Agency response (R. Taylor in a letter dated 5/10/89) upheld the requirements for data on plant and animal metabolism and stated that a processing study, using corn instead of soybeans as specified in the Guidance Document, would fulfill the requirements for data depicting the concentration of residues in the oil of oil seeds. It was added that these data should be submitted after the required plant metabolism studies are complete.

American Cyanamid has submitted residue data on soybean foliage (1986; MRID 40185101, DEB No. 5494) and corn grain (1986; MRID 40185102, DEB No. 5495); the latter are submitted in lieu of the required oil-seed processing study. In addition, the registrant states the intention to carry out a study of ruminant metabolism, but continues to argue that additional plant metabolism data are not necessary (the existing plant metabolism data were not resubmitted).

Deficiencies Remaining to be Resolved

1. The remaining residue chemistry data gaps on plant and animal metabolism; storage stability; and on residue data for tobacco, fish and shellfish, and milk that were raised in the Registration Standard have not been addressed in this submission and are still unresolved.
2. A corn grain processing study must be submitted (refer to conclusion 3b).
3. The registrant must provide a description of the analytical method and provide recovery data to validate the submitted residue data on soybean foliage.

CONCLUSIONS PERTAINING TO THIS REVIEW

1. The requirement for additional plant metabolism data remains outstanding for the reasons and with the recommendations stated previously by the Agency (letters by R. Taylor dated 4/16/86 and 5/10/89).
2. The registrant should discuss test protocols with the Agency before beginning work on the planned ruminant metabolism studies.

3(a). The registrant must provide a description of the analytical method and provide recovery data to validate the submitted residue data on soybean foliage.

3(b). The submitted corn residue data cannot be used to fulfill the requirement for an oil-seed processing study. If, in fact, residues in corn grain are never >0.002 ppm and a method exists for detection of such low levels, the tolerance should be revised to 0.002 ppm. Then, if a 25x concentration in corn oil occurred, a food additive tolerance of 0.05 ppm would be required. The Agency does not intentionally set tolerances on the raw agricultural commodity such that concentration in processed commodities will be covered. In cases such as this where application of exaggerated rates equivalent to the theoretical concentration factor is not practical and no detectable residues occur following application of slightly exaggerated rates (2x), samples treated at the highest practical exaggerated rate must be processed. If no detectable residues are found in the processed products, no food additive tolerances will be required.

RECOMMENDATIONS

American Cyanamid should be informed that the requirements for additional plant metabolism data and data on oil-seed processing remain outstanding and that additional data pertaining to the analytical methodology are required to validate the residue data on soybean foliage. The registrant should be reminded that the data on plant metabolism should be completed prior to submitting the results of the requested processing study.

The registrant should be encouraged to discuss protocols for additional studies with the Dietary Exposure Branch before initiating any additional experiments.

DETAILED CONSIDERATIONS

Residue Data on Soybean Hay and Straw

American Cyanamid Co. submitted data from two tests conducted in IL and MN (1986; MRID 40185101) depicting combined residues of pendimethalin and CL 202,347 in or on soybean hay and straw harvested 62 or 68 days after an at-planting ground application of the 4 lb/gal EC formulation at 2 lb ai/A. Combined residues of pendimethalin and CL 202,347 were <0.1 ppm (nondetectable, including <0.05 ppm of each compound) in or on each of four samples of straw and four samples of hay. Control samples also bore nondetectable residues. All samples were stored frozen (-18 C) for 86-150 days until analysis by GLC (Method M-1609); the method was not described. The limit of detection was reported as

0.05 ppm. Recovery data were not presented. These data indicate that the combined residues of pendimethalin and CL 202,347 are not likely to exceed the established tolerance of 0.1 ppm in or on soybean hay or straw following registered use. We note that although validation data for the analytical method (M-1609) were referenced as being available in Report No. C-2667, these data could not be located in this submission. The registrant needs to submit these validation data.

Residue Data on Corn Grain

American Cyanamid Co. (1986; MRID 40185102) submitted data from 10 tests conducted in IA, IL, NE, OH, and WI (two tests at each location) depicting residues of pendimethalin per se in or on corn grain harvested 118-187 days following preemergent or postemergent application at of the 4 lb/gal EC formulation at 1.5-4 lbs ai/A (0.75-2x the maximum registered rate). Residues of pendimethalin per se were <0.002 ppm (nondetectable) in or on each of 20 treated samples. Apparent residues in or on seven untreated samples were <0.002 ppm (nondetectable). Samples were stored frozen (-18 to -29 C) for 37-77 days after harvest until analysis using GLC Method M-1692. The limit of detection was reported as 0.002 ppm. We note that although validation data for the analytical method (M-1692) were referenced as being available in Report No. C-2890, these data could not be located in this submission.

The registrant contends that, if residues concentrate 25x in corn oil during processing of grain bearing residues of <0.002 ppm, the residues in oil would not exceed 0.1 ppm (the established tolerance for combined residues of pendimethalin and CL 202,347).

The registrant's rationale for not submitting a corn processing study is not acceptable. If, in fact, residues in corn grain are never >0.002 ppm and a method exists for detection of such low levels, the tolerance should be revised to 0.002 ppm. Then, if a 25x concentration in corn oil occurred, a food additive tolerance of 0.05 ppm would be required. The Agency does not intentionally set tolerances on the raw agricultural commodity such that concentration in processed commodities will be covered. In cases such as this where application of exaggerated rates equivalent to the theoretical concentration factor is not practical and no detectable residues occur following application of slightly exaggerated rates (2x), samples treated at the highest practical exaggerated rate must be processed. If no detectable residues are found in the processed products, no food additive tolerances will be required. Furthermore, data on additional compounds may be needed if the requested plant metabolism data reveal the presence of additional metabolites of concern. Therefore, the requirement for data from an oil-seed processing study remains outstanding.