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

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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Propanil. List A Reregistration Case No. 0226/Chemical ID No. 028201. Rohm and Haas Submission of Wheat Residue and Method Validation Data. MRID Nos. 43196001 and 43196002. CBRS No. 13729. DP Barcode No. D203514.

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Rohm and Haas has submitted residue data from wheat field trials and method validation data in wheat; the field trials were conducted to generate samples for a wheat processing study. The submission (dated 4/12/94) also included a waiver request for a wheat processing study.

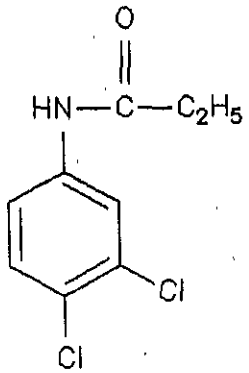
The product and residue chemistry chapters of the propanil Reg. Std. were completed 8/26/87. Additional rice, wheat, poultry, and ruminant metabolism studies were required, as well as a wheat processing study. In addition, the registrant was requested to propose a higher tolerance (1.5 ppm) for wheat straw.

Tolerances are established for the combined residues of propanil (3',4'-dichloropropionanilide) and its metabolites (calculated as propanil) in or on barley grain (0.2 ppm); barley straw (0.75 ppm); cattle, goats, horses, hogs, and sheep, (fat, meat, MBYP), 0.1 ppm; eggs (0.05 ppm); milk (0.05 ppm); oat grain (0.2 ppm); oat straw (0.75 ppm); rice (2 ppm); rice straw (75 ppm); wheat grain (0.2 ppm); and wheat straw (0.75 ppm) [40 CFR §180.274]. There are no food/feed additive tolerances established under 40 CFR §185 and §186.

Both rice and wheat metabolism studies were submitted and deemed inadequate. The rice metabolism study was subsequently upgraded, and additional information needed to upgrade the

wheat metabolism study was due to be submitted to the Agency 8/94. The structure of propanil is shown below:

PROPANIL



Conclusions

1. Hard red spring wheat grown in ND was treated with single postemergence ground applications at 1X and 5X the maximum registered label rate of 1.1 lb ai/A. Applications were made when wheat had reached the 4th leaf stage of growth. The test substance used in the study was Stampede® 80EDF.

2. The field trial was supported by adequate documentation of pesticide application, plot maintenance, sample handling, and rainfall and temperature data for the duration of the study.

3. Wheat forage and hay were cut 60 days after the plots were treated, and hay was allowed to dry for 2 days in the field. Plots were threshed to obtain grain and straw samples 87 days after treatment. Sampling was random throughout the plots; samples were composited and frozen immediately.

4. The analytical method "Analytical Method for Determination of Propanil as Base-Releasable 3,4-Dichloroaniline (DCA) in Soil, Water, Crayfish, Rice Grain, Rice Hulls, Rice Bran, and Rice Straw and the Determination of Base Releasable 3,4-Dichloroaniline from N-(3,4-Dichlorophenyl)-D-glucosylamine (DCA-glucose) in Crayfish" (EN-CAS method ENC-9/90) was used to analyze wheat grain samples.

5. The analytical method was subjected to a method validation study in wheat grain and straw which was submitted along with the wheat field trial data. The three day validation study demonstrated that the method was validated at 0.01 and 0.10 ppm, but that

additional modifications would be necessary to obtain consistent results for the higher fortification level of 1.0 ppm.

6. **Since the Agency has recommended that the registrant propose an increased tolerance of 1.5 ppm in wheat straw, successful validation of the method in wheat straw (1.0 ppm and above) will be required if the method is to be used as an enforcement method.**

7. Propanil residues (determined as base-releasable 3,4-DCA) in the 1X grain were <0.01 ppm; although the 5X grain sample was determined to bear residues of 0.018 ppm using the base-release method, analysis of the sample using GC/MS demonstrated that propanil residues in the 5X sample were <0.01 ppm.

8. Adequate supporting raw data, sample calculations, and sample chromatograms were submitted for both the method validation study and the wheat field trial.

9. A wheat processing study was not conducted, since the propanil residues were <0.01 ppm in the grain from wheat treated at 5X. The maximum theoretical concentration factor for wheat is 9X (refer to the 1/13/93 E. Zager and D. Edwards memo).

10. Based on the early-season application timing (4-leaf stage or earlier) and the lack of residues in grain (<0.01 ppm) resulting from a 5X exaggerated rate field trial, CBRS does not expect residues to concentrate in processed products of wheat. A processing study is not required.

11. The Agency no longer considers restrictions against feeding wheat forage to livestock to be practical. **Residue data for propanil in/on wheat forage must be submitted by the registrant.**

Recommendation

CBRS concludes that a wheat processing study is not required. Additional modifications must be made to the analytical method (ENC-9/90) for wheat straw if it is to be used as an enforcement method (see Conclusion 6).

As stated in Conclusion 11, residue data in/on wheat forage are required. Residue data should be provided according to the specifications of recent Agency guidance entitled "Number and Location of Domestic Field Trials," 6/94.

CBRS notes that the nature of the residue in plants is not adequately understood; additional residue data may be required if it is determined that propanil metabolites not determined by the base-release method are present in plants at toxicologically significant levels.

DETAILED CONSIDERATIONS

The study sponsor was the registrant Rohm and Haas Co., Philadelphia, PA; the application of the pesticide to wheat, and sample harvest and processing was conducted by Stewart Ag. Research Services, Inc., Macon, MO. Analysis of wheat samples and validation of the analytical method in wheat were conducted by EN-CAS Analytical Laboratories, Winston-Salem, NC. The field trial was conducted in Grand Forks County, ND.

Wheat Field Trial

The test substance used in the wheat field trial was Stampede® 80EDF (Extruded Dry Flowable), an 80% propanil formulation [EPA Reg. No. 707-226]. The study plots included one control plot (located 115 feet from the treated plots) and two treated plots. All three plots (10,000 ft^2 each) were planted with hard red spring wheat 5/15/92 which had emerged by 5/21/92. A single postemergence application of the test substance was made to the two treated plots on 6/9/92, when the wheat had reached the 4th leaf growth stage; one plot received a 1X treatment of 1.1 lb ai/A, while the other received a 5X treatment of 5.5 lb ai/A. Each application was made using a tractor mounted sprayer and a spray volume of 9.9 gallons of water per acre.

No unusual weather conditions were noted on the day of application, and the first rainfall occurred 5 days after the herbicide was applied. Adequate information was provided regarding test plot history, the composition of the soil, and daily temperatures and rainfall for the duration of the study. Forage and hay samples were harvested using clippers from random locations within the plots at the "green chop" growth stage on 8/8/92; the preharvest interval (PHI) for forage and hay was 60 days. The forage samples were immediately frozen, while the hay samples were allowed to dry outside for 2 days prior to being frozen.

Grain and straw were obtained at crop maturity (9/4/92) by using a commercial thresher on the three plots (the untreated plot was harvested first, followed by the 1X and then the 5X plots. Grain and straw samples were composited and then frozen for analysis. The PHI for wheat grain and straw was 87 days. Adequate measures were taken to ensure that cross-contamination of the samples did not occur. Samples were shipped frozen to the analytical laboratory, and were received frozen and in good condition.

Analytical Method

The field trial study report included a complete description of the analytical method used to determine propanil residues (as base-releasable 3,4-dichloroaniline) in wheat grain [wheat straw, forage and hay were not analyzed for propanil residues]. An additional study was submitted entitled "Method Validation for the Determination of Propanil as Base Releasable 3,4-Dichloroaniline (DCA) in Wheat Straw and Wheat Grain," Rohm and Haas Report Dated 8/13/93, MRID No. 43196001. The analytical method used in the study was EN-CAS method ENC-9/90, entitled "Analytical Method for the Determination of Propanil as Base-Releasable 3,4-Dichloroaniline (DCA) in Soil, Water, Crayfish, Rice Grain, Rice Hulls, Rice Bran, and

Rice Straw and the Determination of Base Releasable 3,4-Dichloroaniline from N-(3,4-Dichlorophenyl)-D-glucosylamine (DCA-glucose) in Crayfish."

The method validation study was conducted by EN-CAS Analytical Laboratories, Winston-Salem, NC. The method description included in the current submission also included validation data for soil, water, crayfish, and rice (grain, hulls, bran and straw). These data were included in an appendix to the submission, and are therefore not reviewed in detail herein.

Frozen untreated wheat grain and wheat straw samples were placed in a round-bottom flask with 5 M sodium hydroxide (NaOH) and hexane, and then a Nielsen-Kryger distillation apparatus was attached to the flask. As the propanil residues were hydrolyzed to DCA, the DCA was partitioned into hexane. The duration of the hydrolysis/distillation step was 16 hours. The combined hexane and aqueous fractions were frozen to facilitate separation of the layers, and then the hexane fraction was removed for further analysis; the remaining aqueous fraction was washed once with hexane.

Combined hexane fractions were then cleaned up on a silica gel column, and DCA residues were eluted using hexane/ethyl acetate (EtOAc) [3:1, v/v). The eluate was then analyzed for DCA residues using a gas chromatograph equipped with a nitrogen/phosphorous detector (NPD) and a capillary DB-17 or DB-1701 column.

Untreated wheat grain and wheat straw were fortified with 0.01, 0.10, and 1.0 ppm propanil. The method validation study was conducted over a 3-day period, in which a sample set including one control sample and three fortified samples (one at each fortification level) was analyzed each day. Standard curves were generated by intermittently injecting a range of DCA standards and plotting the peak height versus the nanograms of analyte injected. Each GC run began and ended with an injection of a standard. Calibration standards ranged in concentration from 0.005 μg/ml to 1.0 μg/ml. The lowest standard injected was equivalent to 50% of the LOQ (0.01 ppm).

Sample calculations were provided in the report, demonstrating how the ng DCA in each sample was calculated, and the conversion to parent propanil equivalents. The report included a calibration curve from the second day of the validation study, as well as standard chromatograms. In addition, a complete set of sample chromatograms for fortified wheat straw and grain was submitted. The data from the 3-day method validation study are presented in Table 1.

Table 1. Method Validation of ENC-9/90 in Wheat Grain and Straw.

Matrix	Fort. Level (ppm)	% Recovery			Mean % Recovery ± S.D.
		Day 1	Day 2	Day 3	
Wheat grain	0.01	112	102	97	103.7 ± 7.6
	0.10	101	83	79	87.7 ± 11.7
	1.00	59	74	67	66.7 ± 7.5
Wheat straw	0.01	88	106	127	107 ± 19.5
	0.10	87	78	89	84.7 ± 5.9
	1.00	72	67	71	70.0 ± 2.6

The report concluded with the statement that the method had been successfully validated at the lower levels of 0.01 and 0.10 ppm, but that additional modifications might be needed to obtain consistent results for the higher fortification level (1.0 ppm). It was noted that the method is validated for the range of residues one would typically expect to observe for propanil. **The method is acceptable for data collection, but since the wheat straw tolerance recommended by the Agency is 1.5 ppm, additional modifications may be needed if it is to be used as an enforcement method.**

Additional method recoveries were determined by the performing laboratory in conjunction with the analysis of the wheat field trial samples. Wheat grain obtained from the untreated plot was fortified with propanil at 0.01, 0.05, and 0.10 ppm (2 reps each), and analyzed using the method described above. The overall recovery was 99.0 ± 3.7%. In addition, when wheat grain obtained from the treated plots was analyzed, control samples fortified with 0.01 and 0.05 ppm propanil (1 rep each) were analyzed concurrently. The control sample fortified with 0.01 ppm had a recovery of 93%, while the recovery from the 0.05 ppm sample was 81%.

Storage Stability

No storage stability data were submitted with the field trial report. The 1X and 5X treated grain samples were stored 39 days prior to extraction, and extracts were analyzed for DCA residues 3 days later. Based on the short time interval between harvest and analysis, and based on the fact that samples were stored at less than -20 °C during that time, no decline in propanil residues is expected to have occurred.

Results

The analysis for residues of propanil as 3,4-DCA in the 1X and 5X grain yielded <0.01 ppm

in the 1X sample, and 0.018 ppm in the 5X sample, using the analytical method previously described. In order to confirm these results, the analytical laboratory conducted an additional experiment in which the 5X grain sample was analyzed for base-releasable 3,4-DCA using GC/MS techniques.

The instrumental conditions were adequately described: an HP 5890 GC was equipped with a mass selective detector. The ion with an amu of 161 was monitored for DCA; results were compared with the GC/MS analysis of 0.01, 0.025, and 0.25 ppm DCA standards. The registrant submitted the raw data from the GC/MS analysis, including spectra. CBRS concurs with the registrant's conclusion that the 5X grain sample contained <0.01 ppm base-releasable DCA.

Discussion

Based on the fact that there were no detectable propanil residues (as base-releasable DCA) in either the 1X or 5X samples, a processing study was not conducted. The registrant maintains that propanil residues in wheat processed fractions would be <0.01 ppm. According to the 1/14/93 E. Zager and D. Edwards memo, the maximum theoretical concentration factor for wheat is 9X. Agency policy dictates that if the maximum theoretical concentration factor is 5X or greater, a processing study is always required.

Based on the early-season application timing (4-leaf stage or earlier) and the lack of residues in grain (<0.01 ppm) resulting from a 5X exaggerated rate field trial, CBRS does not expect residues to concentrate in processed products of wheat. Therefore, we conclude that a processing study is not required. CBRS notes, however, that the nature of the residue in plants is not adequately understood; additional residue data may be required if it is determined that propanil metabolites not determined by the base-release method are present in plants at toxicologically significant levels.

As stated in the Updated Livestock Feed Tables (6/94), the Agency no longer considers the feeding of wheat forage to be under grower control, and therefore restrictions against feeding wheat forage to livestock are not practical. Residue data for propanil in/on wheat forage must be submitted by the registrant. Residue data should be provided according to the specifications of recent Agency guidance entitled "Number and Location of Domestic Field Trials," 6/94.

cc: CSwartz; SF; RF; List A Rereg. File; Circulation
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RDI:WJHazel:9/1/94 MSMetzger:9/21/94 EZager:9/21/94