2-5-93

DATA EVALUATION RECORD

Study 4

CHEM 128101 RH-5287 §163-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 41845004
Olson, G.L., and L.J. Lawrence. 1991. Soil adsorption/desorption of [^{14}C]RH-5287 by the batch equilibrium method. Laboratory Project ID: PTRL Report No. 1246, PTRL Project No. 296, Rohm and Haas Technical Report No. 34-90-28. Unpublished study performed by PTRL East, Inc., Richmond, KY, and submitted by Rohm and Haas Company, Spring House, PA.

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CONCLUSIONS:

Mobility - Leaching and Adsorption/Desorption

1. This batch-equilibrium adsorption/desorption is acceptable and study can be used towards partially satisfies 163-1 data requirements by providing information on the mobility (batch equilibrium) of unaged [^{14}C]RH-5287 residues in loamy sand, sandy loam, silt loam, and silty clay loam soils, and in an aquatic sediment (texture not specified).

2. RH-5287 is somewhat mobile in soils and is immobile in aquatic sediment, with Freundlich K_{ads} values of 31.5-76.4 for loamy sand, sandy loam, silt loam, an silty clay loam soils, and 625.4 in an aquatic sediment. Values of n indicate that adsorption was non-

linear. A fraction (as high as 34%) of the adsorbed material desorbed from soils and sediment. RH-5287 was identified as the major component in the soil and aqueous phases.

3. The registrant must provide an explanation for the differences in behavior observed with the aquatic sediment in this study and with the seawater/aquatic sediment in the metabolism studies. While in the batch-equilibrium study radioactive residues (soil/sediment and water phases) was mainly identified as parent RH-5287 (even after 24-hr equilibration time) and up to 30% desorbed, in the metabolism studies there was rapid degradation and binding to the sediment.

4. The registrant must provide soil series names for the soil/sediments used in this study. Clay mineralogy, if available, should be included. Soil/sediment origin and location from where they were taken should be provided.

METHODOLOGY:

Loamy sand, sandy loam, silt loam, and silty clay loam soils, and an aquatic sediment (Table 1) were air-dried and sieved (2-mm for soils and 1-mm for sediment). Based on preliminary batch equilibrium experiments, a 24-hour equilibration time and soil:solution ratios of 1:30 for the loamy sand, 1:60 for the sandy loam, 1:120 for the silt loam, 1:60 for the silty clay loam, and 1:600 for the aquatic sediment were selected for the definitive experiment.

[^{14}C]RH-5287 (radiochemical purity 100%, specific activity 55.39 mCi/g, Rohm and Haas) was dissolved at nominal concentrations of 0.25, 0.50, 0.75, 1.0, and 1.5 mg/L in a 0.01 M calcium chloride solution. Soil subsamples (0.05-1.0 g) and aliquots (30 mL) of the treated solutions were placed in Teflon centrifuge tubes. The soil:solution slurries were equilibrated in a shaking water bath at 25 ± 1 C in the dark for 24 hours. Following equilibration, the samples were centrifuged and decanted, and triplicate 0.5 mL aliquots of the supernatants were analyzed by LSC.

To determine desorption potential, the decanted supernatant was replaced with an equivalent amount of pesticide-free 0.01 M calcium chloride solution. The soil:solution slurries were equilibrated in the shaking water bath at 25 ± 1 C for 24 hours in the dark. The samples were centrifuged, and the supernatant was decanted and analyzed by LSC. Following desorption, portions of each soil were analyzed for total radioactivity by LSC following combustion.

In order to characterize the radioactivity in all soil types following the desorption phase, one replicate of each soil type equilibrated at 1.0 and 1.5 ppm was extracted with methylene chloride:methanol (1:1, v:v) by shaking for 20 minutes. The samples were centrifuged for approximately 5 minutes, and the supernatants decanted. The procedure was repeated two additional times, and the supernatants were combined. The extracts were stored at approximately 4 C for an unspecified period of time. The extracts were analyzed for RH-5287 with HPLC using a reverse-phase LC-18 column with a methanol:water gradient (75:25 to 100:0), and UV/VIS (220 nm) and radioactivity detection. The extracted soils were analyzed for unextracted residues by LSC following combustion.

DATA SUMMARY:

Based on batch equilibrium studies, [^{14}C]RH-5287 (radiochemical purity 100%), at nominal concentrations of 0.25, 0.50, 0.75, 1.0, and 1.5 mg/L, was somewhat mobile in loamy sand, sandy loam, silt loam, silty clay loam soil and was immobile in aquatic sediment:calcium chloride slurries that were equilibrated with shaking in the dark for 24 hours at 25 C. Freundlich K_{ads} values were 31.459 for the loamy sand soil, 42.497 for the silty clay loam soil, 73.334 for the sandy loam soil, 76.434 for the silt loam soil, and 625.371 for the aquatic sediment; the respective K_{oc} values were 7,865, 6,538, 6,337, 5,662, and 15,441 (Table XIII). Following desorption, it was determined that 10.3-25.7% of the adsorbed was desorbed from the loamy sand soil, 7.5-22.9% from the sandy loam soil, 13.0-33.3% from the silt loam soil, 16.0-34.5% from the silty clay loam soil, and 18.0-29.9% from the aquatic sediment (Table VII). K_{des} values were 48.454 for the loamy sand soil, 63.760 for silty clay loam soil, 96.735 for the sandy loam soil, 102.257 for the silt loam soil, and 872.421 for the aquatic sediment (Table XIII). During equilibration, the soil:solution ratios were 1:30 for the loamy sand, 1:60 for the sandy loam, 1:120 for the silt loam, 1:60 for the silty clay loam, and 1:600 for the aquatic sediment.

Based on HPLC analyses of extracts of the four soils and aquatic sediment treated at 1.0 or 1.5 mg/L, RH-5287 comprised 89.3-98.0% of the applied and three unidentified degradates ("Unknowns") were up to 6.8, 2.8, and 1.2% of the applied (Table XIV).

Material balances were 82.7-120.2% of the applied radioactivity (Tables II-VI).

COMMENTS:

1. The actual concentrations of the test substance were 0.25, 0.50, 0.71, 0.97, and 1.36 mg/L.
2. Recovery efficiencies and method detection limits were not reported.
3. The position of the radiolabel on the test substance was not reported.
4. Textural classification of the aquatic sediment was not specified.

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