DATA EVALUATION RECORD

STUDY 6

CHEM 069601 Pyrazon §163-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 41507918
Ellenson, J.L. 1987. Soil adsorption/desorption of pyrazon. Report number 8710. BASF Registration Document No. 87/5074. Unpublished study performed and submitted by BASF Corporation, Research Triangle Park, NC.

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CONCLUSIONS:

Mobility - Leaching and Adsorption/Desorption

1. This study may partially fulfill data requirements.

2. Based on batch equilibrium experiments, pyrazon was very mobile in sand, loamy sand, sandy loam, silt loam, and clay loam soils. The mobility of pyrazon increased as the clay content and CEC values of the soil decreased.

3. This study may be acceptable to partially fulfill EPA Data Requirements for Registering Pesticides by providing information on the mobility (batch equilibrium) of unaged pyrazon in sand, loamy sand, sandy loam, silt loam, and clay loam soils. However,

additional information on the soils used in the study must be provided. The information requested includes: a. Soil series name (USDA) for each of the soils used; b. Information on handling of soils prior to starting the study (drying, sieving, storage).

4. An additional study is needed to establish the mobility of aged pyrazon residues in soil. EFGWB prefers that the registrant conducts a batch-equilibrium adsorption/desorption study with each of the metabolites/degradates found at >10% in the aerobic soil metabolism study, in this case with the dephenylated pyrazon degradate.

METHODOLOGY:

In a preliminary batch equilibrium study, sand, loamy sand, sandy loam, silt loam, and clay loam soils (Table I) were treated with a 0.01 M calcium chloride solution (1 g soil:5 mL solution) containing [^{14}C]pyrazon (labeled in the 4- and 5-C positions; radiochemical purity 98.8%, specific activity 1.38 x 10^8 dpm/mg, BASF) plus unlabeled pyrazon (purity >99.5%, BASF) at 2.58 ug/mL and shaken on a wrist-action shaker for 1, 6, 24, and 96 hours. After equilibration, the samples were centrifuged and analyzed using LSC. Based on the data obtained from this experiment (Table II), 24 hours was selected as the equilibration time for subsequent experiments.

In the definitive batch equilibrium study, [^{14}C]pyrazon or [^{14}C]pyrazon plus unlabeled pyrazon was added to 0.01 M calcium chloride solution in duplicate 10-mL conical test tubes containing the test soils (1 g soil:5 mL solution) to make final pyrazon concentrations of 0.0372, 0.228, 1.19, and 4.80 ug/mL. The tubes containing the treated soil, along with duplicate control tubes (prepared in the same manner, except that the test soils were not added), were shaken as previously described for 24 hours at 25 $\pm$ 1 C. At the conclusion of the shaking period, the tubes were centrifuged. One-mL aliquots of the supernatant were removed for total radioactivity determinations by LSC; additionally, aliquots of the supernatants were analyzed using one-dimensional TLC on silica gel plates developed with 80:10:10 ethyl acetate:acetic acid:water. Radioactive zones on the plates were located with a TLC analyzer.

Desorption of pyrazon from these same five soils was investigated by removing the supernatant from each tube with a Pasteur pipette, measuring its volume in a 10-mL graduate cylinder, and replacing the test solution with an equal volume of pesticide-free 0.01 M calcium chloride solution. The soil:solution slurries were shaken for 24 hours at 25 C and centrifuged. The supernatants were removed as before, and the desorption was repeated. The supernatants were combined with those obtained from the first desorption step, brought up to a volume of 50 mL, and sampled for total radioactivity by LSC. Residual radioactivity in the soils was determined following the second desorption step by LSC following combustion.

DATA SUMMARY:

Based on batch equilibrium experiments, [^{14}C]pyrazon (radiochemical purity 98.8%), at 0.0372-4.80 ug/mL, was very mobile in sand, loamy sand, sandy loam, silt loam, and clay loam soil:calcium chloride slurries (1 g soil:5 mL solution) equilibrated for 24 hours at 25 $\pm$ 1 C. Freundlich K_{ads} values were 0.25 for the sand soil, 0.2 for the loamy sand soil, 0.69 for the sandy loam soil, 1.0 for the silt loam soil, and 3.6 for the clay loam soil (Table III); respective K_{oc} values were 220, 89, 180, 220, and 340. Adsorption increased as the CEC values and clay content of the soils increased (correlation values $\geq$98%); K_{oc} values were erratic and correlated poorly with all soil characteristics (Tables III and V).

In the desorption phase of the study, 44-63% of the pyrazon adsorbed by the clay loam and silt loam soils was desorbed; respective k_{des} values were 0.41 and 1.42 (Table III). Insufficient pyrazon was adsorbed by the sand, loamy sand, and sandy loam soils to reliably compute K_{des} values; respective percentages of pyrazon desorbed from these three soils were 30, <10, and 47 (Table III).

Pyrazon did not degrade in the soil:solution slurries during the course of the study (Figures 2-6).

COMMENTS:

1. Relevant information concerning handling of the soils prior to the starting of the study, such as drying, sieving, and storage, was not provided, which must be provided to reevaluate the study.

2. Soil series names for each of the soils must be provided.

3. With the exception of the sand, the soils described by the study author in Table I and elsewhere in the original document were either improperly named or incorrectly classified according to the USDA Soil Textural Classification System. The soil type names used by the study author and the corresponding correct designations are as follows: Soil II, "sand-loam" is loamy sand; Soil IV, "clay" is clay loam; and Soil V, "sand-loam" is sandy loam. Also, the USDA soil series designation was not provided for each soil.

4. It could not be determined from the methods section whether the TLC analysis of the supernatant solutions (linear analyzer scans presented in Figures 2-6) represent one unspecified concentration of the [^{14}C]pyrazon treatment solutions or all four concentrations pooled into one sample. Similarly, it was not clear whether the material balance data in Table IV represent one or all concentrations of the [^{14}C]pyrazon treatment solutions.

5. The study author ran a statistical analysis correlating the various physical soil factors with the calculated constants (Table V). In spite of the generally low adsorption of [^{14}C]pyrazon on the test

soils, a high correlation existed between the Freundlich K_{ads} constants and the CEC values and clay content of the soils.

6. In the "Conclusions" section, the study author incorrectly referenced the sand soil (Soil I) in Table III as having a R_{des} value of <0.1. The soil in question was the loamy sand (Soil II) (incorrectly designated as a "sand-loam" in the table).

PAGES 6.2 THROUGH 6.17 HAVE BEEN REMOVED FROM THIS DOCUMENT. THOSE PAGES CONSIST OF REGISTRANT-SUBMITTED DATA.