12-7-90

DATA EVALUATION RECORD

STUDY 9

CHEM 128974 Quinclorac §163-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 41063562
Ellenson, J.L. and V.W. Winkler. 1988. Soil adsorption/desorption of BAS 514-H. Registration Document No. BASF 88/5030. Unpublished study performed by BASF Corporation Chemicals Division, Research Triangle Park, NC, and submitted by BASF Corporation Chemicals Division, Parsippany, NJ.

DIRECT REVIEW TIME = 8

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This study was originally reviewed by EFGWB. The review has been reformatted for inclusion in the Registration Standard by Dynamac Corporation; the conclusions are those of the EFGWB reviewer and were not altered by Dynamac.

CONCLUSIONS:

Mobility - Leaching and Adsorption/Desorption

1. This study can be used to fulfill data requirements.
2. Quinclorac was very mobile in five soils ranging in texture from sand to silty clay. In general, adsorption increased with increasing soil organic matter content, CEC, and clay content. Quinclorac appears to have the potential to leach into ground water.

3. This study is acceptable and fulfills EPA Data Requirements for Registering Pesticides by providing information on the mobility of quinclorac in five soils.

4. No additional data on the mobility of quinclorac are required.

METHODOLOGY:

Duplicate 1-g samples of sand, sandy loam, loam, clay loam, and silty clay soils (Table I) were mixed with 5.8 mL of 0.01 M calcium chloride solutions containing 0.052, 0.174, 0.46, or 2.09 ug/mL of [3-^{14}C]quinclorac (radiochemical purity 99.62%, specific activity 40.4 uCi/mg, BASF). Triplicate aliquots of the supernatants were removed from each tube. The centrifuge tubes containing the soil:solution slurries were capped, and the slurries were agitated on a wrist-action mechanical shaker for 20 hours at 25 C. Then, the soil:solutions slurries were centrifuged for 20 minutes. The initial solution samples and triplicate 1-mL aliquots of the supernatants sampled after equilibration were analyzed for total radioactivity using LSC.

In order to determine desorption of quinclorac, the supernatant that had been removed from the soil after adsorption was replaced with an equal volume of pesticide-free calcium chloride solution. The soils were agitated for 24 hours at 25 °C, then centrifuged. The supernatants were removed and saved. A second volume of pesticide-free calcium chloride solution was added to the soil and the soils were again equilibrated. The supernatants from the two desorptions were combined, and triplicate 1-mL aliquots of the solutions were analyzed by LSC.

DATA SUMMARY:

Based on batch equilibrium studies, [^{14}C]quinclorac was determined to be very mobile in sand, sandy loam, loam, clay loam, and silty clay soils that were equilibrated at 25 °C for 20 hours in 1:6 soil:calcium chloride solution slurries containing 0.052, 0.174, 0.46, or 2.09 ug/mL of [^{14}C]quinclorac (radiochemical purity 99.62%). Freundlich K_{ads} values were 0.067 for the sandy loam soil, 0.258 for the loam soil, 0.597 for the clay loam soil, and 0.516 for the silty clay soil; 1/n values ranged from 0.77 to 1.23 (Tables II and III). An accurate Freundlich K_{ads} value could not be calculated for the sand soil due to the small amount of quinclorac adsorbed; it was estimated that the K_{ads} value was <0.05. K_{oc} values ranged from 13 for the sandy loam soil to

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54 for the clay loam soil (Table III). In general, adsorption increased with increasing soil organic matter content, CEC, and clay content.

K_{des} values were 0.87 for the silty clay soil and 1.0 for the clay loam soil following two desorption steps; while 1/n values were 0.97 and 1.09, respectively. K_{des} values were not determined for the sand, sandy loam, and loam soils because insufficient [^{14}C]quinclorac was adsorbed by these soils during the adsorption phase of the study to allow an accurate determination of the desorption isotherms (Table III).

Material balances for the five test soils treated with quinclorac at 2.09 ug/mL ranged from 94 to 106% (Table IV).

REVIEWERS COMMENTS:

1. Based on the results of this study, EFGWB concludes that quinclorac has the potential to leach in the soil environment and into ground water.

2. It was not stated whether the soils were sieved or sterilized prior to use, although these handling procedures may have a significant effect on various soil properties that influence mobility. This information should be available to allow an accurate interpretation of the results of this study.

3. Only soils treated with quinclorac at 2.09 ug/mL were analyzed for total adsorbed residues at the termination of the study. In soils treated at other concentrations, adsorption was determined only by analysis of the supernatants.

4. The soil referred to in the original document as a "clay" is actually a "clay loam" soil, according to the USDA Textural Classification System. The soil is referred to by its correct classification as a "clay loam" in this review.

5. A stability test was conducted in which soil:solution slurries treated at 1 ug/mL were equilibrated for 3 days and then analyzed by HPLC and TLC. It was reported that quinclorac was stable in the soil:solution slurries during the 3-day equilibration. Actual data values for the percentage of quinclorac remaining undegraded after equilibration were not reported; only a poor-quality copy of a TLC autoradiogram was provided. In experiments to determine the mobility of an unaged test substance, the identification of [^{14}C]residues in the supernatant and soil is not required by Subdivision N guidelines.

6. The equilibration time of 20 hours was established in a preliminary study using similar test parameters.

7. Tubes containing the quinclorac solutions but no soil were studied as a control. The controls were used to measure "systematic changes in measured radioactivity of the supernatants over the adsorption test period", which in turn was used to normalize the data.

8. The percent of field moisture at 0.33 bar for the sand soil was reported in Table I as 0.86. This number seems to be lower than is normally found in sand soil and is probably the result of a typographical error; the actual value may be 8.6%.