

DATA EVALUATION RECORD

STUDY 4

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Sing, Y.L. 1988. Adsorption/desorption of MON-7200/15100. Laboratory Project Identification MSL-7778; R.D. No. 866. Unpublished study prepared and submitted by Monsanto Agricultural Company, St. Louis, MO.

DIRECT REVIEW TIME = 24

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CONCLUSIONS:Mobility - Leaching and Adsorption/Desorption

For the purposes of an EUP this study satisfies the requirement for leaching by providing information on the mobility (batch equilibrium) of unaged MON-7200/15100 in six soils ranging from a sandy loam to a clay. An additional study is needed to establish the mobility of aged (30 days) MON-7200/15100 residues. For full registration, a mobility study (batch equilibrium) of the three major degradates (two monoacids and one diacid) must be conducted.

SUMMARY OF DATA BY REVIEWER:

Using batch equilibrium techniques, ring-labeled [^{14}C]MON-7200/15100 (radiochemical purity >99%), at 0.01-0.3 ug/mL, was determined to be slightly mobile to mobile in soil:0.01 M CaSO_4 solution slurries. Freundlich K values were 6.59 in a Sarpy sandy loam soil, 7.91 in a Dupont silt loam soil, 10.93 in a Drummer silt loam soil, 26.92 in a Sharkey clay soil, 34.74 in a "volcanic ash upland" loam soil, and 64.77 in a "volcanic ash paddy" loam soil; 1/n values were 0.80-0.93. The three

highest Freundlich K values ($\approx 27-65$) correlated with the soils having the highest CEC values ($\approx 27-40$) and organic matter content ($\approx 2-5\%$). Similarly, the sandy loam soil which had the lowest K value (6.59) had the lowest CEC value and percentage organic matter content (≈ 10 and <1 , respectively). The K_{OC} values varied from 1141 to 3748. The percentage of MON-7200/15100 desorbed from the soils following adsorption ranged from a low of 5.5% in the "volcanic ash paddy" loam soil to a high of $\approx 62\%$ in the Sarpy sandy loam soil.

DISCUSSION:

1. The reviewer has classified the soils as slightly mobile to mobile based on the definitions of mobility reported in the Federal Register 44(53), dated March 16, 1979. Soils with K values of ≈ 10 are considered mobile and those with K values of ≈ 100 are slightly mobile. The reviewer is uncertain how the registrant determined that the K values obtained in this study determined MON-7200/15100 to be immobile; if the determination was based on the K_{OC} values rather than the K values, it should be noted that mobility scales were not designed for use with K_{OC} values.
2. The mobility of aged [^{14}C]MON-7200/15100 was not addressed. Based on 30-day posttreatment data from the aerobic soil metabolism study (Study 3), aged residues would be $>86.4\%$ parent MON-7200/15100 and three degradates (the normal acid, reverse acid, and diacid) would each comprise $<2\%$ of the applied.
3. The registrant calculated K_{OC} using the equation: $100 \times K'/\text{organic C}$; however, the equation is reported as $K'/\text{organic C}$ in the definitions listed under each table. $K'/\text{organic C}$ is the equation encountered most frequently.
4. It should be noted that an apparent typographical error exists in Table 3 (properties of the soils used) where the sand content of the Drummer silt loam is listed as 1.11%. If this value is used, the sum of sand, silt, and clay would be only $\approx 77.8\%$.

MATERIALS AND METHODS

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In a batch equilibrium study, six soils (two loams, a clay loam, two silty loams, and a sandy loam; described in Table 3) were air-dried for 1-2 days and sieved through a 2-mm sieve. A preliminary equilibrium test was conducted on each of the soils to determine a valid shaking time for conducting the adsorption experiment. Sixteen hours was selected for all subsequent studies based upon the equilibria obtained (Figure 4). The adsorption studies were conducted with duplicate samples of each soil which were shaken for 16 hours at 25-26°C with 0.01 M CaSO_4 solutions containing ring-labeled [^{14}C]MON-7200/-15100 (radiochemical purity was >99%, specific activity was 26.21 mCi/mmol, Monsanto Agricultural Company) at 0.01, 0.05, 0.1, and 0.3 ppm. After the shaking period, the containers of soil and solution were centrifuged, and aliquots of the supernatant were analyzed for total radioactivity by LSC. An acetonitrile wash was used to minimize loss due to adsorption of the pesticide on the container walls. Identification was by HPLC/LSC and structure confirmation was by GC/MS. A chemical stability test to confirm that MON-7200/15100 was not degraded on the soil or during the analytical steps indicated that degradation was negligible.

Desorption of [^{14}C]MON-7200/15100 was determined by adding back to the centrifuged soils (used in the adsorption experiments) a volume of 0.01 M CaSO_4 equal to that previously decanted, followed by 16 hours of shaking, and a repeat of the decanting and aliquot-counting steps. These desorption steps were repeated three times, the remaining [^{14}C]MON-7200/15100 on the soil was determined by combustion, and all recoveries were totaled to determine the mass balance.

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