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DATA EVALUATION RECORD

DPX-L5300 STUDY 2

CHEM 128887 DPX-L5300

BRANCH EAB

FORMULATION--00 - ACTIVE INGREDIENT

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Monson, K.D. 1986. Photodegradation of [phenyl(U)-^{14}C]DPX-L5300 and [triazine-2-^{14}C]DPX-L5300 on soil. Laboratory Project ID AMR-536-86. Prepared and submitted by E.I. du Pont de Nemours and Company, Inc., Wilmington, DE. No. 7F3540.

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CONCLUSIONS:

Degradation - Photodegradation on Soil

This study is acceptable and fulfills EPA Data Requirements for Registering Pesticides by providing information on the photodegradation of phenyl- and triazine-labeled [^{14}C]DPX-L5300 on soil.

SUMMARY OF DATA BY REVIEWER:

Phenyl- and triazine-labeled [^{14}C]DPX-L5300 (radiochemical purities >95%, specific activities 20.5 µCi/mg and 41.2 µCi/mg, respectively), at 1.0 and 1.4 oz ai/A, were resistant to photolysis on silt loam soil (pH 7.5), degrading in both sunlight-irradiated (total of 126,098 Watt-hours/m^2) and dark control samples with a half-life of <4 days. Between 0 and 4 days posttreatment, phenyl-labeled [^{14}C]DPX-L5300 declined from 88.1 to 37.4% of the applied radioactivity in the irradiated samples and to 35.9% in the dark controls; and triazine-labeled $[^{14}C]$-DPX-L5300 declined from 86.3 to 45.2% of the applied radioactivity in the irradiated samples and to 37.8% in the dark controls. DPX-L5300 was not detected (detection limit not reported) at 33 days posttreatment in the irradiated samples and was <2% of the applied in the dark controls. Data from soil extracts indicate the rapid degradation of parent DPX-L5300 to the hydrolysis products resulting from the cleavage of the sulfonylurea bridge. The major phenyl-labeled products were sulfonamide and saccharin (26.4 and 58.8%, respectively, after 33 days), whereas triazine amine was the predominant triazine-labeled product (92.1% after 33 days). Samples were analyzed for acid sulfonamide, but no data were reported. No degradates were unique to the dark controls or irradiated samples. At 33 days posttreatment, volatilized $^{14}CO_2$ totaled 1% and 0.1% of the applied radioactivity in the phenyl-labeled irradiated and dark control samples, respectively; $^{14}CO_2$ was not detected (detection limit not reported) from the triazine-labeled samples. The material balances throughout the study ranged from 96 to 112% of the applied.

DISCUSSION:

1. Using first-order reaction kinetics, the registrant determined the half-lives for phenyl-labeled $[^{14}C]$DPX-L5300 were 2.5 days in sunlight and 5.1 days in the dark, and the half-lives for triazine-labeled $[^{14}C]$DPX-L5300 were 3.4 days in sunlight and 4.0 days in the dark. These values are misleading since at the day 4 interval (the first sample taken after time 0), only 35.9-45.2% of the applied DPX-L5300 remained undegraded and degradation had proceeded faster in the dark controls. Many pesticides follow second-order rather than first-order kinetics; the "goodness-of-fit" to a first-order equation is a function of number of samples, sampling intervals, and rate of decline. Since very few samples were taken during the first part of the soil photodegradation study (>50% dissipated during the first 4 days, but only 2 samples were taken) in comparison to the entire study (<50% dissipated between days 4 and 33), the half-lives calculated from the entire decline curve overestimate the observed half-lives.

2. Since degradation is pH dependent, the half-life DPX-L5300 in soil may be shorter under more acidic conditions and longer under more basic conditions.

3. Under the slightly basic conditions used to maintain the stability of the parent compound during extraction, the degradate 2-(aminosulfonyl) benzoate (sulfonamide) undergoes a base-catalyzed cyclization reaction to form 1,2-benzisothiazol-3(2H)-one, 1,1-dioxide (saccharin). This procedure, therefore, could not distinguish between saccharin naturally present in the soil and the saccharin formed as an artifact of the extraction process. This reaction accounts for the variation in concentrations of sulfonamide and saccharin in the irradiated and dark controls.

4. Acid sulfonamide and saccharin could not be adequately separated using HPLC (R_f 14.5); however, the compounds were adequately resolved using TLC (R_f 0.34 and 0.25, respectively). The registrant did not report

that acid sulfonamide was detected in any samples; however, its presence cannot be precluded since the possibility exists that acid sulfonamide, like sulfonamide, may also have been converted to saccharin during the extraction process.

5. Since only an insignificant amount of absorption occurs beyond 290 nm for DPX-L5300, photolytic degradation is expected to be minimal.

6. Storage stability data were not provided.

7. The limit of detection was not reported.