12-1-88

DATA EVALUATION RECORD

STUDY 2

CHEM 059101 Chlorpyrifos §161.2

FORMULATION--00--ACTIVE INGREDIENT

FICHE/MASTER ID 40026101
McCall, P. 1986. Photodegradation of chlorpyrifos in aqueous buffer. Laboratory Project Identification GH-C 1862 (6015-293). Unpublished study prepared by Hazelton Laboratories America, Inc. 59 p.

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CONCLUSIONS:

Degradation - Photodegradation in water

This study is scientifically sound and provides supplemental information towards the registration of chlorpyrifos. This study does not fulfill EPA Data Requirements for Registering Pesticides because degradates accounting for up to 31.3% of the applied were not characterized, it could not be determined if the artificial light source used in this study is similar to sunlight, and wavelengths <290 nm were not filtered out.

SUMMARY OF DATA BY REVIEWER:

2,6-Pyridine ring-labeled [^{14}C]chlorpyrifos (radiochemical purity 96.9%), at 0.35-0.38 ppm, degraded with a half-life of approximately 743 hours (≈31 days) in sterile, aqueous, pH 5 buffered solutions irradiated with artificial light; the registrant-calculated half-life was 52 days. Several unidentified degradates were isolated at up to 31.3% of the applied. At 743 hours posttreatment, dark control samples contained 73.2% chlorpyrifos, and two degradates were isolated at 7.1% and 13.9%.

DISCUSSION:

1. Degradates each accounted for up to 31.3% of the applied but were not characterized.

2. The registrant stated that the light source used is similar to sunlight; however, the data provided were not sufficient to support this claim. Data for characterization of the artificial light source are inadequate; none of the data provided were measured under test conditions.

   a. The spectral energy distribution was provided by the manufacturer and appears to have been measured using one light instead of four lights as used in the photolysis study. The distance at which measurements were taken was not specified.

   b. The intensity of two lights at "a distance from the lamps that corresponded to the location of the photolysis samples" was measured at 300-400 nm only. The intensity should have been measured over the entire visible spectrum. The registrant assumed that four lamps would produce twice the intensity of two lamps; however, the positioning of the lamps and other aspects of the photolysis apparatus (such as positioning of reflectors) may have resulted in different intensity in the 300-400 nm range than calculated by the registrant.

   The registrant stated that further characterization of the artificial light source (radiometer data) will be submitted as an amendment to this study.

3. Wavelengths <290 nm were not filtered out.

4. The method detection limits were not reported.

MATERIALS AND METHODS

MATERIALS AND METHODS:

2,6-Pyridine ring-labeled [^{14}C]chlorpyrifos (radiochemical purity 96.9%, specific activity 15.7 mCi/mmol, Dow Chemical) was added at 0.35-0.38 ppm to sterile pH 5 buffered (0.05 M potassium phosphate) aqueous solutions. The solutions were irradiated continuously with four Chroma 50 lamps (intensity of two lamps 96.4 $\mu W/cm^2$ at 300-400 nm) at 25 ± 1°C. Some of the solutions were incubated in the dark at 25 ± 2°C to serve as controls. Irradiated and dark control solutions were sampled at intervals up to 743 hours (≈31 days) posttreatment.

The solutions were analyzed for total radioactivity by LSC and for chlorpyrifos and degradates by HPLC using a reverse phase column (system I). In addition, the 743-hour sample was analyzed by HPLC using an amine column (system II).

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Pages 5 through 18 are not included.

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