



## CONCLUSIONS

### Mobility - Leaching & Adsorption/Desorption

1. This study is scientifically valid and provides useful information on the soil mobility (batch equilibrium) of the trifloxystrobin degradate CGA-321113 in five soils.
2. This study meets Subdivision N Guidelines for the partial fulfillment of EPA data requirements on soil mobility (batch equilibrium).
3. Uniformly phenyl ring-labeled [<sup>14</sup>C]CGA-321113, at nominal concentrations of 0.25, 0.75, 2, and 5 µg/mL, was determined to be very mobile in loam, sand, clay loam, Hanford sandy loam and Saw-Wake sandy loam soil:solution slurries that were equilibrated in darkness at 25 ± 1 °C for 48 hours. Freundlich  $K_{ads}$  values were 4.0 for the loam soil (5.4% o.m.), 1.9 for the sand soil, 3.2 for the clay loam soil, 0.28 for Hanford sandy loam soil (1.0% o.m.), and 0.65 for Saw-Wake sandy loam soil; corresponding  $K_{oc}$  values were 127, 235, 130, 48, and 80 mL/g. Respective 1/N values (reviewer-calculated) were 0.81, 0.83, 0.80, 0.88, and 0.85 for adsorption. Freundlich  $K_{des}$  values determined following a 48-hour equilibration period were 5.8 for the loam soil, 2.9 for the sand soil, 4.6 for the clay loam soil, 0.40 for Hanford sandy loam soil, and 0.89 for Saw-Wake sandy loam soil; corresponding  $K_{oc}$  values were 184, 355, 188, 70, and 109 mL/g. Respective 1/N values (reviewer-calculated) were 0.81, 0.87, 0.80, 0.94, and 0.86 for desorption. The reviewer-calculated coefficient of determination ( $r^2$ ) values for the relationships  $K_{ads}$  vs. organic matter and  $K_{ads}$  vs. pH were 0.89 and 0.0091, respectively.

## METHODOLOGY

Based on preliminary studies of the adsorption of the uniformly phenyl ring-labeled [<sup>14</sup>C]CGA-321113 {methoxyimino-[2-[1-(3-trifluoromethyl-phenyl)-ethylideneaminoxymethyl]-phenyl]-acetic acid; radiochemical purity 97.2%, specific activity 37.7 µCi/mg; pp. 19, 20} to Hanford sandy loam (from Madera, CA), Gardena loam (from Northwood, ND), Saw-Wake-Wedowee sandy loam (from Louisberg, NC), Lynchburg sand (from Raleigh, NC), and Bearden-Perella clay loam (from Northwood, ND) soils (Table I, p. 48), an equilibration period of 48 hours was chosen for all soils; for desorption, a 48-hour period was chosen for all soils (p. 43). In a preliminary study, adsorption of the test compound to the Teflon centrifuge tubes and syringe filters was determined to be negligible (p. 42). In a preliminary study to determine the stability of the test compound, degradation was not observed during a 24-hour period (p. 43). In a preliminary study, the optimal soil:solution ratio was determined to be 1:5 (w:v) for the loam, sand, and clay loam soils, 1:2 (w:v) for Saw-Wake sandy loam soil, and 1:1 (w:v) for Hanford sandy loam soil (p. 44). In a preliminary study, the solubility (25°C) of the test compound in 0.01 M CaCl<sub>2</sub> solution was determined to be 32.9 µg/mL (p. 41; Table

II, p. 49).

For the adsorption phase of the definitive study, aliquots (25.0 mL) of 0.01 M CaCl<sub>2</sub> solution treated with uniformly phenyl ring-labeled [<sup>14</sup>C]CGA-321113 (dissolved in acetonitrile) at nominal concentrations of 0.25, 0.75, 2, and 5 µg/mL, were added to Teflon centrifuge tubes containing samples of sieved (2 mm) loam, sand, and clay loam soils (5.0 g); Saw-Wake sandy loam soil (12.5 g); and Hanford sandy loam soil (25 g; p. 30). Duplicate tubes were prepared for each soil type/treatment rate combination; a second set of duplicate tubes of untreated 0.01 M CaCl<sub>2</sub> and each soil were prepared as blanks and a third set of duplicate tubes without soil were prepared as controls. The soil:solution slurries (w:v ratios are reported above) were equilibrated by shaking in darkness at 25 ± 1 °C for 48 hours (pp. 15, 31). Following equilibration, soil:solution slurries were centrifuged and triplicate aliquots of the supernatant were analyzed for total radioactivity by LSC; the limit of detection was not reported.

For the desorption phase of the study, a volume of pesticide-free 0.01 M CaCl<sub>2</sub> solution, equal to the volume of supernatant decanted following the adsorption phase, was added to the soil pellets from the adsorption phase of the study (p. 31). The soil:solution slurries were equilibrated in darkness at 25 ± 1 °C for 48 hours. Following equilibration, the soil:solution slurries were centrifuged and triplicate aliquots of the supernatant were analyzed for total radioactivity by LSC. All supernatants were refrigerated when not in use.

To determine the stability of the test substance in the adsorption and desorption supernatants, aliquots of the concentrated 48-hour adsorption and desorption supernatants were diluted with acetonitrile:water (8:2, v:v), filtered (0.2 µm) and analyzed by reverse-phase HPLC (Hibar LiChrosorb column) using a mobile phase gradient of acetonitrile:0.1% aqueous formic acid (0:100 to 65:35, v:v) with UV (254 nm) and radioactive flow detection (pp. 22, 23); detection limits were not reported. Eluent fractions were collected at one-minute intervals and analyzed by LSC. Samples were co-chromatographed with a nonradiolabeled reference standard. Selected samples were further analyzed by two-dimensional TLC on silica gel plates developed perpendicularly with toluene:chloroform:ethyl ether:formic acid (60:34:5:1, v:v:v:v) followed by toluene:ethyl acetate:acetic acid (70:30:1.5, v:v:v; pp. 23, 24). Areas of radioactivity were detected by radioimage scanning, scraped from the plates, and analyzed by LSC. Samples were co-chromatographed with a nonradiolabeled reference standard which was visualized by UV light (wavelength not reported).

Following the desorption phase, each soil pellet was extracted three times by shaking with acetonitrile:acidified (pH 4; formic acid) water (8:2 v:v), and the supernatants were decanted (p. 25). The combined extracts were concentrated to dryness, redissolved in acetonitrile:water (8:2 v:v), filtered (0.2 µm) and analyzed by LSC, HPLC and TLC as described previously.

Subsamples of the dried (nitrogen), post-extracted soils were analyzed for total radioactivity by LSC following combustion (p. 32); radioactivity values were corrected for combustion efficiency (p. 24).

## DATA SUMMARY

Uniformly phenyl ring-labeled [<sup>14</sup>C]CGA-321113 (radiochemical purity 97.2%), at nominal concentrations of 0.25, 0.75, 2, and 5 µg/mL, was determined to be very mobile in loam, sand, clay loam, Hanford sandy loam and Saw-Wake sandy loam soil:solution slurries that were equilibrated in darkness at 25 ± 1 °C for 48 hours. Freundlich  $K_{ads}$  values were 4.0 for the loam soil (5.4% o.m.), 1.9 for the sand soil, 3.2 for the clay loam soil, 0.28 for Hanford sandy loam soil (1.0% o.m.), and 0.65 for Saw-Wake sandy loam soil (Table XXIV, p.71); corresponding  $K_{oc}$  values were 127, 235, 130, 48, and 80 mL/g. Respective 1/N values (reviewer-calculated) were 0.81, 0.83, 0.80, 0.88, and 0.85 for adsorption. The reviewer-calculated coefficient of determination ( $r^2$ ) values for the relationships  $K_{ads}$  vs. organic matter and  $K_{ads}$  vs. pH were 0.89 and 0.0091, respectively. Freundlich  $K_{des}$  values determined following a 48-hour equilibration period were 5.8 for the loam soil, 2.9 for the sand soil, 4.6 for the clay loam soil, 0.40 for Hanford sandy loam soil, and 0.89 for Saw-Wake sandy loam soil; corresponding  $K_{oc}$  values were 184, 355, 188, 70, and 109 mL/g. Respective 1/N values (reviewer-calculated) were 0.81, 0.87, 0.80, 0.94, and 0.86 for desorption.

During the 48-hour adsorption equilibration period, 37.5-54.2% of the applied radioactivity was adsorbed to the loam soil (for all replicates across all application levels) (Table XIII, p. 60), 21.7-34.2% of the applied radioactivity was adsorbed to the sand soil (Table XV, p. 62), 31.2-47.4% of the applied radioactivity was adsorbed to the clay loam soil (Table XVI, p. 63), 17.9-25.1% of the applied radioactivity was adsorbed to the Hanford sandy loam soil (Table XII, p. 59), and 19.6-31.4% of the applied radioactivity was adsorbed to the Saw-Wake sandy loam soil (Table XIV, p. 61). Following a 48-hour desorption period, 33.6-48.4% of the previously adsorbed radioactivity was desorbed from the loam soil, 54.3-67.9% was desorbed from the sand soil, 39.7-55.2% was desorbed from the clay loam soil, 66.7-74.9% was desorbed from the Hanford sandy loam soil, and 56.8-72.3% was desorbed from the Saw-Wake sandy loam soil.

The test compound was stable in the adsorption supernatants, desorption supernatants and soil extracts (Tables XXVI-XXVIII, pp. 73-75); parent was ≥97.9%, ≥96.0% and ≥95.7% of the recovered radioactivity, respectively.

Material balances were 92.0-101.0% for the loam soil (across all application levels), 94.3-101.5% for the sand soil, 94.0-105.1% for the clay loam soil, 94.6-99.7% for Hanford sandy loam soil, and 94.6-101.4% for Saw-Wake sandy loam soil (Tables XII-XVI, pp. 59-63).

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COMMENTS

1. Method detection limits were not reported. Limits of detection and quantitation should be reported to allow the reviewer to evaluate the adequacy of the method for the determination of the test compound.
2. The soil series name of the Saw-Wake sandy loam soil was not reported. Instead, the soil complex (Saw-Wake-Wedowee) was reported (Table I, p.48).
3. The study authors stated that the Saw-Wake-Wedowee sandy loam and Gardena loam soils utilized in this study were the same type of soils used in aerobic metabolism studies (footnote of Table I, p. 48). The reviewer confirmed that the sandy loam and loam soils were utilized in submitted aerobic metabolism studies (MRIDs 44496730 and 44496731, respectively).
4. The qualitative classifications of soil mobility reported in the data summary were determined by the reviewer using "Table III: The general relationship between the soil/solution partition coefficient  $K$ ,  $R_p$ , and soil mobility" (*Federal Register*, Vol. 44, No. 53) and are based on the  $K_{ads}$  values (Freundlich) reported by the study authors. The qualitative determinations reported by the study authors in the form of a McCall mobility class (p. 46) were based on  $K_{oc}$  values associated with the adsorption phase of the experiment; these class determinations were not reported by the reviewer. It is preferred that the reported mobility class be based on  $K_{ads}$  values.

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