DATA EVALUATION RECORD

STUDY 3

CHEM 128993 Cyproconazole 162-1

FORMULATION--00--ACTIVE INGREDIENT

FICHE/MASTER ID 40607708

Skinner, W.S., G.B. Quistad, & D.H. Sakai. 1986. Aerobic soil metabolism of SAN 619F. Report No. 3760-24-08-85. Unpublished study prepared and submitted by Sandoz Crop Protection Corporation, Des Plaines, IL

DIRECT REVIEW TIME = 12

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CONCLUSIONS:

Metabolism - Aerobic Soil (162-1)

(1) The study does not satisfy the aerobic metabolism in soil data requirement (162-1) primarily because no attempts were made to identify and quantify degradates. To satisfy the data requirement, a new study must be conducted in which major degradates are identified. An exaggerated application rate (eg., 5X or 10X the maximum proposed field application rate) may be used if the quantity of major degradates formed under normal application rates is too low for identification and quantification.

(2) The study is scientifically sound and provides supplemental information on the aerobic metabolism of cyproconazole in one loam and 2 loamy sand soils.

(3) Cyproconazole degraded very slowly in a loam and 2 loamy sand soils under aerobic conditions. After 365 days incubation at 22°C, the cyproconazole in combined MeOH/H_2O/MeOH and KOH extracts of treated soils accounted for 87-90% of the radioactivity initially applied as ^{14}C-labeled cyproconazole at 1.1 or 2.2 ppm. Unextractables and non-cyproconazole extractables combined, $^{14}CO_2$, and volatiles accounted for 6-7%, 0.4-2.9%, and <0.1% of applied radioactivity, respectively.

MATERIALS AND METHODS:

(RS,RS)-a-[^{14}C] Cyproconazole (radiochemical purity 99.2%, specific activity 54.9 mCi/mmol, Sandoz) was added to a loam soil at 1.1 ppm and two loamy sand soils at 2.2 ppm in biometer flasks (Table 1). Air was passed over the soil in each flask and sequentially through a polyurethane foam plug and 1 N sodium hydroxide solution in the side-arm of the flask in order to trap volatiles. The Gilroy loam, Germam 2.2 loamy sand, and German 2.3 loamy sand were maintained at moistures of 20%, 10%, and 12%, respectively, and incubated at 22 ± 2 C in the dark. The soils, polyurethane plugs, and sodium hydroxide trapping solutions were sampled at intervals up to 365 days post-treatment.

Soil samples were sequentially extracted with methanol, water, and methanol. The combined extracts were analyzed for radioactivity by LSC and for cyproconazole and degradates by reverse-phase HPLC. The extracted 365-day samples were further extracted with 1 M potassium hydroxide at 80 C. The potassium hydroxide extracts were analyzed by reverse-phase HPLC. Polyurethane plugs were extracted with methanol, and the extracts were quantified by LSC. Potassium hydroxide trapping solutions were analyzed by LSC. It was confirmed that the radioactivity in the solutions was CO_2 by acidifying the solutions and then measuring the loss of $^{14}CO_2$. The extracted soils were analyzed by LSC following combustion.

SUMMARY OF DATA BY REVIEWER:

(RS,RS)-a-[^{14}C] Cyproconazole was applied at 1.1 ppm to a loam soil and at 2.2 ppm to 2 loamy sand soils. The loam and loamy sand soils were maintained at 20% and 10-12% moisture, respectively, and incubated at 22 ± 2 C in the dark. At 365 days posttreatment, parent cyproconazole was 0.73 ppm in the loam soil and 1.83-1.85 ppm in the loamy sand soils (Table 3). Total MeOH/H_2O/MeOH extractable unidentified degradates reached maximum concentrations of 0.03-0.11 ppm cyproconazole equivalents. At 365 days posttreatment, unextractable residues were 0.29 ppm in the loam soil and 0.15-0.21 ppm in the loamy sand soils. The majority of radioactivity not extracted with MeOH/H_2O/MeOH was identified as parent cyproconazole (0.24 of 0.29 ppm in the loam soil and 0.15-0.18 of 0.19-0.21 ppm in the loamy sand soils) after further

extraction of the soils with KOH. Carbon dioxide totaled 0.4-2.9% of the applied radioactivity, and other volatiles were isolated at <0.1% (Table 2).

DISCUSSION:

(1) The attempted identification of all non-parent residues present at > 0.01 ppm parent equivalent is recommended in the Subdivision N Guidelines. However, no attempts were made to identify and quantify degradates even though total MeOH/H_2O/MeOH and KOH extractable non-cyproconazole residues ranged from possibly as much as 0.08 ppm cyproconazole equivalents in the loam soil (0.03 ppm in the MeOH/H_2O/MeOH extractables plus the difference between the total 0.29 ppm MeOH/H_2O/MeOH unextractables and the 0.24 ppm cyproconazole removed by the KOH extract) to possibly as much as 0.14 ppm in one of the loamy sand soils (0.11 ppm in the MeOH/H_2O/MeOH extractables plus the difference between the total 0.21 ppm MeOH/H_2O/MeOH unextractables and the 0.18 ppm cyproconazole removed by the KOH extraction) after 365 days incubation.

(2) If the level of primary degradates formed using the equivalent of maximum field application rates is too low to identify and quantify, an exaggerated application rate (eg., 5X or 10X maximum field application rates) should be used as recommended in the Subdivision N Guidelines and The Standard Evaluation Procedure for Aerobic Soil Metabolism studies.

(3) The study authors estimate an aerobic degradative half-life for cyproconazole of 1.5-2.0 yrs in the loam soil and > 2 yrs in the loamy sand soils apparently based upon Figure 1 of the study report. No calculations were presented and no data points were obtained between 180 and 365 days. Furthermore, based upon the y axis of Figure 1 and Table 2, their estimates of half-lives appear to be based upon decreases in MeOH/H_2O/MeOH extractable cyproconazole with time. However, since a substantial percentage of the decrease in the MeOH/H_2O/MeOH extractable cyproconazole is due to the adsorption of cyproconazole to the soil, their estimates of degradative half-lives are too low. KOH extractions should have been performed on all soil samples, not just the ones taken at 365 days so that degradative half-lives could have been based upon cyproconazole decreases in the combined MeOH/H_2O/MeOH and KOH extracts.

(4) A domestic sandy loam, silt loam, or a soil representative of the intended pesticide use site maintained at is recommended in Subdivision N Guidelines for use in aerobic metabolism studies. One domestic loam soil and two foreign loamy sand soils were used in this study. No comparison of the foreign soils to domestic soils or justification for the deviations from Subdivision N Guidelines was provided. Sandy loam soils were used in the field dissipation studies (Studies 5 and 6).

PERTINENT DATA TABLES AND/OR FIGURES

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Pages 5 through 8 are not included in this copy.

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