DATA EVALUATION RECORD

I. Study Type: Field Dissipation Study

II. Citation:

Tummons, O.J., N. Pegelly, S.L. Hargreaves, L. Reed. I.P. Allen, E.M. Roper, and M. Earl. 1995. ICIA5504: Field Dissipation Trial Following Treatment to Turf Carried Out in California, USA during 1993/1994. Performed by Zeneca Agrochemicals (Zeneca Limited), Berkshire, U.K. Submitted by Zeneca Agricultural Products (Zeneca Inc.), Wilmington, Delaware. MRID 43678184.

III. Reviewer:

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V. Conclusions:

The study provides upgradable supplemental data on the field dissipation of methyl(E)-2-{2-[6-(6-2-cyanophenoxy)pyrimidin-4-yloxy]pheny}-3-methoxyacrylate (ICIA5504) and its transformation products on a California turf site. The data are deemed supplemental because storage stability data were inadequate to support a 24 month storage period and the hydrology of the study site was not clearly explained The data may be upgraded with submission of storage stability data to support 24 month storage period and a complete explanation of the study site hydrology. (Please see Section VIII for more details).

Azoxystrobin, applied as five application of 1.0 lbs a.i./A/ at 14 day intervals or 5.0 lbs a.i/A, had a range of 50% field dissipation time (DT_{50}) of 8 to 24 days. The overall first-order degradation half-life of ICIA5504 was 65 days. Major transformation products of ICIA5504 were 4-(2-cyanophenoxy)-6-hydroxypyrimidine (R401553), methyl(Z)-2-{2-[6-(2-cyanophenoxy) pyrimidin-4-yloxy]-3-methoxyacrylate (R230310), and (E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]-3-methoxyacrylic acid (R234886). Azoxystrobin and R234886 were detected until 196-to-371 days after the last ICIA5504 treatment. R2310310 and R401553 were detected from immediately posttreatment to 30 to 62 days after the last ICIA5504 treatment. The transformation product R234886 was detected in deep soil layers (6 to 18 inches) at 30, 62, 97, and 196 and 377 days after the last ICIA5504 application.

VI. Materials and Methods:

The study was conducted in Visalia, CA. The study site was described as a flat (slope=0%) turf site with a water table depth of 10 to 30 feet deep. The soil on the test site is described as a Foster fine sandy loam (coarse-loamy Thermic Aquic Hapoxeroll[1]). Physicochemical properties of soil are shown in Table 1. The site received 78.63 inches of rainfall and irrigation from May 1993 to September 1994. The cumulative precipitation was 680% of the 30 year average annual precipitation. Betsan 12.5G, at 12.5 lbs a.i./A, was applied to the study site in 1988. No other chemicals were applied between 1988-to-1993.

Two field plots (30 feet X 120 feet) were established on the test site. Each test site was subdivided into three sampling plots. On May 26, 1993 one of the field plots was sprayed with 1.0 lb a.i/A of ICIA5504 (formulated as 50% Wettable Granular [WG]) at 14 day application intervals. The cumulative application rate of ICIA5504 was 5.0 lbs a.i/A. Weed control in the study plots was maintained by mowing and application of Gramoxone Extra at 0.625% v/v, and Triton X-77 at 0.125 v/v., and VAPAM at 1 gal/1000 ft^2.

Soil samples were taken with a zero contamination soil probe to a depth of 42 inches. Surface soil samples (0-6 inches) were taken immediately after each application and deep soil samples (0-42 inches) were taken at sampling interval after the last application (or fifth application). Soil samples were immediately frozen at -15°C at Zeneca Ag Products Western Research Center and then shipped frozen to the Jealott's Hill Research Station in Berks, U.K. Soil samples were taken immediately after each application, 14, 30, 62, 97, 196, and 377 days after the last application.

Each deep soil core was further divided into 0-6, 6-12, 12-18, 18-24, 24-30, 36-42 inch depth increments. Five soil samples within each subplot, representative of the sampling time and soil depth increment, were combined into a single composite sample for chemical analysis.

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[1] The U.S.D.A soil taxonomic classification indicates the soil has an aquic moisture regime. An aquic moisture regime indicates the soil has low chroma mottles within 1 meter of the soil surface. Low chroma mottles indicate a anaerobic soil environment (Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys. USDA/SCS. Agriculture Handbook No. 436).

Analytical

Soil samples were analyzed for ICIA5504, R230310, R234886, R401553, and R402173. Soil samples were extracted with methanol: 1M HCL (75:25 v/v). Soluble residues in soil extracts were liquid-liquid partitioned with NaCl and dichloromethane for chemical analysis.

Souble ICIA5504 residues were separated using a HPLC with a UV detector or HPLC MS-MS or GC-MS. Separated residues were identified by co-chromatography with know standards. The limit of detection for ICIA5504, R230310, R234886 and R401553/R402173 was 0.2 mg kg^{-1} and 0.01 mg kg^{-1}, respectively. The mean analytical recovery of ICIA5504, R230310, and R234886, at 0.02 to 0.4 mg/kg, was 99% (CV=9%), 99 (CV=8%), and 103 (CV=10%), respectively (Table 15). The mean analytical recovery of R402173 and R401553, at 0.02 to 0.05 mg/kg, was 99% (CV=18%) and 89% (CV=12%), respectively (Table 16).

Storage Stability

Soil samples were stored frozen (-15°C) for 24 months. The registrant did not provide a storage stability study in the data submission. (Reviewer Note: The registrant stated an on-going storage stability will be submitted at a later date.)

VII. Study Author's Conclusions

A. Residues of ICIA5504 were not detected in the nontreated control plot and pre application samples (Tables 2 and 14).

B. The field recovery of ICIA5504 at immediately posttreatment ranged from 7 to 196% of applied after each application (Table 21).

C. ICIA5504, applied at 1.0 lb a.i./A at five 14 day application intervals, had a range of 50% field dissipation time of 8 to 28 days (Table 3; Figures 6,7, and 8). [Reviewer Note: The overall first-order degradation half-life of ICIA5504 was 65.39 days].

D. The pattern of formation and decline of ICIA5504 transformation products are shown below.

R230310- The surface soil concentration of R230310 reached a maximum concentration of 0.05 mg/kg at immediately after the last ICIA5504 application and then declined to 0.03 mg/kg at 30 days after the last ICIA5504 treatment and not-detectable (< 0.02 mg/kg) at 62 days after the last treatment (Tables 2; Figures 6,7, and 8).

R234886 - The surface soil concentration of R234886 reached a maximum concentration of 0.6 mg/kg at 30 days at the last ICIA5504 application and then declined to 0.18 mg/kg at 196 days after the last ICIA5504 treatment and 0.05 mg/kg at 377 days after the last treatment (Tables 2; Figures 6,7, and 8).

R402173 - The transformation product R402173 was not detected (<0.01 mg/kg) in the surface soil (Table 2; Figures 6,7, and 8).

R401553 - The surface soil concentration of R401553 reached a maximum concentration of 0.03 mg/kg after the last ICIA5504 treatment and then declined to 0.01 mg/kg at 62 days after the last ICIA5504 treatment and not-detectable (< 0.01 mg/kg) at 97 days posttreatment (Table 2; Figures 6,7, and 8).

E. The transformation product R234886 was detected in at 6-12 inch soil layer at 30, 62, 97, and 196 days after the last ICIA5504 application and 12-18 soil layer at 96, 196, and 377 days after the last ICIA5504 application (Table 2). ICIA5504, R401553, and R230310 were not detected in subsurface soil samples (> 6 inches).

VIII. Reviewer's Comments

A. Pan evaporation data were not provided for the study site. EFGWB notes the absence of pan evaporation or evapotranspiration (ET) data prevent a complete assessment of the water balance. Such information is needed to evaluate the surplus of soil water and its potential for downward movement. EFGWB recognizes the cumulative total precipitation (rainfall and irrigation) was 680% of the 30 year annual average. It is reasonable to assume a 680% exceedance of precipitation would promote leaching conditions. However, the absence of pan evaporation data prevent a complete assessment of the hydrology of the study site.

B. The soil on the test site was described as a Foster sandy loam. (coarse-loamy Thermic ***Aquic*** Hapoxeroll). This classification indicates the soil has an aquic moisture regime. An aquic moisture regime indicates the soil is anaerobic, as representated by low chroma mottles in the soil profile, at some time during the year because of saturation with non-oxygenated water. EFGWB is requesting a complete explanation of the soil hydrology at the study site. (Please refer to comment A.)

D. The registrant did not provide a complete description of the analytical methods. EFGWB notes the registrant submitted method validation studies for detection of ICIA5504 in soil and water. The analytical methods described in the study are presented in the MRID 43678188 and 43678192. These methods will be reviewed by BEAD/OPP/EPA.

E. The registrant did not provide a storage stability study to support a 24 month frozen storage period. EFGWB notes the registrant provide a 12 month storage stability study (MRID 43678183). The registrant stated an on-going storage stability will be submitted at a later date. As per Subdivision N guidelines, a 24 month storage stability is needed to support the field dissipation study.

F. The registrant described the dissipation rate as a DT_{50}. EFGWB notes field dissipation rate is commonly described using a first-order degradation kinetic model. The overall dissipation half-life of ICIA5504 was 65.39 days. EFGWB notes the first order half-life and DT50 of ICIA5504 are not equal. These data suggest the dissipation rate of ICIA5504 may be slower than indicated by the DT_{50}.

G. The registrant did not describe the exact procedures for handling grass clippings on the study plots. EFGWB believes the removal of grass clipping could result in the removal of ICIA5504 or "dissipation" from the test plots. EFGWB believes the registrant should explain the procedures for handling grass clippings.

AZOXYSTROBIN

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