7-30-96

DATA EVALUATION RECORD

I. Study Type: Field Dissipation Study

II. Citation:

Runnalls, J.K., N. Pengelly, E.M. Roper, and M. Earl. 1995. ICIA5504: Field Dissipation Trial Following Treatment to Turf Carried Out in Florida, USA during 1993/1994. Performed by Zeneca Agrochemicals (Zeneca Limited), Berkshire, U.K. Submitted by Zeneca Agricultural Products (Zeneca Inc.), Wilmington, Delaware. MRID 43678186.

III. Reviewer:

Name: James A. Hetrick, Ph.D. James A. Hetrick
Title: Soil Chemist
Organization: EFGWB/EFED/OPP 30 JUL 1996

IV. Approved by:

Name: Paul J. Mastradone, Ph.D. Paul J. Mastradone
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Organization: EFGWB/EFED/OPP 30 JUL 1996

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 or Azoxystrobin) and its transformation products on turf in Florida. The data are deemed supplemental because storage stability data were inadequate to support a 19 month sample storage period and the hydrology of the study site was not clearly explained. The data can be upgraded with submission of storage stability data to support a 19 month sample storage period and a complete explanation on the hydrology of the site. (Please see Section VIII for more details.)

Azoxystrobin, applied in five applications of 1.0 lbs a.i./A at 14 day intervals, had a of 50% field dissipation time (DT_{50}) of 8 to 23 days. The first-order dissipation half-life of ICIA5504 was 60 days. Transformation products of ICIA5504 were 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). These compounds were detected 14 days to 176 days after the last ICIA5504 application. Azoxystrobin, R230310, and R234886 were not detected in deep soil samples (> 6 inches).

VI. Materials and Methods:

The study site was conducted near Oviedo, FL. The study site was described as a flat (slope=1 to 2%) turf site with a fluctuating water table depth of 1.5 to 3.0 feet deep. The soil on the test site was described as a Leon-Delray-St. John soil association[4]. Physicochemical properties of the soil are shown in Table 1. The site received 82.94 inches of rainfall and irrigation from May 1993 to May 1994. The cumulative precipitation on the test site is equivalent to 160% of the 30 year annual average precipitation. The test site was not treated with agrochemicals for 6 years prior to the study.

Two field plots, a treatment and control plot, were established on the test site. One of the field plots was subdivided into three sampling plots and then sprayed with five application of ICIA5504 (formulated as 50% Wettable Granular [WG]) at 1.0 lb a.i./A /application on 14 day application intervals. The total application rate of ICIA5504 was 5.0 lbs a.i/A. The plots were mowed during the study.

Five soil cores were taken from treated subplots taken with a zero contamination soil probe. Surface soil samples (0-6 inch) were taken immediately after each ICIA5504 application and deep soil samples (0-42 inch) were taken at each sampling interval after the last ICIA5504 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 post application, 14, 28, 59, 87, 176, and 360 days post the fifth application.

Each soil core was divided into 0-6, 6-12, 12-18, 18-24 inch depth increments for chemical analysis.

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[4] The soils in the Leon-Delray-St. John soil association are described as follows:

Leon - Aeric Hapl**aqu**ods
St. John - Typic Hapl**aqu**ods
Delray - Grossarenic Agri**aqu**olls

The soil classification indicates the soils have 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 indicates an anaeroic soil environment (Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys. USDA/SCS. Agricultural Handbook No. 436).

Analytical

Soil samples were analyzed for ICIA5504, R230310 and R234886. Soil samples were sequentially extracted with methanol:water. Soluble residues in soil extracts were further liquid-liquid partitioned with NaCl and dichloromethane for chemical analysis.

Souble residues in the methanol water extracts were separated using either HPLC with a UV detector or HPLC-MS-MS. Separated residues were identified by co-chromatography with know standards. The limit of detection of the HPLC and HPLC MS-MS was 0.2 and 0.1 mg/kg, respectively. The mean analytical recovery of ICIA5504, R230310, and R234886, at 0.02 to 5 mg kg, was 94%, 94.8, and 96.1%, respectively (Tables 7, 8, and 9).

Storage Stability

Soil samples were stored frozen (-15°C) for 19 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 control plot and pre-application samples in the treated plot (Tables 2 and 6).

B. The field recovery of ICIA5504 ranged from 21 to 148% of applied (Table 12).

C. Azoxystrobin, applied at five applications of 1.0 lbs a.i./A on 14 day application intervals, had a range of 50% field dissipation times (DT_{50}) of 8 to 23 days (Table 3; Figures 4,5, and 6). [Reviewer Note: The overall first-order dissipation half-life of ICIA5504 was 60 days].

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

R230310- The concentration of R230310 in surface soil reached a maximum concentration of < 0.03 mg/kg at 14 days after the last treatment and then declined below detection limits (< 0.02 mg/kg) at 28 days posttreatment (Table 2).

R234886- The concentration of R234886 in surface soil reached a maximum concentration of 0.34 mg/kg at 14 days after the last ICIA5504 treatment and then declined to 0.05 mg/kg at 176 days after the last ICIA5504 treatment and non-detectable at 360 days after the last ICIA5504 treatment.

E. ICIA5504, R230310, and R234886 were detected in the surface soil layer (0-6 inches) (Table 2).

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. EFGWB recognizes the cumulative total precipitation (rainfall and irrigation) was 160% of the 30 year annual average precipitation. It is reasonable to assume a 160% exceedance of precipitation could promote leaching. EFGWB requests pan evaporation data for the test site to assess the study site hydrology.

B. The soils on the test site have an aquic suborder according to USDA Soil Taxonomy. This classification indicates the soils have aquic moisture regime. An aquic moisture regime indicates the soil is anaerobic, as represented by low chroma mottles in the soil profile, at some time during the year because of saturation with non-oxygenated water. EFGWB requests an explanation on the soil hydrology of the study site. (Please refer to comment A.)

C. 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 MRID 43678188 and 43678192. These methods will be reviewed by BEAD/OPP/EPA.

D. The registrant did not provide a storage stability study to support a 19 month frozen storage period. EFGWB notes the registrant provided 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, storage stability is needed to support a 19 month sample storage time.

E. The registrant described the dissipation rate as a DT50. EFGWB notes field dissipation is commonly described using a first-order degradation kinetic model. The overall first-order dissipation half-life of ICIA5504 was 60 days. EFGWB notes the first order half-life and DT_{50} are not equal. These data suggest the dissipation rate of ICIA5504 may be slower than indicated by the DT_{50}.

F. 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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