DATA EVALUATION RECORD

STUDY ????

DRAFT

CHEM 080808 Propazine §164-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 441848-09
Hughes, D.L. 1996. Field Soil Dissipation of Propazine (Milo-Pro^{TM} 4L) on Bare Soil in Texas. Laboratory Project Identification: CHW Study No. 6641-100. Unpublished study preformed by Corning Hazelton Inc., Madison, WI, and submitted by Griffin Corporation, Valdosta, GA.

REVIEWED BY:

Rodolfo A. Pisigan, Jr.
Chemist
OPPTS/OPP/EFED
CRS #2

Signature:__________________________

Date:__________________________

APPROVED BY:

Mah T. Shamim, Ph.D.
Branch Chief, ERB-IV
OPPTS/OPP/EFED
CRS #2

Signature:__________________________

Date:__________________________

CONCLUSIONS:

1. The study was submitted to support registration of an end use product and to provide data that may be used toward fulfillment of Subdivision N (164-1) environmental fate data requirements on the field dissipation of propazine on bare soil at a test site in Texas . The study was found ~~unacceptable~~ supplemental due to ~~several~~ the following deficiencies ~~found as discussed in the reviewer's comments section.~~ (a) the starting concentration of propazine was not reported. (b) soil sampling was not done at sufficient depth to adequately define the extent of leaching; (c) rate and pattern of formation and decline of propazine degradates was not addressed

2. Propazine dissipated with a reported half-life of 51.7 days during the 186-day study period. Residues of propazine at 0.665 ppm (dry weight basis) on day 1 decreased to <0.0100 ppm after 362 days. Propazine was found only in the 0-3 inch depths on 1, 14, 21, and 31 days. Propazine was also detected on the 0-3 and 3-6 inch depths on 93 and 186 days. No residues of propazine were found the soil layers below the 3-6 inch depth.

   The three degradates of propazine detected were 2-amino-4-chloro-6-isopropylamino-s-triazine (DEA), 2,4-diamino-6-chloro-s-triazine (DAA), and 4,6-diisopropylamino-2-hydroxy-s-triazine (OH-Propazine). DEA was found in the 0-3 inch depths on days 1, 14, 21, and 31 and in the 0-3, 3-6, and 3-6, and 6-9 inch depths on day 93. DEA residues increased from 0.0789 ppm on day 1 to 0.120 ppm on day 21, and then declined to 0.0100 ppm after 362 days. DAA was found only 0-3-inch depths on 14, 21, and 31 days at 0.0223, 0.0366, and 0.0105 ppm (dry weight basis), respectively. OH-Propazine was found in the 0-3 inch depths on days 1, 14, 21 and 31. Concentration of OH-Propazine was 0.0884 ppm after 1 day and then decreased to 0.0200 ppm after 93 days.

3. Metabolism an~~d photolysis are the~~ is a likely major ~~pathways that contributed to~~ the dissipation pathway of propazine in the test site. The role of leaching in the field dissipation is difficult to assess because the data are limited and the soil depths considered in the study ranged from the surface to 9-12 inch only below the ground.

METHODS:

Test Substance and Plot Information: Unlabeled propazine [2-chloro-4,6-bis(isopropylamino)-s-triazine] was applied using a tractor mounted sprayer in a test site in Armstrong County of Texas at a rate of 1.2 lb a.i./acre on July 6, 1995. The treated test plot (150' x 48') and untreated or control plot (50' x 48') are located in an area with 0-1.5% slope. No pesticides or triazine-containing products were reported to be applied at the test site in the last 5 years prior to start of study, except maintenance chemicals 2,4-D and Roundup that were applied on 7/25/95. Daily weather data that included rainfall, air temperature, pan evapotranspiration and soil temperature were collected during the study period and summarized in Table 4. Supplemental irrigation was applied such that both rainfall and irrigation amounted to 150% of the norm for 1995 -1996.

Sampling: The untreated plot (2400 ft^2) was used as the control site where 3 soil core samples were taken at each sampling period. The treated plot (7200 ft) were divided into 3 equal subplots. At each sampling interval, 5 soil core samples were taken in each of the treated subplots. Each core sample was approximately 12 inches in length and 2 inches in diameter. Soil cores were sectioned into three-inch segments representing 0-3, 3-6, 6-9, and 9-12 inch fractions. Soil samples from similar depth fractions within each subplot were composited. Samples were collected one day prior to pesticide application, about 7 hrs after application (day 0), then 1, 3, 7, 14, 21, 31, 93, 186, 272, and 362 days after application. Within 1.5 hrs after collection, soil core samples and irrigation water samples were stored in the freezer (-32 to -5 ^{0}C) for 10-89 days and 41-174 days, respectively, before shipping the samples through a freezer truck or overnight carrier on a dry ice to the laboratory for analysis.

Analysis: A representative sample of soil was initially soxhlet-extracted with a mixture of methanol and water. The extract was then analyzed for the propazine and its two degradation products, DEA [2-amino-4-chloro-6-isopropylamino-s-triazine] and DAA [2,4-diamino-6-chloro-s-triazine] using capillary gas chromatography with mass selective detection with a quantification limit of 0.0100 ppm on a wet basis. The extract was also analyzed for OH-Propazine (4,6-diisopropylamino-2-hydroxy-s-triazine), another degradation product of propazine, using high performance liquid chromatography with column switching with a quantification limit of 0.0200 ppm on a wet basis. The analytical data for propazine and its 3 degradates were finally reported in ppm on a dry weight basis. In the method validation analysis, propazine recoveries ranged from 91.4 to 111%, DEA recoveries from 98.3% to 130%, DAA recoveries from 32.0 to 93.2 %, and OH-Propazine recoveries from 78.3 to 107%. No information was found in the report concerning the analysis and analytical method for propazine and its degradates in irrigation water samples.

DATA SUMMARY

The field dissipation study was conducted on a bareground soil in an area where sorghum is grown commercially. The upper soil layer (0-6 inch depth) is a loamy sand with a 0.5% organic matter content and pH of 6.5. The lower layer (6-12 inch depth) is also a loamy sand with 1.1% organic matter and pH of 8.2. The total concentrations of propazine and its degradates (in dry weight basis) were found to vary with time in the 0-9 inch sections of the soil layer. The total residues of propazine decreased from 0.665 ppm on day 1 to 0.206 and 0.273 ppm on day 14 and 21, respectively. Propazine residues continued to decline to 0.176 ppm on day 31, 0.061ppm on day 93, and 0.0376 ppm on day 186. No propazine was detected on day 362. DEA, initially detected at 0.0789 ppm on day 1, increased in total concentration at day 14 to 0.115 ppm, then slightly increased at day 21 to 0.120 ppm and afterwards decreased at day 31 to 0.102 ppm. DEA total concentrations dropped to 0.0583 ppm on day 93 and to 0.0226 ppm on day 186, then below detection limit on day 382. DAA was undetected on days 1, 93, 186, and 362, but was found at total concentrations of 0.0223, 0.0366, and 0.0105 ppm on days 14, 21, and 31, respectively. OH-Propazine was initially found at a total concentration of 0.0884 ppm on day 1. Its concentrations decreased to 0.0272 ppm on day 14, 0.0441 ppm on day 21, and 0.0415 ppm on day 31.

Both the residues of propazine and DEA were confined to the 0-3 inch sections of the soil layer on days 1, 14, 21, 31 and to 0-3 and 0-6 inch sections on days 93 and 186. DAA was found in the 0-3 inch sections on days 14, 21, and 31. OH-Propazine was detected in the 0-3 sections only on days 1,14, 21, and 31.

Dissipation Pathways: Based on the degradates detected during the study, aerobic metabolism is one possible route of dissipation of propazine. OH-Propazine, a major degradate, and DEA, a minor degradate, reported in the aerobic metabolism study, were both detected in the current field dissipation investigation. The other possible dissipation pathway is photolysis which can lead to the formation of OH-Propazine. Photolysis has been known to cause degradation of s-triazines such as atrazine, propazine, and simazine when irradiated in aqueous solutions at 253.7 nm wavelength. This dissipation process would be expected to be important in the soil surface during the initial application of the pesticide. Leaching is another pathway that can contribute to the overall dissipation of propazine and OH-Propazine. The Koc of both propazine and OH-Propazine are lower than 400ml/g, suggesting that these chemicals would be expected to be mobile in the subsurface environment. However, thr possible contribution of leaching could not be evaluated in the present study because dissipation data were collected only for 0-12 inch depth.

REVIEWER'S COMMENTS

1. The original concentration of the pesticide was not reported. Consequently, the concentration of propazine at the start of the study could not established. Although soil samples were collected one day prior to application (day -1), about 7 hours after the application (day 0), and then at days 1, 3, 7, 14, 21, 31, 93, 186, 272, and 362 after the application, analytical data for days -1, 0, 3, 7, and 272 were not reported. The concentration of propazine at day 0 (immediately post-treatment) is important in understanding the rate of propazine dissipation and pattern of formation of the degradates. At day 1, 0.0884 ppm of OH-Propazine and 0.0789 ppm of DEA were detected already suggesting that degradation of propazine has occurred if the data for day 0 indicated that these two degradates were not initially present at levels found in soil samples at day 1. The unreported concentrations of propazine and degradates residues on day 3 and day 7 are similarly important in the evaluation of the dissipation kinetics because a significant mass loss of propazine happened between day 1 and day 14. Total residues of propazine decreased from 0.665 ppm on day 1 to 0.206 ppm on day 14, representing a concentration loss of about 70%.

2. The soil core samples were taken only at a shallow depth, at 0-3 inch, 3-6 inch, 6-9 inch, and 9-12 inch sections of the soil layer. For days 1, 14, 21, and 31, samples were taken only up to the 9-inch depth. The sampling depth was extended to 12 inches on days 93, 186, and 362. These sampling depths are not sufficient to define the extent of potential leaching of propazine and its degradates such as OH-Propazine. As mentioned previously, the Koc of propazine and OH-Propazine are lower than 400 ml/g. Based on the study of Perdue (1995), Koc values range from 78.7 to 268 ml/g for propazine and 78 to 342 ml/g for OH-Propazine. With these experimentally derived Koc values, propazine and its major degradate, OH-Propazine, would be expected to be mobile and quite leachable in the unsaturated zone. As such, it would be sound to monitor the residues of propazine and OH-Propazine up to a depth of 36 inches or 90 cm. to check if both chemicals are leaching beyond the 12-inch depth.

3. The kinetics of the formation and decline of the degradates of propazine, OH-Propazine. DEA and DAA, was not evaluated. Instead, the total residues of propazine, DEA, and DAA were taken together and eventually used in the first-order kinetic analysis of propazine and Cl metabolites that yielded a combined degradation half-life of 51.7 days. This kinetic data treatment approach would not provide meaningful information on the pattern of formation and decline of the degradation products. The concentration-time profiles of the degradation products are different from that of propazine. In addition, the concentrations of propazine are much higher than those of the degradates, especially during the early phase of the dissipation study. As such, kinetic evaluation of combined propazine and Cl metabolites could lead to misleading information about the dissipation behavior of DEA and DAA. For instance, DEA concentrations increased after 14 and 21

days relative to that of the first day after application, and then started to decline after 31 days. This concentration trend was not reflected in concentration curve of combined masses of propazine and Cl metabolites.

4. Both the prequalification soil sample taken at day -1(one day before application) and prequalification irrigation water sample taken at day 8 should have been analyzed as indicated in page 55/277 of the reports. Analytical results for both samples are important to check for any possible contamination and verify if interfering residues or chemicals are present at the test site. However, no information nor data about the prequalification samples were provided in the report.

5. Another field soil dissipation study in North Carolina was submitted to provide data and information about the potential leaching and degradation characteristics of propazine.

STUDY AUTHOR'S CONCLUSIONS INCLUDING PERTINENT TABLES AND FIGURES

____

Page ______ is not included in this copy.

Pages ___7____ through 32____ are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

_X____ FIFRA registration data.

_____ The document is a duplicate of page(s) _______.

_____ The document is not responsive to the request.

_____ Internal deliberative information.

_____ Attorney-client communication.

_____ Claimed confidential by submitter upon submission to the Agency.

_____ Third party confidential business information.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.