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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 1 1995

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: Atrazine (080803), Reregistration Case No. 0062.
Special Review. Ciba-Geigy Comments on the
Triazine PD1; Magnitude of the Residue in Corn and
Sorghum.
CBRS Nos. 15629, 15635, 15636,
DPBarcode Nos. D215518, D215514, D215513,
MRIDs 43598632 (Sorghum), 43598631 (Sorghum),
43598630 (Corn).

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Special Review of triazine herbicides, including atrazine, has been initiated (59 FR 60412, 11/23/94, PD1). Ciba-Geigy Corporation has submitted comments in response, including additional magnitude of the residue data in corn and sorghum. The present submissions represent Volumes 31-33 (MRID 43598630), 34-36 (MRID 43598631), and 37 (MRID 43598632) of the Registrant's comments. Assignment instructions are to review the present submissions in response to the PD1 and provide evaluation for PD2/3. The conclusions below pertain to the present submissions, and their relation to the Agency position in the PD1.

Tolerances are established for residues of the herbicide atrazine, 2-chloro-4-ethylamino-6-isopropylamino-*s*-triazine, in



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Printed with Soy/Canoia Ink on paper that
contains at least 50% recycled fiber

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or on various raw agricultural commodities (40 CFR 180.220(a)), and for combined residues of atrazine and its metabolites 2-amino-4-chloro-6-ethylamino-*s*-triazine, 2-amino-4-chloro-6-isopropylamino-*s*-triazine, and 2-chloro-4,6-diamino-*s*-triazine, in or on specified plant commodities (40 CFR 180.220(b)). Designations for the metabolites in the tolerance expression are G-28279, G-30033, and G-28273, respectively; structures are indicated in Figure 1. Atrazine is a List A Chemical. The Residue Chemistry Chapter was issued 7/25/83; the Registration Standard (Guidance Document) was issued 9/85; a Second Round Review (SRR) Residue Chemistry Chapter was issued 10/18/88.

Background

As part of its response to the FR notice initiating special review, registrant submitted the following documents:

Magnitude of Residues in Field Corn Forage, Silage-Stage Forage, Fodder, and Grain and Sweet Corn Ears and Forage Following Applications of AAtrex® 4L to Field Corn and Sweet Corn, Report ABR-91070, Ciba-Geigy Corporation, Greensboro, NC, March 15, 1995, Volumes 31, 32, and 33 of Submission (MRID 43598630).

Magnitude of Residues in Grain Sorghum Forage, Hay, Silage-Stage Forage, Fodder, Grain, and Processed Grain Fractions Following Applications of AAtrex® 4L to Grain Sorghum, Report ABR-91071, Ciba-Geigy Corporation, Greensboro, NC, March 16, 1995, Volumes 34, 35, and 36 of Submission (MRID 43598631).

Atrazine and Metolachlor - Magnitude of Residues in Soil and Grain Sorghum Following Applications of AAtrex 4L® and Dual 8E® With and Without the Addition of Acrysol G-110, Report ABR-93080, Ciba-Geigy Corporation, Greensboro, NC, March 16, 1995, Volume 37 of Submission (MRID 43598632).

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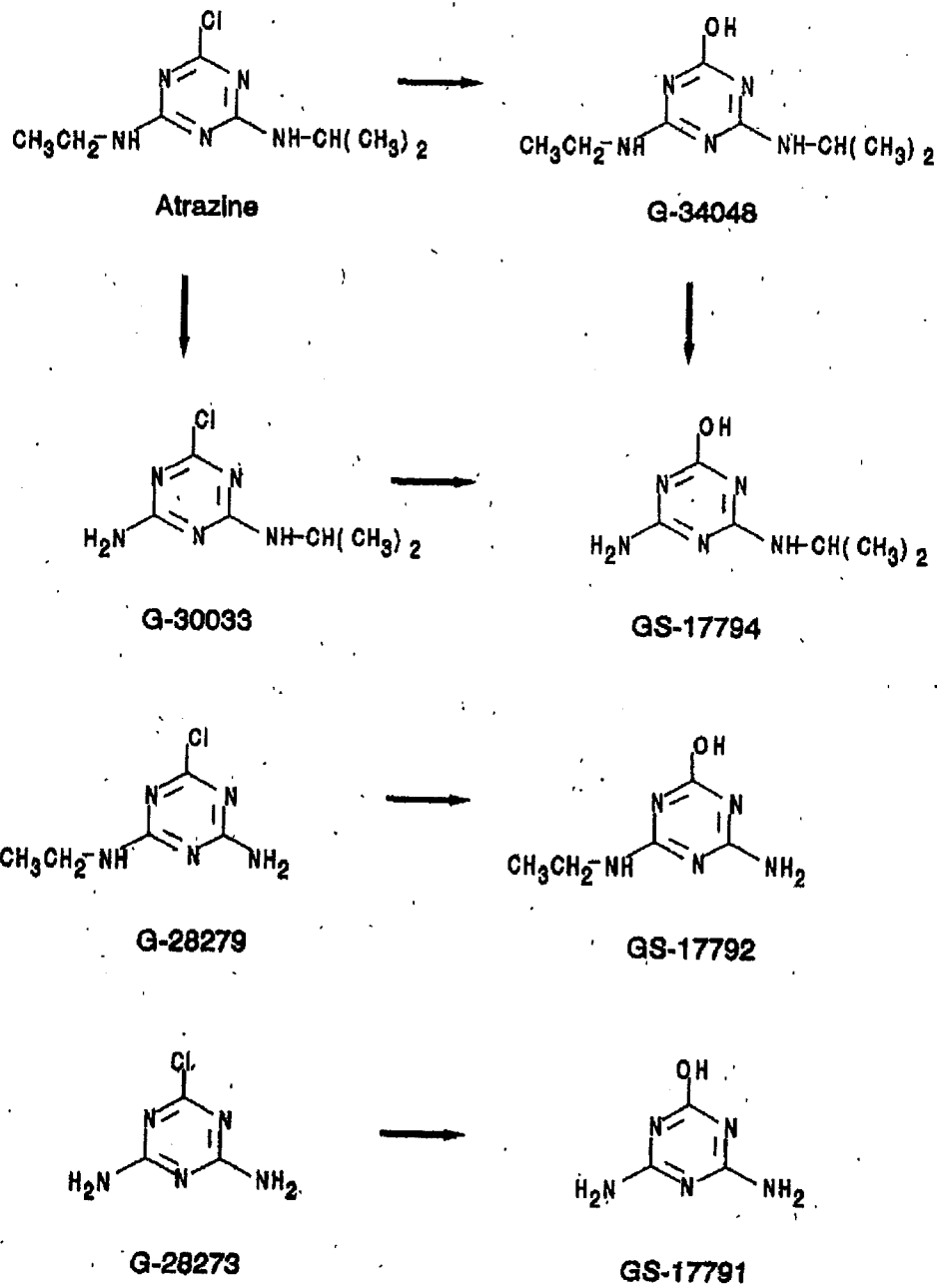


Figure 1. Atrazine, chloro (left), and hydroxy metabolites

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MRID 43598630 reports the results of field trials conducted to obtain data on the magnitude of the residues of atrazine and its three chloro metabolites in field and sweet corn. This report summarized residue data from 21 field trials in the following 17 states: CA, FL, IL (2), IA, MN (2), MS, MO (2), NE, NY, NC, OH, OR, PA, SC, TN, TX, and WI (2). Field and sweet corn were treated with AAtrex 4L (EPA Reg. No. 100-497) in single preemergence or postemergence applications. 1X rates were 4 lb ai/A preemergence broadcast, 4 lb ai/A postemergence broadcast approximately 30 days after planting, or 3.0 lb ai/A made to 6 inch high or 12 inch high corn. The Registrant noted that these rates exceeded the 1995 label maximum of 0.5 lb ai/A preemergence, 2.0 lb ai/A postemergence, with a maximum total application of 2.5 lb ai/A per calendar year. Postemergence application must be made before corn exceeds a height of 12 in. Residue data were reported for atrazine and the chloro metabolites G-30033, G-28279, and G-28273, in or on the field corn commodities 30 day and 60 day forage, silage stage forage, fodder, and grain; and in or on the sweet corn commodities 30 day, 60 day, and harvest forage, and ears (K+CWHR).

MRID 43598631 reports the results of field trials conducted to obtain data on the magnitude of the residues of atrazine and its three chloro metabolites in grain sorghum. This report summarized residue data from 14 field trials in the following 12 states: AZ, AR, CA, GA, IL, KA (2), MO, NE, OK (2), SD, TN, and TX. Sorghum was treated with AAtrex 4L (EPA Reg. No. 100-497) in single preemergence or postemergence applications. 1X rates for preemergence broadcast were 2.38 lb ai/A. 1X rates for postemergence broadcast were 3 lb ai/A, or 1.2 lb ai/A for application with crop oil concentrate, to 6 in high or 12 in high sorghum. The Registrant noted that the 1995 label maximum rate was 2.0 lb ai/A preemergence, or maximum postemergence application of 2.0 lb ai/A of atrazine applied alone, or 1.2 lb ai/A of atrazine applied with emulsifiable oil, oil concentrates in water, or surfactant. The total atrazine applied may not exceed 2.5 lb ai/A per calendar year, without oil or surfactant. Postemergence application must be made before sorghum exceeds a height of 12 in. Residue data were reported for atrazine and the chloro metabolites G-30033, G-28279, and G-28273, in or on 30 day and 60 day forage, hay, silage stage forage, fodder, grain, and dry- and wet-milled processed grain fractions.

MRID 43598632 reports the results of field trials designed to obtain data concerning the magnitude of the residues of atrazine, including two hydroxy metabolites, in grain sorghum, in response to an Agency Data Call-In Notice of 9/28/90. A second purpose of the study was to obtain data concerning the magnitude of the residues of atrazine and metolachlor with and without the addition of the polymer Acrysol G-110 in grain sorghum following application of the herbicides AAtrex 4L and Dual 8E. This second

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purpose was canceled via protocol amendment when the polymer treatments failed to produce the desired biological results.

This report summarized residue data from field trials in sorghum conducted in CA, IL, MS, and NY. AAtrex 4L was applied postemergence broadcast to 12 inch sorghum at a maximum rate of 3 lb ai/A. The Registrant noted that this rate exceeded the label maximum as of 1993 of 2.0 lb ai/A applied postemergence or 2.5 lb ai/A total amount, preemergence plus postemergence, to sorghum in one calendar year. Data were reported for residues of atrazine, the chloro metabolites G-30033, G-28279, and G-28273, and the hydroxy metabolites G-34048 and GS-17794 (see Figure 1 for structures), in or on 0 day forage, 30 day forage and hay, silage stage forage, harvest fodder, and harvest grain.

CBRS Comments

The initiation of special review on the triazines describes the Agency's position pertaining to triazine metabolism and residues of concern. The full FR notice contains more detail, but the following excerpts outline the Agency position (59 FR 60412, 11/23/94):

"In estimating triazine dietary risks, the Agency assumes that the total toxic residue of concern is the parent triazine compound plus all metabolites with a triazine ring, including among others, all chloro and hydroxy metabolites."

"Based on its assessment of the structure-activity relationship and potential carcinogenicity of all registered triazine compounds, EPA believes metabolites which have been dechlorinated may be less potent carcinogens than the parent compounds.... However, in the absence of completed laboratory studies of the hydroxy metabolites, the Agency has relied on its equivalency policy and has made the assumption that all metabolites containing the triazine ring are equipotent as carcinogens as the parent compound when conducting its risk assessment." (59 FR 60418-60419)

The Agency position is consistent with the most recent decision of the HED Metabolism Committee on triazine chemicals (Memo, 8/7/92, M.S. Metzger). The Committee noted that in the absence of data on the toxicity of triazine metabolites, all metabolites containing a triazine ring with a substituent would be assumed toxicologically equivalent to the parent compound. Should data be reviewed and accepted which indicate that hydroxyatrazine is not carcinogenic, then the exposure assessment for atrazine will include only parent and chloro metabolites. No analytical methods were available to determine total residues of metabolites containing triazine rings with substituents. Field studies using ¹⁴C-atrazine would allow exposure assessment for total triazine

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ring residues as the total radioactive residue (TRR), because most of the radioactivity remains as triazine-ring containing metabolites; TRR will be assumed to represent all residues of concern.

The Agency therefore does not preclude the possibility that exposure assessment for cancer could be limited to combined residues of parent and chloro metabolites. However, at the present time, the Metabolism Committee has not altered its previous decision, and total triazine ring residues remain the appropriate value for exposure assessment.

Chemistry Branch has previously determined anticipated residues for atrazine, for combined residues of parent plus the three chloro metabolites, for agricultural commodities, including corn and sorghum (DEB 3688-3703, 3756, 9/14/88, M.S. Metzger). Anticipated residues were revised to reflect total triazine residues for corn, sorghum, and animal commodities, based on metabolism data (DEB 5783, 5/3/90, M.S. Metzger). Modest revisions were subsequently made to anticipated residues for total triazine ring, based on data from field metabolism studies in corn and sorghum (Memo, 6/7/93, J. Abbotts).

These considerations lead to the following conclusion:

Conclusion

The present submission reports residue data from field trials on corn and sorghum. Data are provided for residues of parent atrazine and three chloro metabolites, and residues of two hydroxy metabolites in addition with one set of field trials. The Agency does not preclude the possibility that exposure assessment may ultimately be based on some subset of total triazine ring residues. However, the most recent conclusion of the HED Metabolism Committee that exposure assessment should be based on the best available data for total triazine ring residues has not been altered. In addition, CBRS has previously determined anticipated residues for atrazine and its three chloro metabolites (DEB 5783, 5/3/90, M.S. Metzger). CBRS does not believe that it is necessary to provide a detailed review of the present submissions at this time. Should the Agency position on the residues of concern change in such a way that the data in the present submissions would be appropriate, then CBRS will evaluate those data in determining anticipated residues for preparation of a PD2/3.

cc:Circ, Abbotts, RF, Atrazine List A File, SF
RDI:FBSuhre:7/17/95:RBPerfetti:7/21/95:EZager:7/21/95
H7509C:CBII-RS:JAbbotts:CM-2:Rm805A:305-6230:8/1/95
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