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

JUN 28 1995  
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OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Mepiquat Chloride. List B Case No. 2375. Chemical I.D. No., 109101. Registrant's Response to Data Requirements. MRID Nos. 432904-01, -02, -03, -04; 43379501, 430247-1, 43440301. CBRS No. 14230, 14703, 13220, 14891. DP Barcode D206656, D209020, D199513, D210500.

FROM: Felecia A. Fort, Chemist *FA Fort*  
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Chemistry Branch II: Reregistration Support  
Health Effects Division (7509C)

THRU: Edward Zager, Branch Chief  
Chemistry Branch II: Reregistration Support  
Health Effects Division (7509C)

*Edward Zager*

TO: Ruby Whitters/Kathryn Davis PM-52  
Accelerated Reregistration Branch  
Special Review and Reregistration Division (7508W).

Attached is a review of metabolism, magnitude of the residue, and storage stability data submitted in support of reregistration of mepiquat chloride. These data were reviewed by Dynamac Corporation under supervision of CBRS and have been revised to reflect Branch policies.

No additional data are required for guidelines 171-4(a-1).

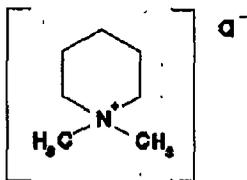
The nature of the residue in plants and livestock is adequately understood. The residue of concern is the parent, mepiquat chloride. The magnitude of the residue in cottonseed and cottonseed processed commodities is adequately delineated; however, residue data on cotton gin byproducts must be submitted. As discussed in the Revised Table II, the registrant will be given sufficient time to provide these data. In conjunction with the RED, cotton forage tolerances will



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be revoked since it is no longer regulated an animal feed item. The storage stability data submitted is adequate and demonstrates that mepiquat chloride is stable for up to 22 to 28.5 months in cottonseed and its processed commodities under frozen conditions.

cc: Reviewer(F. Fort), List B File, RF, SF, Circ., Dynamac  
RDI:Pilot Team:6/13/95: RPerfetti:6/22/95 EZager: 6/23/95  
H7509C:CBRS:CM#2:Rm805B:305-7478:FAFort/FF:6/12/95  
Disk4:mepiquat.sec

MEPIQUAT CHLORIDE

Shaughnessy No. 109101; Case 2375  
(CBRS Nos. 13220, 14230, 14703, and 14891)  
(DP Barcodes D199513, D206656, D209020, and D210500)

REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY DATA REQUIREMENTSBACKGROUND

The Mepiquat Chloride Phase 4 Review (S. Funk, 1/15/91) specified data requirements for plant and animal metabolism, storage stability, and magnitude of the residue. In response, BASF Corporation submitted data on plant metabolism (1992; MRID 42330804), ruminant metabolism (1988-89; MRIDs 41585204 through -06 and 1991; MRID 42394301) and radiovalidation (1991; MRID 42394303), storage stability (1993; 42892201) and magnitude of the residue (1993; 42734601 and -02) that were reviewed by the Agency (CBRS No. 10229; CBRS Nos. 10685 and 11386; CBTS Nos. 10671, 10689, and 10690; CBRS No. 12046; and CBRS No. 12702). Additional data/information were required by the Agency. BASF has submitted supplemental data/information on cotton metabolism (1993; 43024701), goat metabolism (1994; MRIDs 43290401 through -05 and 43440301), storage stability of cottonseed and cottonseed processed commodities (1994; MRID 43379501), and a BASF interoffice memo clarifying the procedure used for determination of magnitude of the residue in cottonseed and processed fractions. The BASF submissions are reviewed in this document for their adequacy in fulfilling residue chemistry data requirements. The Conclusions and Recommendation stated in this document are intended to update the status of the nature of the residue in plants and livestock, storage stability, and magnitude of the residue.

The qualitative nature of the residue in plants is understood. An adequate cotton metabolism study indicates that mepiquat chloride *per se* is the residue of concern. With the additional information/data reviewed herein, the qualitative nature of the residue in poultry and ruminants is understood. The residue to be regulated in livestock is mepiquat chloride *per se*.

Method I in PAM, Vol. II, is described as very specialized and as having recoveries in the 50% range, but is considered adequate for plant and animal tolerance enforcement purposes. Tolerances for residues of mepiquat chloride in cottonseed, cotton forage, livestock commodities, and cottonseed meal are currently expressed in terms of mepiquat chloride *per se* (N,N-dimethylpiperidinium chloride) (40 CFR §180.384 and §186.2275).

There are no established Codex MRLs for mepiquat chloride. Therefore, no compatibility questions exist with respect to U.S. tolerances and Codex.

### CONCLUSIONS AND RECOMMENDATIONS

#### Qualitative Nature of the Residue in Plants:

1. The submitted data confirm the previously submitted data for plant metabolism. The qualitative nature of the residue in plants is adequately understood. The residue to be regulated is mepiquat chloride *per se*.

#### Qualitative Nature of the Residue in Ruminants:

- 2a. The submitted information along with previously submitted data satisfy the requirements for ruminant metabolism. The qualitative nature of the residue in ruminants is adequately understood. The residue to be regulated is mepiquat chloride *per se*.
- 2b. The registrant has adequately addressed the deficiencies cited in the Agency review of the ruminant metabolism study. Adequate information/data concerning specific activity, dose rate, and the interval between dosing and sacrifice were submitted. The registrant also submitted adequate descriptions of goat liver and milk sample storage conditions and intervals and storage stability data. The data indicate that mepiquat chloride *per se* is stable in milk and liver samples stored frozen ( $\leq -17^{\circ}\text{C}$ ) for up to 45 months.

#### Storage Stability:

- 3a. The submitted information along with previously submitted data satisfy the requirements for storage stability data on cottonseed and cottonseed processed fractions.
- 3b. The registrant has adequately addressed the deficiencies cited in the Agency review of the interim storage stability study. In addition to submitting a final storage stability study, the registrant presented information concerning characterization of the test material as requested by the Agency. The data indicate that mepiquat chloride *per se* is stable in cottonseed and its processed commodities for up to 22-28.5 months of frozen storage ( $< -5^{\circ}\text{C}$ ). No additional storage stability data on cottonseed and cottonseed processed fractions are required.

Magnitude of the Residue in Cottonseed and Cottonseed Processed Commodities:

- 4a. The submitted information along with previously submitted data satisfy the requirements for magnitude of the residue data on cottonseed.
- 4b. The registrant has adequately addressed the deficiency cited in the Agency review of the magnitude of the residue study. A clarifying statement was presented indicating that the extraction/homogenization procedures for Method A9106 were followed correctly for the magnitude of the residue studies.
- 4c. No additional magnitude of the residue data on cottonseed are required and no data are required on cotton forage as it is no longer listed as a regulated commodity in the Updated Livestock Feeds Table (6/94). However, the Updated Livestock Feeds Table lists cotton gin byproducts as a regulated feed item. Therefore, data are required on residues of mepiquat chloride in/on cotton gin byproducts harvested at normal maturity from plants treated at the maximum seasonal application rate. The cotton must be harvested by commercial equipment (or a simulation thereof) to provide an adequate representation of plant residue from the ginning process. As discussed in the Revised Table II, the registrant will be given sufficient time to provide these data.
- 4d. A CBTS memorandum (J. Stokes, 5/25/95) recommends that the established tolerance for cottonseed meal be elevated from 3 ppm to 4 ppm. The registrant should revise the tolerance accordingly.

Detailed Considerations

Qualitative Nature of the Residue in Plants

The Mepiquat Chloride Phase 4 Review (S. Funk, 1/15/91) required a new plant metabolism study. In response, BASF submitted (1992; MRID 42330804) data on the metabolism of [<sup>14</sup>C]mepiquat chloride in cotton. The study was reviewed by the Agency (R. Perfetti, 3/5/93, CBRS No. 10229, DP Barcode D180700) and was deemed adequate. BASF has submitted data (1993; MRID 43024701) on the reanalysis of cotton forage and cottonseed samples from the original cotton metabolism study

Extracted <sup>14</sup>C-residues from the 15- and 67-day samples of cotton forage and 67-day cottonseed samples were analyzed by an additional TLC system. The TLC system consisted of an IONEX-25 SA-NA TLC plate with a 7N HCl mobile phase. The results from the original TLC analyses conducted on silica gel plates using two solvent systems (MRID 42330804) and from the additional analysis (MRID 43024701) are presented in Table 1. The results of the analysis by the additional TLC system did not alter the results of the original study. The data indicate that the only residue present in major quantities in cotton forage and seed is mepiquat chloride *per se*.

Table 1. Comparison of two different TLC analyses performed on 15- and 67-day cotton forage samples and 67-day cottonseed samples.

| DAY | Sample (MRID)     | % TRR (ppm)       |              |             |
|-----|-------------------|-------------------|--------------|-------------|
|     |                   | Mepiquat Chloride | Unidentified | Insoluble   |
| 15  | Forage (43024701) | 90.7 (0.339)      | 1.4 (0.006)  | 3.0 (0.013) |
|     | Forage (42330804) | 90.0 (0.337)      | 2.1 (0.009)  | 3.0 (0.013) |
| 67  | Forage (43024701) | 91.2 (0.793)      | 0.0 (0.000)  | 4.6 (0.040) |
|     | Forage (42330804) | 91.2 (0.793)      | 0.0 (0.000)  | 4.6 (0.040) |
|     | Seed (43024701)   | 93.5 (0.879)      | 5.8 (0.064)  | 5.0 (0.048) |
|     | Seed (42330804)   | 94.7 (0.902)      | 4.6 (0.043)  | 5.0 (0.048) |

### Qualitative Nature of the Residue in Animals

#### Ruminants

The Mepiquat Chloride Phase 4 Review (S. Funk, 1/15/91) required ruminant metabolism data. In response, BASF submitted animal metabolism data that were reviewed by the Agency (S. Funk, 9/30/93, CBRS Nos 10685 and 11386, DP Barcodes D183217 and D188232). The Agency concluded that the ruminant metabolism studies were adequate pending the submission of the following additional in-life and storage information:

1. The specific activity of the final material administered, the dose rate equivalent in feed, and the interval between the last dose and sacrifice must be reported for the liver and milk samples generated for radiolabel validation (1991; MRID 42394303) and analyzed for metabolism purposes (1991; MRID 42394301).
2. An adequate description of sample storage conditions and intervals for the milk and liver samples from MRIDs 42394301 and 42394303 must be provided. If the storage intervals exceed 6 months, storage stability data may be required.

In response, BASF has submitted six volumes of data (1994; MRIDs 43290401 through -05 and 43440301) addressing the ruminant metabolism data requirements. The registrant's response to each deficiency and the CBRS conclusions are presented below.

Registrant's response to deficiency no. 1: The registrant submitted calculations used to determine the specific activity of the dose material. The specific activity of the administered [<sup>14</sup>C]mepiquat chloride was 11.05  $\mu\text{Ci}/\text{mg}$  (24,534  $\text{dpm}/\mu\text{g}$ ).

The registrant stated that the dose rate equivalent in the feed could be calculated from the daily dosage data in section 3.6 and the feed consumption data in section 3.1 of the original report. The average dose rate in the feed for the seven days of the study was 755 mg of mepiquat chloride per kilogram of feed.

The registrant stated that the goat was sacrificed 6 hours after the last dose.

**CBRS conclusions:** We conclude that deficiency no. 1 is resolved. Adequate information on the specific activity of the administered dose, the dose rate equivalent in feed, and the interval between the last dose and sacrifice have been submitted.

**Registrant's response to deficiency no. 2:** The registrant stated that all samples were stored at  $\leq -18^{\circ}\text{C}$ . Prior to extraction and radiolabel validation (MRID 42394303), liver and milk samples were stored for up to 5 and 3 months, respectively. Prior to metabolite characterization (MRID 42394301), the liver samples were stored for an additional 9 months (14 months total) and the milk samples were stored for an additional 17 months (20 months total). To determine storage stability, the registrant stored ( $\leq -17^{\circ}\text{C}$ ) the liver samples for an additional 31 months and the milk samples for an additional 25 months and analyzed for mepiquat chloride. Liver and milk samples were also analyzed for 4-OH mepiquat chloride after storage for 20-45 months. Storage stability data are presented in Table 2.

Table 2. Residue analysis results at various storage intervals for liver and milk samples.

| Milk                         |                     |        |                     |                     |
|------------------------------|---------------------|--------|---------------------|---------------------|
| Storage Intervals (months)   | 3                   | 20     | 34                  | 45                  |
| TRR (ppm)                    | 0.402 <sup>a</sup>  | 0.338  | 0.440 <sup>a</sup>  | 0.320               |
| 4-OH Mepiquat Chloride (ppm) | ND <sup>b</sup>     | 0.081  | 0.120               | 0.067               |
| Mepiquat Chloride (ppm)      | 0.080               | ND     | ND                  | 0.083               |
| Liver                        |                     |        |                     |                     |
| Storage Intervals (months)   | 5                   | 14     | 34                  | 45                  |
| TRR (ppm)                    | 16.190 <sup>c</sup> | 17.322 | 17.140 <sup>a</sup> | 16.539 <sup>d</sup> |
| 4-OH Mepiquat Chloride (ppm) | ND                  | 6.902  | 5.520               | 5.121               |
| Mepiquat Chloride (ppm)      | 7.140               | 9.383  | ND                  | 9.768               |

<sup>a</sup> Mean of 2 determinations. <sup>b</sup> ND=not determined. <sup>c</sup> Mean of four determinations. <sup>d</sup> Mean LSS values from two different analyses as described in MRID 43290401.

**CBRS conclusions:** The data indicate that mepiquat chloride *per se* is stable in milk and liver samples stored frozen ( $\leq -17^{\circ}\text{C}$ ) for up to 45 months and support the qualitative nature of the residue in ruminants study (MRID 42394301). We conclude that deficiency no. 2 is resolved.

**Storage Stability**

The Mepiquat Chloride Phase 4 Review (S. Funk, 1/15/91) required storage stability data for cottonseed and its processed commodities. In response, BASF Corporation submitted an interim freezer storage stability study for mepiquat chloride in cottonseed and its processed commodities that was reviewed by the Agency (S. Knizner, 2/18/94, CBRS No. 12702, DP Barcode D195902). The interim report indicated that mepiquat chloride is stable in cottonseed and its processed commodities for at least 10.5 to 14.5 months of frozen storage ( $< -5^{\circ}\text{C}$ ). The Agency requested the final report and also that the registrant address the following concern:

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The registrant stated that the test substance used as the reference standard and to fortify the storage samples was characterized according to Good Laboratory Practices. This information is located at Landwirtschaftliche Versuchsstation der BASF, Limburgerhof, Germany and is available to BASF; for the final report, the registrant should provide copies of this information.

In response, BASF has resubmitted (1994; MRID 43379501) the storage stability study. This study, previously reviewed by the Agency (CBRS No. 12702), has been revised to include data on storage stability of cottonseed and its processed commodities stored for up to 28 months. The registrant also included information concerning characterization of the test material. The additional data/information are presented below.

The additional storage stability data submitted by BASF has been incorporated into Table 3. Table 3 is a revised version of Table 2 found in the Agency review of the interim storage stability report (CBRS No. 12702).

Table 3. Summary of mepiquat chloride storage stability data.

| Storage Period (Months) | Residue Found (ppm) <sup>a</sup> | Uncorrected Percent Recovery | Procedural Percent Recovery | Residue Found Corrected for Procedural Recovery (ppm) | Corrected Percent Recovery |
|-------------------------|----------------------------------|------------------------------|-----------------------------|---|----------------------------|
| <b>Delinted Seed</b>    |                                  |                              |                             |   |                            |
| 0                       | 2.87                             | NA <sup>b</sup>              | 84                          | 3.42  | NA                         |
| 11                      | 2.62                             | 91.2                         | 84                          | 3.12  | 91.2                       |
| 19                      | 3.26                             | 113.6                        | 90                          | 3.62  | 105.9                      |
| 25                      | 2.95                             | 103.1                        | 93                          | 3.17  | 92.7                       |
| <b>Hulls</b>            |                                  |                              |                             |   |                            |
| 0                       | 0.61                             | NA                           | 88                          | 0.69  | NA                         |
| 5                       | 0.55                             | 90.2                         | 69                          | 0.80  | 115                        |
| 10.5                    | 0.60                             | 98.4                         | 77                          | 0.78  | 113                        |
| 22                      | 0.77                             | 126.2                        | 78                          | 0.99  | 143.5                      |
| <b>Meal</b>             |                                  |                              |                             |   |                            |
| 0                       | 5.01                             | NA                           | 90                          | 5.57  | NA                         |
| 5                       | 4.90                             | 97.8                         | 82                          | 5.98  | 107                        |
| 11                      | 4.70                             | 93.8                         | 77                          | 6.10  | 110                        |
| 23                      | 5.22                             | 104.2                        | 86                          | 6.07  | 109                        |
| <b>Crude Oil</b>        |                                  |                              |                             |   |                            |
| 0                       | 0.87                             | NA                           | 87                          | 1.00  | NA                         |
| 3                       | 0.80                             | 92.0                         | 79                          | 1.01  | 101                        |
| 12                      | 0.71                             | 81.6                         | 76                          | 0.93  | 93                         |
| 28                      | 0.90                             | 103.5                        | 80                          | 1.08  | 108                        |
| <b>Refined Oil</b>      |                                  |                              |                             |   |                            |
| 0                       | 0.85                             | NA                           | 85                          | 1.00  | NA                         |
| 2.5                     | 0.82                             | 96.5                         | 88                          | 0.93  | 93                         |
| 12                      | 0.82                             | 96.5                         | 83                          | 0.99  | 99                         |
| 28.5                    | 0.77                             | 90.6                         | 78                          | 0.99  | 99                         |
| <b>Soapstock</b>        |                                  |                              |                             |   |                            |
| 0                       | 0.76                             | NA                           | 76                          | 1.00  | NA                         |
| 2.5                     | 0.72                             | 94.7                         | 75                          | 1.00  | 100                        |
| 14.5                    | 0.70                             | 92.1                         | 73                          | 0.96  | 96                         |
| 28                      | 0.86                             | 113.2                        | 98                          | 0.92  | 92                         |

<sup>a</sup> Residues found are mean of two samples except for delinted seed day-11, which was a result from analysis of one sample. <sup>b</sup> NA=not applicable.

The registrant also submitted information concerning characterization of the test material used for fortification of samples and as a reference standard for analyses including purity statements and typical chromatograms. Purity of the mepiquat chloride used in the study (Lot Nos. 39/123-1 and 39/153-1) was determined using HPLC. The compound was >99% and was expected to be stable for  $\geq 2$  years. Adequate information on the characterization of the test material has been submitted. This deficiency has been resolved.

The submitted information along with previously submitted data satisfy the requirements for storage stability data on cottonseed and cottonseed processed fractions. The data indicate that mepiquat chloride *per se* is stable in cottonseed and its processed commodities for up to 22-28.5 months of frozen storage ( $< -5^{\circ}\text{C}$ ).

#### Magnitude of the Residue in Cottonseed and Cottonseed Processed Commodities:

The Mepiquat Chloride Phase 4 Review (S. Funk, 1/15/91) required magnitude of the residue data for cotton forage and cottonseed, and for cotton processed commodities. In response, BASF submitted residue data and a description of Method A9106 for determining residues of mepiquat chloride *per se* in or on cottonseed. The Agency (J. Stokes, 10/12/93, CBTS Nos. 10671, 10689, and 10690, DP barcodes D183140, D183187, and D183197) concluded that the ion chromatography method No. A9106 is adequate for collecting data on residues of mepiquat chloride *per se* in/on cottonseed. Subsequently, the registrant submitted additional magnitude of the residue data collected from cottonseed using method A9106; the method was summarized and a flowchart of the method was presented. The Agency (S. Knizner, 1/27/94, CBRS No. 12046, DP Barcode D192305) concluded that the residue data were adequate provided that the registrant address the following concern:

The registrant stated in the summary text of the current submissions that whole cottonseed samples, rather than homogenized cottonseed, were extracted. The method flowchart calls for homogenization as the first step of extraction, and the method modifications do not indicate that this step was omitted. The registrant must clarify this statement.

In response, BASF submitted an interoffice memo dated 7/21/94 clarifying their statement. The registrant stated that the method flowchart indicates that the samples are homogenized during the extraction phase of the method, but this homogenization refers to the blending which homogenizes the whole cottonseed subsamples during extraction. A mechanical homogenization prior to extraction is not part of the method. The registrant further stated that step 2.3.1 of the method explains that any mechanical milling of the seed must be avoided because this causes separation of the lint and seed, which would make obtaining a representative sample difficult. The registrant stated, and CBRS agrees, that the extraction/homogenization procedures for Method A9106 were followed correctly for the magnitude of the residue studies. The registrant has adequately addressed the deficiency cited in the Agency review of the cottonseed magnitude of the residue studies.

The submitted information along with previously submitted data satisfy the requirements for magnitude of the residue data on cottonseed. No additional magnitude of the residue data on cottonseed are required and no data are required on cotton forage as it is no longer listed as a regulated commodity in the Updated Livestock Feeds Table (6/94). However, the Updated Livestock Feeds Table lists cotton gin byproducts as a regulated feed item. Therefore, data are required on residues of mepiquat chloride in/on cotton gin byproducts harvested at normal maturity from plants treated at the maximum seasonal application rate. The cotton must be harvested by commercial equipment (or a simulation thereof) to provide an adequate representation of plant residue from the ginning process. As discussed in the Revised Table II, the registrant will be given sufficient time to provide these data.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No.: 10229  
DP Barcode: D180700  
Subject: Response to the Mepiquat Chloride Phase IV Review: Cotton Metabolism  
From: R. Perfetti, CBRS  
To: R. Whitters, SRRD and E. Saito, HED  
Date: 3/5/93  
MRID: 42330804

CBRS Nos.: 10685 and 11386  
DP Barcode: D183217 and D188232  
Subject: Reregistration of Mepiquat Chloride: Nature of the Residue in Ruminants  
From: S. Funk, CBRS  
To: K. Davis/R. Whitters, SRRD  
Date: 9/30/93  
MRIDs: 42394301 through -04 and 41585201 through -04

CBTS Nos.: 10671, 10689, and 10690  
DP Barcode: D183140, D183187, and D183197  
Subject: Mepiquat Chloride on Cotton. Proposed Increases in the Maximum Seasonal Rate.  
From: J. Stokes, CBTS  
To: C. Giles-Parker/D. Wilson, RD and R. Whitters, SRRD  
Date: 10/12/93  
MRID: 42426800 through -03

CBRS No.: 12046  
DP Barcode: D192305  
Subject: Magnitude of the Residue in Cottonseed and Cottonseed Processed  
Commodities.  
From: S. Knizner  
To: R. Whifers, SRRD  
Date: 1/27/94  
MRIDs: 42734601 and 42734602

CBRS No.: 12702  
DP Barcode: D195902  
Subject: Mepiquat Chloride: Interim Storage Stability Study for Cottonseed Processed  
Commodities  
From: S. Knizner, CBRS  
To: R. Whifers, SRRD  
Date: 2/18/94  
MRID: 42892201

**MASTER RECORD IDENTIFICATION NUMBERS**

Citations for the MRID documents referenced in this review are presented below.

41585204 Kohl, W. (1989) The Metabolism of [Carbon 14]-Mepiquat Chloride in Lactating Goats: BASF Registration Document No.: 89/0424. Unpublished study prepared by BASF AG, Agricultural Research and Development. 95 p.

41585205 Giese, U. (1988) Dosing of Lactating Goat with [Carbon 14]-Mepiquat Chloride for Further Isolation and Identification of Metabolites: BASF Registration Dites: BASF Registration Document No.: 88/0616. Unpublished study prepared by NATEC Institute for Scientific and Technical Services. 31 p.

41585206 Cheng, T. (1988) Biokinetics and Metabolism Study of [Carbon 14]-BAS 083 W in Lactating Goats: BASF Registration Document No.:89/5022. Unpublished study prepared by Hazleton Laboratories America. 69 p.

42330804 Goetz, A. (1992) Metabolism of [carbon 14]-BAS 083 in Cotton (Gossypium hirsutum): Lab Project Number: M9016. Unpublished study prepared by BASF Corp. 90 p.

42394301 Kohl, W. (1991) The Metabolism of [carbon 14]-Mepiquat Chloride in Lactating Goats-The Identification of a New Metabolite in Liver and Milk: Lab Project Liver and Milk: Lab Project Number: 90/10385. Unpublished study prepared by BASF AG. 77 p.

42394303 Schepers, U. (1991) Mepiquat Chloride-Accountability of Method No. 286 in Goat Tissues and Milk: Lab Project Number:91/11194. Unpublished study prepared by BASF AG. 74 p.

42734601 Nichols, K. (1993) The Magnitude of Mepiquat Chloride Residues in Cotton Seed Based on Ultra-low Volume Aerial Applications: Lab Project Number: R-9204 Lab Project Number: R-92045: 93/5048: 9200537. Unpublished study prepared by Harris Labs and American Agricultural Services, Inc. 177 p.

42734602 Nichols, K. (1993) The Magnitude of Mepiquat Chloride Residues in Cotton Seed Based on Low-rate Multiple Applications: Lab Project Number: A9307: 920 Project Number: A9307: 9200535: R-92044. Unpublished study prepared by Harris Labs and American Agricultural Services, Inc. 200 p.

42892201 Burkey, J. (1993) Freezer Storage Stability of BAS 083 W in Cottonseed and its Processed Commodities: (Mepiquat Chloride): Interim Report: Lab Project Chloride): Interim Report: Lab Project Number: 93/5047: 91140: A9305. Unpublished study prepared by BASF Corp., Agricultural Research Center. 54 p.

43024701 Goetz, A. (1993) Metabolism of (carbon 14)-BAS 083 W in Cotton (*Gossypium hirsutum*): Amended Report: Lab Project Number: M9016: M9203: M9203A. Unpublished study prepared by BASF Corp. 87 p.

43290401 Grosshans, F. (1994) The Metabolism of Mepiquat Chloride in Lactating Goats-Reinvestigation of Liver and Milk: Lab Project Number: 94/10029: P93-M002. Unpublished study prepared by BASF Aktiengesellschaft. 41 p.

43290402 Giese, U. (1989) Dosing of Lactating Goats with (carbon 14)-Mepiquat Chloride for the Determination of Accountability: Lab Project Number: 89/10508: NA 89 9230. Unpublished study prepared by NATEC. 23 p.

43290403 Panek, E. (1994) Dosing of Lactating Goat with (carbon 14)-Mepiquat Chloride for Determination of Accountability: Supplementary Report to Reg. Doc. #BASF 89/10508: Lab Project Number: 94/5078: M9420: 89/10508. Unpublished study prepared by BASF Corp. 8 p.

43290404 Panek, E. (1994) Dosing of Lactating Goat with (carbon 14)-Mepiquat Chloride for Further Isolation and Identification of Metabolites: Supplementary Report Metabolites: Supplementary Report to MRID 41585202: Lab Project Number: 94/5079: M9419:94/10045. Unpublished study prepared by BASF Corp. 11p.

43290405: Giese, U. (1994) Dosing of Lactating Goat with (carbon 14)-Mepiquat Chloride for Further Isolation and Identification of Metabolites: Addendum to MRID 41585202: Lab Project Number: 94/10045: 88/0616: NA 88 9726. Unpublished study prepared by NATEC Institute. 7 p.

43379501 Burkey, J. and White, M. (1994) Freezer Storage Stability of BAS 083 W in Cottonseed and its Processed Commodities: Lab Project Number: 94/5120: 91140: A9425. Unpublished study prepared by BASF Corp., Agricultural Research Center. 74 p.

43440301 Panek, E.; Kohl, W. (1994) Supplementary Information on Tissue Storage Conditions and Times For (Carbon 14)-Mepiquat Chloride Goat Metabolism Studies (MRIDs 42394301 and 42390405) and Accountability Studies (MRID 42394303). Lab Project Number: M9428: 94/5153. Unpublished study prepared by BASF Corp.; BASF Aktiengesellschaft. 18 p.