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Tierney, D.P., et al, 2001. Occurrence of Metolachlor (1994-1995) Compared to S-Metolachlor (1999-2000) in Drinking Water From Community Water Systems in 27 Major Use States. Syngenta Crop Protection Report No. 2455-01. Unpublished study performed and submitted by Syngenta Crop Protection, Inc., Greensboro, NC and En fate, LLC, Plymouth, MN..

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ABSTRACT

This study is a non-guideline study and therefore does not satisfy any of the requirements of Subdivision N. The study author has completed a comparative analysis of surface and ground water monitoring data collected in 27 high metolachlor use states collected and analyzed by individual Community Water Systems (CWS) to assess the impact of the replacement of metolachlor with s-metolachlor. The study authors compared the frequency of occurrence and concentration profile of metolachlor from the years 1994-1995 with similar data from 1999-2000. Several important points to note about this study follow:

1. Data aggregation presents a national picture of exposure to metolachlor in drinking water. However, metolachlor exposure in drinking water is expected to be more dependent on regional issues (i.e. climate, pesticide usage, agricultural patterns).

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2. The study does not address the potential impact of other factors such as variations in metolachlor use, climatic, hydrologic, and agricultural practices on the data. It is impossible to correlate the reported decrease in frequency of detections and concentration profile with the replacement of racemic metolachlor with s-metolachlor without evaluating other factors which may have influence on the data. Without detailed information on the usage history of metolachlor and the potential impact of other factors EFED cannot confirm the conclusions of the study.

3. The analytical data from both periods does not distinguish between racemic metolachlor and s-metolachlor. No enantioselective monitoring data are available to document the effect on loadings of the transition from racemic metolachlor to s-metolachlor.

4. No degradates of metolachlor were analyzed in the CWS data. Degradates have been found at higher concentrations and frequencies than parent metolachlor in ground water.

5. The number of states and CWS reporting data varies between 1993 and 2000. Comparative analysis should be performed on the same states and CWS data from both periods. An additional confounding factor for this analysis is that different states will collect quarterly samples at different times within the quarter. Consistency in sample population is critical to comparing data.

The study author reports that the frequency of metolachlor/s-metolachlor detections in surface water decreased from 9.4% in 1994-1995 to 3.5% in 1999-2000. A comparison of percentiles for detections from surface water showed that the 95th, 75th, median, and 25th percentiles of surface water concentrations were reduced by approximately 50% in the 1999-2000 data relative to the 1994-1995 data. Finally, the data show that only 9.2% of samples with detections were between 1.0 and 10 ppb in the 1999-2000 data compared with 26.2% of the detections in 1994-1995 data. Overall, the data suggest that the overall distribution of metolachlor detections is lower in the 1999-2000 data relative to the 1994-1995 data.

The study author reports that for ground water there is little difference in the frequency of detection of metolachlor between 1994-1995 and 1999-2000. Visually, the concentration profile for metolachlor in ground water shows an overall lower concentration. Finally, the data show that only 14.1% of samples with detections were between 1.0 and 10 ppb in the 1999-2000 data compared with 22.0% of the detections in 1994-1995 data. The study authors deduce from this data that the occurrence of metolachlor has been reduced in the 1999-2000 data relative to the 1994-1995 data.

MATERIALS AND METHODS

State by state agricultural use data was used by the study author to rank the top 32 states (representing 97% of metolachlor use) in 1996 (providing use information for the 1994-1995 data) and 1999 (providing use information for the 1999-2000 data). The analysis indicated that the top metolachlor use states had not changed over the time interval. Using this information, the study authors requested data from the 32 top metolachlor use states collected by CWS under the

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Safe Drinking Water Act (SDWA). Data was received from 27 of the 32 states and compiled by the authors for analysis.

CWS surface water data was available from 810 locations in 1994, 766 locations in 1995, 1067 locations in 1999, and 1048 locations in 2000. CWS ground water data was available from 4360 locations in 1994, 4680 locations in 1995, 3893 locations in 1999, and 4057 locations in 2000. The study authors analyzed the data from surface water and ground water CWS sources separately. Sources that used blended surface water and ground water were not used in the analysis. Only quantifiable detections were used in the preparation of concentration profiles.

RESULTS/DISCUSSION

The study author reports that the frequency of metolachlor/s-metolachlor detections in surface water decreased from 9.4% in 1994-1995 to 3.5% in 1999-2000. A comparison of percentiles for detections from surface water showed that the 95th, 75th, median, and 25th percentiles of surface water concentrations were reduced by approximately 50% in the 1999-2000 data relative to the 1994-1995 data. Finally, the data show that only 9.2% of samples with detections were between 1.0 and 10 ppb in the 1999-2000 data compared with 26.2% of the detections in 1994-1995 data. Overall, the data suggest that the overall distribution of metolachlor detections is lower in the 1999-2000 data relative to the 1994-1995 data.

It is also worth noting that while the surface water data suggests that the concentrations from 1999-2000 are lower overall, the single highest concentration reported in this study (28 ppb) was detected in 1999.

The study author reports that for ground water there is little difference in the frequency of detection of metolachlor between 1994-1995 and 1999-2000. Visually, the concentration profile for metolachlor in ground water shows an overall lower concentration. Finally, the data show that only 14.1% of samples with detections were between 1.0 and 10 ppb in the 1999-2000 data compared with 22.0% of the detections in 1994-1995 data. The study authors deduce from this data that the occurrence of metolachlor has been reduced in the 1999-2000 data relative to the 1994-1995 data.

DEFICIENCIES/DEVIATIONS

1. The study does not address the potential impact of other factors such as variations in metolachlor use, climatic, hydrologic, and agricultural practices on the data. It is impossible to correlate the reported decrease in frequency of detections and concentration profile with the replacement of racemic metolachlor with s-metolachlor without evaluating other factors which may have influence on the data.

2. The number of states and CWS reporting data varies between 1993 and 2000. As a result, there was an increase in the total number of surface water samples and a decrease in the total number of ground water samples between the two periods compared. Comparative analysis should be performed on the same states and CWS data from both periods. An additional confounding factor for this analysis is that different states will collect quarterly

samples at different times within the quarter. Consistency in sample population is critical to comparing data.

3. EFED notes that the authors have focused the analysis on the top 27 use states without explaining how this number of states is preferable to say top ten or top five use states. In a review of MRID 45527501, EFED noted that the percentage of population exposed is highly dependent on the population being evaluated (for the top state of Iowa, nearly 33% of the population (797,773 people) are exposed to concentrations of metolachlor above the LOQ). Without the usage information for metolachlor (which was summarized in the study but not provided), it is impossible to determine the distribution of metolachlor use within the 27 states analyzed by the study authors.

4. It is important to note that the analysis is based on quarterly samples and does not represent a targeted sampling program. Typically, a targeted sampling program would be focused on more samples collected within a seasonal or agricultural window in order to capture as much of the peak runoff associated with pesticide usage. CWS data is not targeted in this manner and is likely to miss the peak concentrations and to under predict the long term (chronic) exposure.

5. It is also important to note that the data does not include degradate analysis. This is particularly important for the ground water portion of the study. Data from other monitoring studies (NAWQA) and the two PGW studies suggest that degradates occur in ground water at a much higher concentration and frequency than parent Metolachlor.

6. Finally, the analytical data for metolachlor does not distinguish between racemic metolachlor and s-metolachlor. Without data which distinguishes between the enantiomers, it is impossible to say with any confidence that the concentrations in surface water are reflective of s-metolachlor use.

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