



Department of Pesticide Regulation



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MEMORANDUM

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SUBJECT: CORRECTION OF CUMULATIVE VOLATILIZATION PERCENTAGES AS
FOUND IN [0199-0138]

Summary

A 1,3-dichloropropene (1,3-D) bedded tarped fumigant study conducted in Duette, Florida reported 10.92% and 10.65% cumulative volatilization for a metalized tarp and VIF tarp (Field 1 and Field 2, respectively) (Ajwa et al. 2009). The calculation used treated application rate (g/m² of treated area). The calculation should have used the application rate based on gross acreage (treated plus nontreated areas in the field). Recalculating these cumulative volatilizations results in 36.7% and 32.8% volatilization, respectively.

Discussion

This study used two fields which were 1.2 and 1.1 acres in size (Field 1 and Field 2, respectively). These fields consisted of beds and only the tops of the beds were treated with 1,3-D. The treated area of each field was 0.357 acres. In each field the treated area was less than half of the field area.

The cumulative emissions were calculated in "Air Sampling Log Sheets\[Air Sampling Log Sheets.xls]1,3-D Emissions and Loss Rates" and on that calculation sheet the "amount applied" was listed as 13.88 and 14.18 g/m², respectively. This amount applied was used as the denominator in the calculated cumulative emissions (g/m²) in order to calculate the percentage of mass volatilized. In this same worksheet, the cumulative emissions were reported as 1.516 and 1.511 g/m² for Field 1 and 2, respectively.

On page 89 and 90 of Ajwa et al. 2009 the reported application masses of Telone II were 45.2 and 46.2 lbs for Fields 1 and 2, respectively.



A simple calculation confirms that the “amount applied” values are calculated based on treated acreage.

To convert 13.88 g/m² to a mass applied (assuming it represents treated acres), 13.88(g/m²)*(1/454) (lb/g)*0.357 (acres)*4096(m²/acre) results in 44.7 lbs of 1,3-D applied to Field 1, which is consistent with the reported 45.2 lbs of Telone II. Similarly for Field 2 the calculated mass applied assuming that 14.18 g/m² represented treated application rate is 45.7 lbs of 1,3-D applied, consistent with the 46.2 lbs of Telone II reported as being applied. Telone II is 95-98% 1,3-D.

Therefore the “amount applied” figures used in the cumulative volatilization calculation were based on treated acreage. The method used to calculate the flux was the integrated horizontal flux technique. Part of that technique uses a fetch distance which goes from the mast, at the center of the field, to the edge of the field in the upwind direction. This fetch distance crosses both applied bedtops and unapplied furrow areas. Photographs provided in the study are consistent with wide distances between adjacent bed tops. Because the measurement basis for the flux calculation includes both applied and unapplied areas within the field, the appropriate application rate to use is the rate based on the mass applied per gross acre. Gross acre includes both the treated bed tops and the untreated areas between the bedtops.

The application rates based on gross acreage are:

Field 1: 13.88 (g/m²)*0.357 (treated acres)/1.2 (gross acres) = 4.13 g/m² gross acres

Field 2: 14.18 (g/m²)*0.357 (treated acres)/1.1 (gross acres) = 4.6 g/m² gross acres

Using these application rates in the denominator to calculate the cumulative volatilization fractions results in:

Field 1: 1.516 (g/m² volatilized)/4.13 (g/m²) = 36.7%

Field 2: 1.511 (g/m² volatilized)/4.6 (g/m²) = 32.8%

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Reference

Ajwa, H., D. Sullivan and D. Chellemi. 2009. Monitoring 1,3-dichloropropene, chloropicrin and methyl isothiocyanate emissions from shank applications at three sites near Duette, Florida. Sullivan Environmental Consulting, Inc. 1900 Elkin Street, Suite 200, Alexandria, Virginia 22308. Labor.