

Volatilization: PPDC Meeting



U.S. EPA
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Volatilization

- What is it?
 - Vapors of a pesticide leaving a treated area
 - Example – soil fumigants, structural and commodity fumigation, emissions from other pesticides
- What it isn't
 - Spray drift, overspray, wind blown soil
- Why should we be concerned?
 - Want to ensure that we are accounting for exposures through the inhalation route in or near a field that has been treated with a pesticide

Framework for Assessing

- What do we know about the potential for exposure/risk from pesticides that volatilize?
- What are the criteria for determining when to conduct a quantitative assessment for potential exposure/risk for a pesticide that volatilizes?
- What are the methods that are used in assessing exposure/risk from pesticides that volatilize?

Past History

- Outdoors
 - Soil, structural and commodity fumigants
 - Examples include methyl bromide, chloropicrin, dazomet, metam sodium and iodomethane
- Indoors
 - Crack and crevice and pest strips, pesticides used in greenhouses
 - Examples include propoxur and DDVP
- Exposures and risks are being assessed in REDs for existing chemicals – mitigation measures including buffer zones have been proposed
 - For new fumigants and highly volatile pesticides used indoors, measures are/will be imposed at the time of registration

Past History (continued)

- For other instances where data are available, exposure/risk has been considered informally
 - Pesticides used outdoors that are not considered highly volatile but still could volatilize
 - Typically, these exposures have been only negligible and do not impact overall risks

Available Data on Volatilization

- PANNA Drift Catcher Data
 - Air monitoring data on 4 pesticides (chlorpyrifos, diazinon, endosulfan, trifluralin)
 - Air samples collected over a 24-hour period
 - Samples taken at various places: field edges, homes, schools
 - Not always known when specific applications occurred during the studies – i.e., ambient monitoring

Available Data on Volatilization

- California Air Resource Board (CARB) Data
 - Two types
 - Application site air monitoring
 - Ambient air monitoring conducted during high use seasons
 - Air samples collected over a 24-hour period
 - Samples taken at various places: field edges, homes, schools
 - Over 40 chemicals sampled over the past 20 years
 - More ambient than application focused monitoring

Triggers for Evaluation

■ Vapor Pressure

- Historically, HED has assessed exposures via volatilization for pesticides with a vapor pressure greater than 10^{-6} mm Hg
- Fumigants and certain indoor pesticide uses are the only scenarios that have been assessed at this time
- There is a need to look at factors other than vapor pressure as triggers for when to consider exposures from volatilization

Triggers for Evaluation (continued)

- Other factors to Consider
 - Temperature
 - Solvents/Formulation type
 - Size of area treated
 - Application method

Evaluating Risk

- Need both exposure and hazard information
- Exposure
 - Fumigants – exposures are modeled based on emissions measured at various stations in and around treated fields or other sites
 - Possible to do the same for other pesticides that volatilize if exposures are thought to be significant

Evaluating Risk

■ Hazard

- Preferable to have an inhalation toxicity study of the duration matching exposure to assess risks
- If not available, oral studies are relied upon
- If inhalation study is available, EPA uses the RfC Methodology
 - Used to assess non-cancer risks from inhalation
 - Peer reviewed and Agency policy since 1992
 - Treats vapors differently than aerosols
 - Used to extrapolate from animals to humans
 - Uses known physiological and anatomical differences between animals and humans

<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=71993>

What do the Data Indicate?

The PANNA and CARB data indicate:

- Detectable exposures occur
- Exposures are low and significantly less than the estimated exposures from food, water and other residential exposures
- Using the RfC methodology, risks are generally below the level of concern (negligible)
 - OPP has worked collectively with Canada and the states of Florida and California in evaluating these data

Going Forward

- Reconsider the criteria for triggering an assessment of exposure from volatilized pesticides
- Data from CARB and PANNA are available for a number of semi-volatile chemicals that can help us better understand these situations
- Determine the best way to evaluate these exposures considering magnitude of exposures, duration and timing of exposures and what hazard data are available
- Encourage other stakeholders to produce data looking at pesticides that volatilize