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Human Exposure Issue:

- Monitoring toxic compounds on building surfaces after a chemical attack is a critical step to ensure safe reoccupation.
- Many toxicant(s), including readily available pesticides, may be used as chemical weapons by potential terrorists.
- Protocols for surface sampling will be developed that are similar to methods produced within ORD.



Scientific Approach

Test Compounds & Surfaces:

- Industrial chemicals, including organophosphate and carbamate insecticides, will be tested on walls, floors, ceilings, office furniture, and duct work to ensure the protocol is applicable to different types of building surfaces.



Surface Contamination & Sampling:

- A customized spray chamber will be used to apply the chemicals to each surface.
- Each surface will be dried.
- The surfaces will be wiped with moistened gauze pads across a defined sampling area.



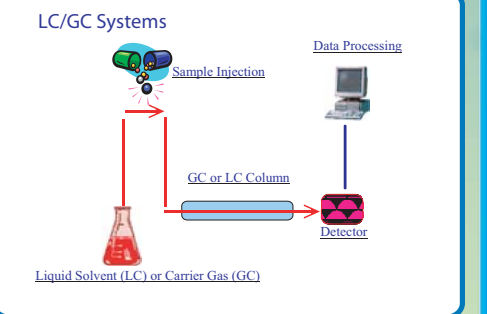
Sample Preparation for Analysis:

- Gauze pads from surface wipes will be inserted into an Accelerated Solvent Extractor cell for extraction of toxicant(s).
- The extract volume is reduced under inert nitrogen gas to increase the overall method sensitivity.



Sample Analysis:

- Flexible analytical instrumentation will be used to address the diversity of compounds that may be encountered in a chemical attack.
- This is achieved using liquid (LC) and gas chromatography (GC) systems with mass spectrometric (MS/MS) and pulsed flame photometric detectors (PFPD).



Previous Surface Monitoring:

Results from previous testing demonstrated that surface wipes with gauze pads were effective at removing pesticides from hard indoor surfaces (Figures 1-3) including surface wipes on ceramic tile, vinyl tile, and hardwood flooring contaminated with an aqueous pesticide spray solution containing chemicals commonly used and/or found in homes. The efficiency of surface wipes was determined by comparing them to surface loading levels.

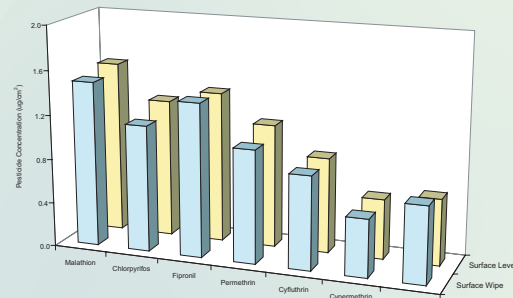


Figure 1. Ceramic tile

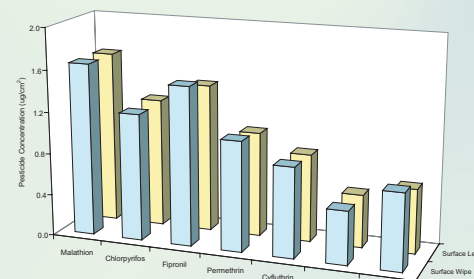


Figure 2. Vinyl tile

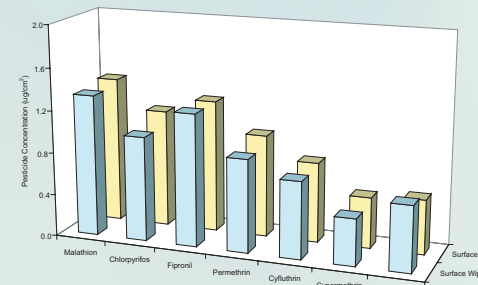


Figure 3. Hardwood flooring

Relevance:

This project is being conducted under the Homeland Security Safe Building Initiative for the detection of contaminants on building surfaces. The study provides a critical link between building decontamination processes and building reoccupation by providing a rapid and sensitive method for monitoring toxicant(s) at low levels on surfaces in order to protect public safety.

Products:

Protocols will be developed for conducting surface sampling of toxicant(s) on contaminated building surfaces including:

- Procedures for performing surface wipes with gauze pads.
- Procedures for sample handling and preparation for analysis.
- Analytical procedures for detection and quantitation of compounds captured in the surface wipes by LC/MS/MS & GC/MS/MS-PFPD.

These protocols and analytical procedures will be available for use by EPA and its partners in an emergency response to chemical terrorism.

