Pest Patrol: Killing Pests in Food Aid

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What is the problem?

Commodity losses due to insect infestation
Loss of weight, nutritional value and synergistic interaction with mycotoxins

Food for Peace, Title II:
1-2 Million MT, ~$1.7 B, ~50 Million people (FY10 & 11)
Fumigants Basics

Metal Phosphides (e.g., Tri-tox, Phostoxin, Quik-Fume)

Phosphine (gas):
• Restricted Use Pesticide – High acute toxicity, inhalation
• Colorless, fish/garlic odor
• Highly explosive, corrosive
• Chemical warfare
Safety & Efficacy Practices

What Technology is Needed?

1. Appropriate PPE use and maintenance
2. Fumigation gas monitoring, efficacy and hazard
3. Gas impermeable tarps, sand snakes
Rehab symptoms match phosphine poisoning: Hospital

MUMBAI: Even as police officials and the Chougles deny that pest control was responsible for the deaths of Rameez and Rehab last week, the hospital that treated Rehab has verified that the victim and her family had offered this reason when they came for treatment.

Contractor Arrested for Culpable Homicide!

What Happened?
- Two siblings, Rameez and Rehab Chougles vomited blood, died of inflammation of lung
- House was treated with phosphine by an unlicensed fumigator
- Entered a fumigated space and turned on the air conditioning without opening windows
- Only < 1 gram used

What went wrong?
- No Markings indicating Fumigation
- Unlicensed Fumigator
- Obtained at a Local Chemical Store
Different Ways Fumigants Enter the Body

Primary ways each group may contact fumigants:

- Fumigation workers - inhalation
- Warehouse worker - inhalation
- Beneficiaries - ingesting fumigated food
Assessing Safety – Human Health Risk Assessment (HHRA)

Repeat application by fumigation providers, multiple acute exposure, chronic impacts?
What Safety Equipment Should our Fumigator be Wearing?

- Respiratory Protection
- Coveralls
- Clean Dry Gloves

15-minute exposure limit of 1.0 ppm
What Safety Equipment do Pesticide Applicators Often (not) Wear?

“Painters Mask” will not stop gas

- No inhalation mask
- Bare feet and hands
Like drug-resistant TB, target insects can become resistant to PH$_3$… No Viable Alternatives

**Problem:**
- Larvae and adult insects effectively
- Not, egg and pupal stages

**Solution:**
- Higher concentrations
- Longer exposure

**Risks:**
- Greater exposure
Efficacy: Pesticide Resistance

Unknown Gas Concentration: Leaky (holes) or Gas Permeable Tarps (Need Impermeable)

Think Gore Tex®: Liquid Impermeable, but Gas Permeable = No Good
Post Application Gas Monitoring Devices

Direct Read-out Meter
- Accurate from 0-200 ppm
- Alarm that goes off at 0.3 ppm

Color-Metric Tube Detectors
- Color change over a range from 0.15-5 ppm

Draeger Tube Detectors
- Range from 0.01-10,000 ppm
Safety & Efficacy Needed

New Technology Practices:

1. Appropriate PPE use and maintenance
2. Fumigation gas monitoring, efficacy and hazard
3. Gas impermeable tarps, sand snakes
What is impact of Fumigation Assessment?

*Early Feedback on New Practice of Technology:*

No Gas Monitoring Equipment in Fumigation Service Providers (FSPs) in Liberia (as of July 2013)
Impacts of Fumigation Assessment?

• Protect food aid resources and doing no harm
• Ability for USAID to speak authoritatively with scientific-evidence basis to justify
• New technologies into program warehouse operators and fumigation service providers
• Agency resource for food security programs, BFS
• Improve country warehousing, global market standards
USAID Programmatic Environmental Assessment for Commodity Fumigation

Under External Public Review with the Food Aid Consultative Group (FACG)

Stakeholder review through August 30, 2013

Public review drafts and comment instructions at:

• http://www.usaidgems.org/fumigationpea.htm