

Health Information on Pesticides in the Air Monitoring Program

November 2008

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Methyl isothiocyanate (MITC)

What is MITC?

When soil is treated with the pesticides metam sodium or metam potassium, a gas called methyl isothiocyanate (or MITC) is formed in the soil. The gas flows through the soil killing weeds, bugs, and plant disease. MITC gas can escape from the soil and enter the air. When this happens, many people describe a rotten egg or garlic odor. MITC is a strong irritant and is toxic if inhaled.

What happens to MITC in the air?

In sunlight, airborne MITC rapidly breaks down into other chemicals. The products that come from this break down are also toxic if inhaled. Additional air testing for the most toxic of these products is planned for spring 2009 in Washington.

How can I be exposed to MITC?

In Washington, metam sodium and metam potassium pesticides are primarily used on potato, onion, and carrot fields. Metam sodium is often applied through the central sprinkler system. This is called chemigation.

If you live or work near a treated field, or drive by a field during treatment, you may breathe-in some MITC. People who handle these pesticides or work in fields after treatment can have workplace exposure to airborne MITC.

Under certain conditions (e.g., calm wind, cool nights, and ground fog), escaping MITC gas can build up in the air near a treated field. It can also drift into nearby neighborhoods. If the air concentration of MITC is high enough, people nearby can experience eye, nose, and throat irritation and other symptoms.

MITC is not a pesticide you would find on food. It is applied before crops are planted and dissipates



Metam sodium is sprinkled on the soil through the irrigation system (chemigation). MITC is formed in the soil.

long before food is harvested from treated fields. So it is not a food contamination concern.

Can I get sick from breathing MITC?

MITC is a strong irritant. In test animals it causes skin, eye, nose, and lung irritation and injury. MITC can damage internal organs, affect body weight, and change animal behavior. High levels of MITC in air are fatal to test animals. In one study, half the rodents died from inhaling MITC at 180,000 parts per billion (ppb) for four hours. Metam sodium is considered a probable human carcinogen (substance that may cause cancer) by the Environmental Protection Agency (EPA). EPA has not determined whether MITC causes cancer in humans. EPA is requiring further tests on MITC.

The most common symptoms reported in people exposed to MITC from treated fields are burning in the nose, throat and eyes, headache, and nausea.

How much MITC is a problem in air?

EPA and the state of California have each determined how much airborne MITC could potentially be a health problem for people. For brief

exposures of 1-8 hours, air levels below 22 ppb are not a concern.

Longer exposures to MITC in air (1 day to 6 months), air levels below 5 ppb are not a concern for EPA. CA uses a slightly lower level of 1 ppb for its level of concern. Levels of concern are set many times lower than the levels known to cause injury. This means that concentrations above a level of concern will not necessarily injure people's health.

If air testing shows concentrations above the level of concern at certain times and places, farmers and the government can work together to prevent the problem.

How can I minimize my exposure to MITC?

If a field near your home or workplace is being treated with metam sodium or metam potassium, be alert for early signs of exposure. You may notice a rotten egg or garlic smell; you may experience eye, nose or throat irritation. If you think you are being exposed, tell the pesticide applicator onsite right away. Then leave the area, especially if you or family members have sensitive health. Report incidents of fumigant drift to Washington State

Drift incidents involving metam sodium fumigant

In 1999, residents of the town of Earlimart, California inhaled MITC and other breakdown products from a nearby treated field. A total of 173 people were evaluated for symptoms. Reported symptoms included burning eyes, nose and throat; headache; nausea; dizziness; abdominal pain; shortness of breath; vomiting; weakness; and skin rash. Five people suffered worsening of their asthma. Investigators estimated that MITC in air averaged 500–1,000 ppb for the neighborhood closest to the field. Higher concentrations probably occurred over shorter time periods in the affected neighborhoods.

In 1991, a rail tank car spilled 19,500 gallons of metam sodium into the Sacramento River. People in the nearby town of Dunsmuir were exposed to airborne MITC coming from the river. At least 705 people sought health care. The symptoms they reported include eye and respiratory irritation, nausea, headache, dizziness, vomiting, and shortness of breath. More persistent symptoms, including a chemically-induced asthma known as reactive airways dysfunction syndrome (RADS), were also documented. Attempts to estimate peak MITC air concentrations during the first three days were based on air modeling. Estimates ranged from 1,300–4,500 ppb within 100 meters of the river.

Department of Agriculture, or the Washington State Department of Health.

What is being done to prevent MITC from escaping treated fields?

Farmers try to keep the MITC gas in the soil where it will work on crop diseases and pests. Some practices farmers use to keep MITC from escaping include: fumigating when the soil temperature is lower, using tractor-pulled equipment to inject the fumigants deeper into the soil, sealing the soil surface (e.g., with tarps, soil compaction equipment, or water seal), and avoiding applications during certain weather conditions (i.e., calm wind conditions, ground fog).

EPA is considering stricter rules that require buffer zones around treated fields. A buffer zone is an area surrounding all sides of the treated section that cannot have any occupied buildings during pesticide application. A buffer zone protects people in nearby homes and businesses from being over-exposed to pesticide escaping from the treated field. The EPA rules would also require that neighbors just outside of the buffer zone be notified, and that signs be posted on the treated fields.

Where can I find more information on MITC?

- EPA fact sheet on new regulations, July 2008 <http://www.epa.gov/oppsrrd1/REDs/factsheets/metamsodium-fs.pdf>
- EPA Registration Eligibility Doc., July 2008 <http://www.epa.gov/opp00001/reregistration/REDS/metamsodium-red.pdf>
- CA Risk Characterization Doc., July 2003 http://www.cdpr.ca.gov/docs/risk/rcd/mitc_sb950.pdf%20

To report pesticide drift:

- WA State Department of Agriculture, Pesticide compliance: 1-877-301-4555 (toll free)
- WA State Department of Health, Pesticide Illness Monitoring: 1-877-485-7316 (toll free)

For more information about this fact sheet:

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