

Hay Fumigation

Several pesticide products such as Phostoxin, Gastoxin, Fumitoxin, Magtoxin, or other names in the USA, may be used to fumigate hay against the cereal leaf beetle. All of these pesticides produce a toxic gas (fumigant called hydrogen phosphide or phosphine gas) in the presence of moisture. The active ingredient, or chemical in these fumigants that produces the toxic gas, is either aluminum phosphide or magnesium phosphide.

The aluminum phosphide or magnesium phosphide reacts with moisture in the air to produce the fumigating gas—hydrogen phosphide, also known as phosphine gas. The other compounds that result from the use of these fumigants are aluminum hydroxide or magnesium hydroxide, which are not hazardous materials.

Uses

Aluminum and magnesium phosphide are primarily used to kill pests in raw agricultural commodities (i.e. wheat, barley, rice), animal feeds (i.e. hay), processed foods (i.e. cereal) and non-food items (i.e. fur, dried flowers, paper products). These fumigants can only be used by certified pesticide applicators who are trained in their proper use.

Application to hay

Hay that is required to be treated is usually fumigated outside in fields, under tarps. The fumigant is placed under the tarp, on the ground at the edge of the stacked bales; it must not come into direct contact with the hay. The tarp is then sealed. The product label specifies how long (2 to 8 days) the hay must remain under the sealed tarp for the fumigant to be effective. The length of time depends on the temperature. It cannot be used when temperatures are less than 5°C.

Aeration

After the necessary exposure period the tarp is removed. The law requires the hay to be aerated for at least 48 hours before it is shipped. Aeration is not considered complete until the phosphine level is below 0.3 ppm (parts per million). The level of the fumigant (hydrogen phosphide or phosphine gas) can be measured with special equipment. Often the hay will be transported on open trucks where additional aeration will occur.

Residues

When used according to label directions, there should be no phosphine or hydrogen phosphide residues on the hay. The phosphine or hydrogen phosphide gas dissipates in the air and must be less than 0.3 ppm, in the air, before the hay is shipped. If either the tablet or pellet form of aluminum or magnesium phosphide is applied directly to hay, it may leave a white-greyish powder residue. These powder residues would be either the aluminum or magnesium compounds resulting from the fumigation. They are not harmful.

Hay Fumigation FACTSHEET



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Concerns

Powder residues are not harmful but can be removed by discarding the portion of hay with the visible residues. However, if you are concerned about visible residues, ask your supplier to find out about the fumigation process used. Hay importers can remind their suppliers to ensure the fumigant is not placed directly on the hay and that the appropriate aeration time is observed. You can also request that the fumigator uses the packaged product (little packets) instead of the pellet or tablet form of the fumigant. No residual powder is left from the packaged product.

If you are concerned about phosphine gas residues, the air can be tested for this gas. Trained individuals (fumigators) can test for low levels of residual phosphine gas or you can do the tests yourself if you obtain training and a Draeger Pump (part # 6400000) and low level Draeger Phosphine Tubes (part # CH31101) from a safety or industrial supply company such as Acklands or Fleck Brothers. Training is available through Draeger (John Andersen) at 604-787-0889. The pump costs approximately \$430 and a box of ten tubes costs approximately \$75.

Toxicity and Symptoms of Poisoning

Phosphine gas or hydrogen phosphide, the fumigating agent, is highly toxic to humans and other animals. It has been reported to have an odor like decaying fish or garlic. Symptoms of exposure include sore throat, irritation of the lungs and airway, difficulty breathing, headache, dizziness, nausea and diarrhea. Intermittent,

low concentrations of phosphine gas have been associated with mild headaches. Due to the nature of these pesticides, no significant exposure is expected through skin contact or ingestion.

Although it is unlikely a person handling aerated hay would experience any of these symptoms, people suspecting they may be poisoned should contact the Poison Control Centre at 1-800-567-8911.

More information on aluminum or magnesium phosphide is available on the NIOSH web site at www.cdc.gov/NIOSH, the Pest Management Regulatory Agency (Health Canada) pesticide label web site <http://www.eddenet.ca/4.0/4.0.asp> or at one of the manufacturers web sites (i.e. Degesch America Inc. <http://www.degeschamerica.com/products.html> or CASA Bernardo Ltda <http://www.casabernardo.com.br/index.html>).

Summary

When the fumigant is properly applied and the hay is properly aerated, the treated hay should be safe to shippers, purchasers, and animals feeding on it.