

STEWARDING PALADIN[®] INTO THE FUMIGANT MARKET

Paladin[®] is a novel, pre-plant soil fumigant for the treatment of weeds, soil-borne plant pathogens and nematodes in soils to be planted with vegetable and fruit crops where plastic-culture is used for fumigation. Paladin[®] fumigant received federal registration in late 2010 and is currently registered in 21 states, with pending registrations in 6 additional states. The active ingredient of Paladin[®] (dimethyl disulfide or DMDS) has a very strong “garlic-like” odor. Early experiments with DMDS as a soil fumigant were conducted using high volumes under standard plastic mulches. These mulches provided limited barriers to the chemical, and odor soon became a concern under certain conditions. In fact, DMDS can be detected as a garlic-like odor at levels as low as 8 to 10 parts per billion. Further development and the introduction of Virtually Impermeable Films (VIF) has allowed reduced application volumes and reduced odor while maintaining efficacy and lowering the total cost to the grower. Currently, our label specifies the use of only VIF tarps for application, and there are no labeled uses for untarped applications.

Multiple steps have been taken to minimize potential odor impact from a Paladin[®] fumigation. First of all, face-to-face trainings are being conducted with all employees of facilities handling Paladin[®] and the sales personnel from fumigant distributors. This training outlines the safe handling and transportation of Paladin[®] and emphasizes that the key to a successful fumigation is good training, planning, and following the recommendations found in the label. This training also covers the dedicated resources to help resolve any questions or concerns that applicators might have.

Paladin[®] Applicator Training details many specific practices that must be followed during Paladin[®] applications, as described on the label. Proper equipment setup and use, field placement, soil conditions and weather requirements are discussed in detail during the training. Up to this point, all applicator training has been done in-person to ensure that our initial grower applicators understand many of the new mandatory good agricultural practices on newer fumigant labels. A series of quizzes are given to the participants during the training to verify the effectiveness of the training. All trained applicators receive a binder containing Paladin[®] labels, MSDS and all outreach materials developed for Paladin[®]. An online training site is also operational and allows applicators to become certified by viewing the online presentation (same as the in-person training) and passing a test. All outreach materials given to the applicators during the face-to-face training are available through the website as well as the Paladin[®] website.

Supporting applicators and emergency personnel during a crisis is also a major goal for Arkema, Inc. A Paladin[®] hotline has been set up and is manned 24 hours a day 7 days a week. This line puts callers in direct contact with personnel knowledgeable about Paladin[®] and can address everything from an odor question or complaint to first responder questions.

Arkema Inc. has developed community outreach materials that can be distributed to neighbors close to a fumigated field that describe what Paladin® is, what fumigants are and how they work, what buffer zones are as they apply to Paladin®, early signs and symptoms of exposure to Paladin®, the appropriate steps to be taken to mitigate exposure and how to report incidents, including the Paladin® Odor Hotline and the Paladin® website.

Much of this same information is also available in outreach material designed for First Responders. This material contains more detailed information about first aid and exposure mitigation. DMDS is a sulfur based compound that has a similar odor characteristic to the gas odorants that are incorporated into Propane or Natural Gas. It is quite possible that some people will confuse the odor of Paladin® with that of a gas leak, or vice versa. If you think you smell Paladin® or a gas leak, you should contact your local first responder so that a proper investigation is completed. The First Responder Information describes this and provides details on how to differentiate between a gas leak and DMDS odor. This outreach material along with the Paladin® MSDS is being sent to county emergency managers in areas where Paladin® fumigation is planned to occur. During the applicator training, it is requested that prior to fumigating with Paladin®, the applicator contact their local first responders as well as their local gas company. This notification directs the first responders/local gas company to the Paladin® website for additional information about Paladin® and alerts them to the fact that a gas leak report in the area needs to be investigated as a potential gas leak or Paladin® application. The fumigant management plan template for Paladin® contains a check box for this step as well.

The Paladin® website contains all of the materials described here, as well as training materials for handlers on the farm (English and Spanish versions), a Transportation Guide and all labels and MSDS materials. The web site also contains emergency contact information for First Responders and links to report any incident involving Paladin®.

It has been shown that Paladin® is an effective soil fumigant and can be used without odor concerns, but training is a key element to the long term success of this fumigant. Training on the proper equipment use, correct field placement as well as proper soil and weather conditions is essential to minimize odor concerns for Paladin®.