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Different mix may make pesticide safer

"Gas lost to the atmosphere could pose risks to farm workers and nearby communities. Even a small improvement in effectiveness achieved through a change in the chemical blend could greatly reduce the amount of pesticide used per acre," says study co-author Kaitlan Prugger. (Credit: iStockphoto)

U. MISSOURI (US) — Researchers are looking for ways to improve the efficiency and safety of a controversial pesticide in which the active ingredient, methyl iodide, is a known carcinogen.

Farm workers and scientists protested when the pesticide, called Midas, was approved by the Food and Drug Administration in 2007. It is primarily used on vegetable and fruit crops in Florida and California.

Midas is a mix of methyl iodide and chloropicrin, a rat poison, and is used on the fields that will grow strawberries, tomatoes, and bell peppers. For a new study published in the *Journal of Agricultural and Food Chemistry*, researchers examined the molecular structure of the pesticide to determine if the product could be made more efficient and safer for those living near, and working in, treated fields.

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DOI: 10.1021/jf2037906

"We found that the two chemicals, methyl iodide and chloropicrin, are mixed to slow the release of methyl iodide and increase its effectiveness," says Rainer Glaser, professor of chemistry at the University of Missouri. "However, we believe that a different chemical mix could further slow the release of methyl iodide and allow farmers to use less of the pesticide, which would make the area safer for workers and the public."

Methyl iodide is a fumigant, meaning that it fills an air space with gas, suffocating and poisoning the pests within the airspace. Farm workers dressed in protective suits apply Midas in liquid form to fields 10 to 14 days prior to planting and cover future crop rows with plastic sheeting.

During that time period, the pesticide is released in gas form, suffocating pests in the top layer of the soil. However, much of the fumigant is useless as it is lost into the atmosphere upon application and during the release period due to ventilation of the area. All of the pesticide is gone before the area is planted.

"Farmers use 200 to 300 pounds of Midas per acre and nearly 80 percent of the pesticide is not effective in killing pests," says Kaitlan Prugger, a study co-author and undergraduate researcher.

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The use of methyl iodide is a consequence of the Montreal Protocol on Substances that Deplete the Ozone Layer. Prior to the protocol, farmers used methyl bromide to fumigate strawberry and tomato fields. However, methyl bromide was found to deplete the ozone and its use was phased out completely in 2005.

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