

EXPLORING OPTIONS IN

Stored Product Pest Control

Three industry experts provide insight into new developments and research on the methods available or on the horizon for stored product pest control.

DR. BHADRIRAJU SUBRAMANYAM

Professor, Department of Grain Science & Industry
Kansas State University



Q: *What options are currently available to commercial users in stored product pest control?*

A: The available options vary with the site where stored product insects are a problem. For instance, there are new and novel protectants as well as fumigants for managing insects in raw commodities, and there are several chemical and non-chemical options for use in food processing facilities and retail environments. Spinosad (not yet commercially available), several formulations of diatomaceous earth, Diacon II, Storcide II, phosphine, phosphine plus carbon dioxide, sulfuryl fluoride, and vacuum are suitable for use on raw commodities. For structural treatments methyl bromide, sulfuryl fluoride, and heat are commonly used options. In retail environments, hydroprone or cyfluthrin can be used.

Q: *What type of research have you conducted regarding stored product pest control?*

A: I have been conducting research for the last 25 years on the use of diatomaceous earth, spinosad, pirimiphos-methyl, chlorpyrifos-methyl, various pyrethroids, including cyfluthrin, hydroprone, infrared radiation, ultrasound, heat, phosphine, methyl bromide and sulfuryl fluoride for managing insects stored-product insects in raw commodities, food processing facilities and retail establishments. Since last year, I have been involved in assessing population rebounds of stored product insects, especially red flour beetles, in flour mills subjected to fumigations with sulfuryl fluoride and methyl bromide. I have also been involved in developing a model for predicting survival of insects during facility heat treatments.

Q: *As a result of your research, what is the most effective treatment option when attempting to eliminate stored product pests?*

A: First, it is impossible to eliminate 100 percent of stored product insects with any tactic in "real-world settings," and second, treatment effectiveness, if measured by degree and duration of insect suppression following an intervention, varies with rate of the chemical used (at or below labeled rates), type of species, life stage of species, environmental conditions, insect density, duration of insect exposure, degree of sealing for fumigants, uniform lethal temperatures attained if using heat and understanding sources and dynamics of re-infestation.

Q: *What results lead you to believe this?*

A: There has always been a heated debate about one tactic being better than the other, and comparisons based on small-scale laboratory tests are not a true indicators of field performance of any pest control product, because many of the variables I have mentioned are uncontrolled and there is limited information on these aspects from

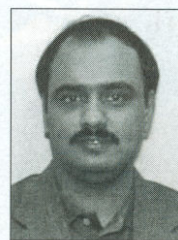
actual field data. Every effort should be made to conduct field trials in multiple locations and in multiple years to verify the most effective treatment option. Although cost is an important issue, it should not be an overriding factor in assessing treatment effectiveness. Furthermore, any one making comparisons regarding products should first define treatment effectiveness that is not based on just percentage mortality.

Q: *What have been some recent "hot topics" in the field regarding treatment of stored product pests?*

A: The use of vacuum for controlling insects in bagged commodities and spinosad for bulk-stored grains are recent hot topics that are getting a lot of attention. Other hot topics include the future of methyl bromide, and methods for optimizing effectiveness of treatments with heat and sulfuryl fluoride.

SURESH PRABHAKARAN, PH.D.

Global Sulfuryl Fluoride Technical Expert, Dow AgroSciences (Indianapolis, Ind.)



ProFume gas fumigant has received registration from the EPA for use in food handling establishments. All fifty states and Puerto Rico have registered uses for ProFume. Dow AgroSciences is the manufacturer of this product.

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Q: *What led Dow AgroSciences to introduce a new product for use in stored product pest control?*

A: The active ingredient, sulfuryl fluoride, has been used successfully for controlling structure infesting pests for

nearly 50 years under the trade name Vikane gas fumigant. When methyl bromide was scheduled to be phased out under the Montreal Protocol, several progressive food industries in the United States and other countries approached Dow AgroSciences to consider developing sulfuryl fluoride for food commodity use. As a result, Dow AgroSciences formed a partnership with leading stored product researchers, fumigators and food industries around the world and developed ProFume as a successful post-harvest fumigant.

Q: What studies are you currently conducting regarding stored product pest control?

A: The issue of developing pest management programs based on sound pest monitoring data is increasingly important – not only to demonstrate the effectiveness of a pest control treatment, but also to evaluate the need for an intervention based on pest population densities. We are conducting several studies to understand the population rebounds in collaboration with food processors and leading researchers. We are also engaged in research projects that enhance (sulfuryl fluoride) use and use pattern through innovation. Some areas of research focus include fumigant detection, Fumiguide enhancements, faster and easier fumigant delivery systems, validation of market expanding commodities, etc.

Q: What attributes has (sulfuryl fluoride) demonstrated in your research and in-field use?

A: Fumigation is the preferred method of post harvest pest eradication in food processing facilities because the pests can be anywhere within the commodity, storage or processing structure. Fumigation with (sulfuryl fluoride) is flexible for use in long or short exposure fumigations and fits current pest management schedules with minimal downtime.

Various research results on a number of commodities have shown that (sulfuryl fluoride) has physical and chemical characteristics including high penetration, low sorption and high desorption, non-corrosiveness to equipment and electronics,

and non-flammability when used according to label directions. Also, (sulfuryl fluoride) does not deplete the ozone.

Q: On what commodities can (sulfuryl fluoride) be used?

A: Examples of commodities that can be fumigated with sulfuryl fluoride include cereal grains and their processed fractions, dried fruits and tree nuts, coffee, cocoa, cheese, ham, dried meat, ginger, herbs and spices, and powdered milk.

Q: Since its recent registration for use in food handling establishments, how has (sulfuryl fluoride) been performing in the field?

A: (Sulfuryl fluoride) fumigations in food processing facilities have been very successful. Follow-up surveys with customers who used (sulfuryl fluoride) in their facilities indicated that 96 percent of respondents are completely satisfied with (sulfuryl fluoride) performance. All respondents unanimously answered “yes” when they were asked if they would use sulfuryl fluoride again in their facility.

Q: What are some examples of food handling facilities that have used (sulfuryl fluoride)?

A: Examples of food processing facilities that have used (sulfuryl fluoride) and had success include a large bakery that produces a variety of processed foods, a pasta production facility, a pet food manufacturing facility, flour mills, and rice processing mills.

JOHN MUELLER

President, Fumigation Service & Supply
(Westfield, Ind.)



Q: What options are currently available to commercial users in stored product pest control?

A: Options currently available include fumigation with sulfuryl fluoride, spot fumigation, fogging, and integrated pest management plans that are specifically geared to the food processing industry.

Q: What is your preferred method of choice for effective stored product pest control in processing facilities? Why?

A: Many factors need to go into determining the “preferred” method of choice for that unique job. Essentially, the answer is: Whatever happens to be the best fit for customer. I would recommend consulting a pest management professional to determine what the best stored product pest treatment method is for your facility.

Q: What are the major concerns of quality assurance managers when discussing pest management plans?

A: The three overriding concerns are: Safety, effectiveness of treatment and economics (cost). Basically, our clients need to know that the quality of their commodities will be preserved and about any potential damage treatment may cause; if the treatment will eliminate the pests and how long it will be before they will have to treat again; and how much ultimately (including operation downtime) the treatment will end up costing their company.

Q: How does a fumigator address these concerns?

A: We address these concerns through careful quality management of modern treatments. The days of living in the grey area of unmanaged products are over. Today, fumigators operate in a glass bowl and are held accountable – as they should be – to represent the integrity of the products and procedures they use. If we do not meet the needs of our fumigation customers, we will ultimately lose out to those processes that will meet them.

Q: What have been some recent “hot topics” in the field regarding treatment of stored product pests?

A: There are a number of developments. They include the registration of...gas fumigant for use in food handling establishments, bar coding of control and monitoring units, on-site education including providing pest identification training, fumigant handling and updates and receiving rail cars, and digitizing documentation. ■

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