

Fumigants & Pheromones

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Summer
2004

Routing:

A Newsletter for the Insect Control & Pest Management Industry

Fumigator's Diary

by John Mueller

The First Commercial ProFume® Fumigation...

I was eager to get the learning curve started when ProFume fumigant was released for commercial use in April, 2004. We had been working experimentally with ProFume for four years on flour mills and rice mills and were ready to move to the real thing.

The chemical sulfuryl fluoride has been a fumigant since 1956. For the post harvest structural sector this methyl bromide silver bullet was much anticipated after a delayed registration process here in the US.

The first commercial ProFume fumigation in the United States was performed by Fumigation Service & Supply, Inc. at an Ohio flour mill in April. This was a very exciting experience full of



John Mueller (r) trains Purdue Ag Engineering graduate students on how to monitor for sulfuryl fluoride with the FUMIGUIDE™.



This fumigation crew recently performed a ProFume fumigation on a large flour mill. Pictured are fumigators from Fumigation Service & Supply, Dow AgroSciences and Purdue University. This fumigation replaced 3400 pounds of Methyl Bromide in 22 hours.

uncertainties and questions. It is difficult not to compare ProFume to methyl bromide or any alternative applications. ProFume applications are very similar to those of post harvest methyl bromide.

ProFume/Methyl Bromide Physical Similarities:

- Cylinderized
- Colorless
- Odorless
- Compressed Liquid
- Fumiscope used for high range monitoring

Here are some important differences we have experienced for ProFume treatments for your consideration.

Distinct Treatment Differences for ProFumes:

- Fact Sheet
- Secondary locking
- Shooting from the outside—exclusively
- Computerized label
- Restrictive commodities

(continued on page 2)

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FSS preforms the first commercial PROFUME™ fumigation. (flour mill, 3/17/04).

Fumigator's Diary *(continued from page 1)*

- Copper tip and grounding application lines
- InterScan for clearance
- Intensive manufacturer stewardship program and testing



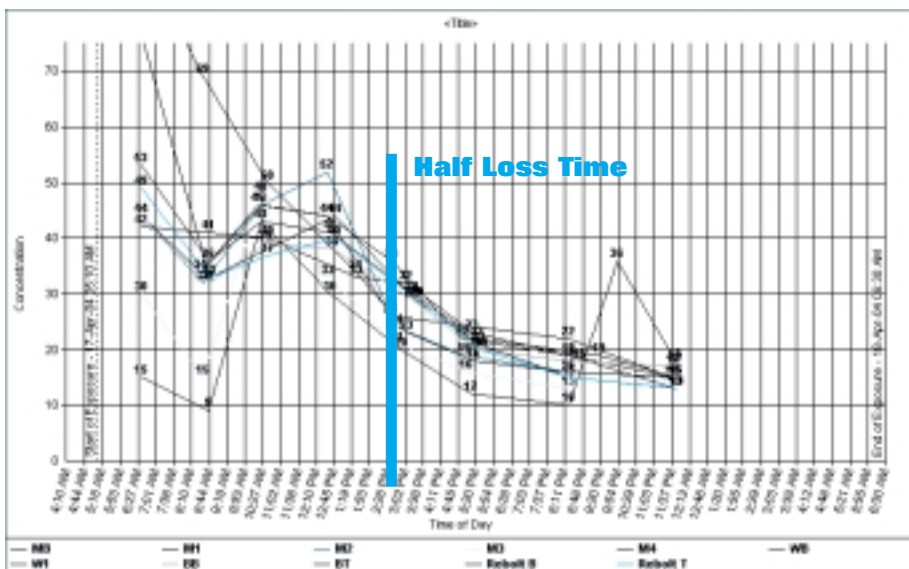
In short, many label clarifications were discovered in this fumigation but the end result was a very successful treatment. Red Michael—the plant manager for our first application said: *“I feel we got much better penetration than we did with methyl bromide.”* What gives ProFume an advantage over methyl bromide is ProFume’s distinct penetration advantage and the precision application guidance of the Fumiguide. ProFume can only be applied from the outside through pre-set application hoses. At first I

was not a fan of applying exclusively from the outside, but, I have learned that this application method allows us to precisely steer the fumigation through the Fumiguide for science based efficacy. The organization, documentation, and assistance this computer based fumigation software provides was fantastic.

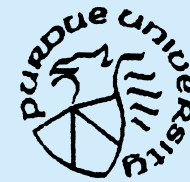
We have now fumigated several more facilities of scale and we are scheduled to treat many more this summer. As we treat these facilities it is important to look closely

“Last weekend I took part in a ProFume fumigation of a flour mill close to Hannover. One week before I trained the fumigation company in charge together with the Dow people (stewardship program). It was a very good experience. The results of the fumigation were perfect. In other words, we do not need MB any more in Germany!”

Dr. Juergen Boeye
B & M Consulting
Hüde, Germany



This graph shows the various gas concentrations of ProFume on each floor of the flour mill. The concentration x time value was reached after 20 hours and the half loss time was 10 hours.



The USDA awarded Purdue University a grant for \$450,000 to be used to study ProFume (sulfuryl fluoride). The principal investigator Dr. Dirk Maier, professor of Ag. Engineering at Purdue, included Dow AgroSciences L.L.P. and Fumigation Service & Supply, Inc. on this successful grant proposal. The grant will investigate how sulfuryl fluoride acts in grain storage. This three year grant is for methyl bromide transition technologies.

at the long term results of the ProFume treatments. I caution people not to expect more from sulfuryl fluoride / ProFume than should be expected. It is true that as a post harvest structural fumigant the physical characteristics of SF are superior to methyl bromide. Many times however, we expect profound improvements when, in fact, beneficial effects may be measured in one or two extra weeks before pest insect re-emergence. Care should be taken when making accurate comparisons by matching internal dynamics and environmental conditions.

ADVICE: For those cautiously waiting to see what ProFume does in these first few months—let me report to you that all is well and it is time to move forward. I strongly encourage people to start the ProFume transitional process. It takes time to ramp up the learning curve for each particular structure during various seasons of the year before your back is against the wall in 2005.

Dave's Soapbox

...for what it's worth



Remembering Albert Mueller

"The only thing that walks back from the tomb with the mourners and refuses to be buried is the character of a man. This is true. What a man is survives him. It can never be buried."

— J.R. Miller

Albert F. Mueller, a former milling superintendent at General Foods, Igelhart Bros who helped his sons start their business Fumigation Service & Supply, Inc. died on April 25, 2004 in Evansville, Indiana. He was 87 years old.

Al was a good man who enjoyed his family. He believed that one's reputation and word were sacred. If he promised to do something, he always did it.

Mueller, who earned emeritus membership status in the International Association of Operative Millers, began his grain elevator and milling career in 1953 at General Foods. After his retirement in 1976 at the age of 58, Al began a second career as a fumiga-

tion specialist and distributor of Phostoxin in the Midwest. He worked with his son David to promote and train the proper use of this grain and structural fumigant in Illinois, Kentucky, Indiana, and Ohio. He later helped his sons John and David Mueller start their fumigation and pheromone business. He continued to help out with the business up until his death as a consultant and advisor. He held the office of vice president and was on the board of directors for Fumigation Service & Supply, Inc.

Al knew a lot about fumigation. He started as a cyanide fumigator of flour mills. He was approached in 1962 to test a 'new' fumigant made in Germany called Phostoxin in his wheat bins at Igleharts. He later developed railcar fumigation techniques. In 1974 he first used magnesium phosphide fumigant as a structural fumigant in his flour mill. He enjoyed experimenting with new ideas and fumigants.

David Mueller stated: "I remember at the beginning when we first started in business around 1980, Dad and I would sit at the kitchen table during holidays and talk for hours about business. Finally, Mom said, "OK, enough business talk, this is a holiday."

John Mueller stated: "Dad didn't give us advice unless we asked for



it. It was our business, but he helped pave the way."

One of Al Mueller's proudest accomplishments was his service in the U.S. Navy on a highly decorated cruiser as a gunner mate during WW II in the South Pacific. Those four years were filled with adventure and terror for this young man from Southern Indiana. As the oldest son of a family of ten kids, Al felt responsible to send his pay to his mother to help with the family during the war. On leave in Evansville one Christmas he noticed that his younger brothers didn't have bikes like the other kids in the neighborhood. Two new red Columbia bikes showed up under the Christmas tree that year. His brother Leo, recently told this story to us for the first time at the hospital as Al sat by with that half smile that we remember so well.

Remembering Al Mueller won't be hard...he was a good man with a strong character.

A. K. Mueller

Food Allergies:

Some Answers, Lots of Questions-Part 1

By Curt Hale

*The food of one
may be poison
for another.*

This quote is from Lucretius a Roman B.C. philosopher. Today, for millions of people with food allergies, this quote is a haunting fact they must live with every day. One bite of the wrong, seemingly harmless, food can mean death to them.

OK, then don't eat foods you know you are allergic to!

It sounds easy but the food allergens causing the most problems are not some weird exotic foods you have never heard of. They are very common and all around us. Peanuts, tree nuts (such as almonds, walnuts, pecans, cashews, hazelnuts, etc), milk, eggs, soy, fish (such as tuna, salmon, catfish, cod, etc), shellfish (such as lobster, crayfish, crab, shrimp, clams, etc), and wheat are the main food allergens in the US. In fact, it is estimated that these "Big 8"

comprise over 90% of all life threatening food allergic reactions.

Have you ever eaten any of these "Big 8" allergenic foods?

You probably did today. Now stop and think what a challenge it would be to never eat that food again. If you fail to avoid even one bite you could suddenly die. That pretty much sums up how 12 to 14 million Americans who have a food allergies live today. The sad reality is that an estimated 150-200 people die each year in the US from food induced anaphylaxis. Another 30,000 survive only because they received prompt emergency medical treatment. These people usually know they are severely allergic and still could not avoid the suspect food. Most people realize "avoidance is the key" and try to do just that but it is very difficult.

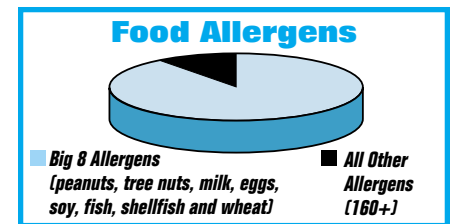
Why such a violent reaction to food?

For some reason a body's immune system is hypersensitive to the perceived threat of a food protein in much the same way some people are allergic to the protein in bee stings. True food allergens are not just a nuisance, such as food sensitivities or intolerance; they are full blown immune system reactions. Symptoms can occur within minutes of ingestion and include nausea, vomiting, abdominal pain, rash, hives, asthma, swelling of the eyes, mouth, and throat, difficulty breathing, loss of

blood pressure, cardiac arrhythmia, and anaphylactic shock. If left untreated, death can occur rapidly. Scientists are studying the immune system and allergies to find answers.

Why are food allergens increasing?

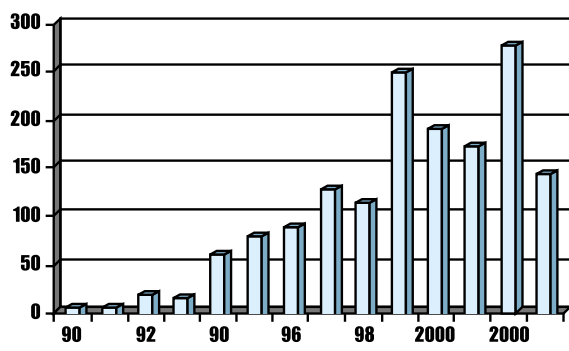
There are many interesting theories but food allergies have probably always been around to



some extent and the true cause of deaths in the past was accurately determined. Several of the theories tossed around today for the increase include:

- More people are aware of and reporting reactions to food allergies, including the medical community. (*The number of people with food allergies has been underestimated in the past.*)
- The diversity of food products we have available to us from around the world. (*We eat foods our grandparents were never exposed to.*)
- The "value added" ingredients used in food products today to cause market differentiation. (*Many of these ingredients are allergens, especially nuts and seeds.*)
- A greater dependence on processed foods and eating out of the home. (*More and more choices with less direct control of preparation, composition, and quality.*)
- Exposure to allergens at an early age is setting the stage for

Food Allergen Recalls 1990-2003



allergic reactions.

(For example peanut butter in the US, which is not commonly given to infants in other countries)

- The rise in asthma. (Lethal allergic reactions often happen to people who also have asthma.)
- The increased sanitation levels and use of antibiotics make us "too clean". (Underdeveloped areas do not have as high an incidence of food allergies.)

Pick one or several but the fact is: food allergens are increasing and unfortunately are not going away anytime soon!

What can food allergic people do to protect themselves?

As mentioned before, avoidance is the key. There is no cure.

- Reading and understanding food ingredient labels is critical.
- Staying away from food where the ingredients are unknown and asking questions about the ingredients are important.
- Not eating foods that could have been cross-contaminated with allergens for reasons such as poor sanitation, preparation near or on the same equipment as allergens, mixed foods, and human error.
- Educating others how serious the allergy is and wearing medical identification.
- Carrying emergency epinephrine injections (such as EpiPen) and liquid antihistamine (such as Benadryl) to keep alive until medical help arrives.



Curt Hale is a graduate of Purdue University and a board certified entomologist. He has worked in the food and food safety industry for over 27 years. Curt provided leadership as Co-Chair of the General Mill's first "Allergen Task Force." He lives in Cedar Rapids, Iowa.

The Do's and Don'ts of Trapping Beetles

by Alain Van Ryckeghem, BCE Technical Director



Stored food insects communicate with each other using different types of pheromones. It is common practice to monitor food storage

areas and food manufacturing facilities with traps using lures containing these compounds. The decision to use pheromones for monitoring stored food insects, however, is often based on a person's level of knowledge about their use. For many it is still an untried or misunderstood technology that has been available for more than 20 years.

To successfully use these devices, one must work with four elements that have a significant influence on trapping results. They are the pest, the pheromone lure, the trap type, and the location or placement of the trap. The starting point and most important element to understand is the insect. The biology and behaviour of each species limits the choices and placement of trapping systems.

The red flour beetle, confused flour beetle, saw-toothed grain beetle, merchant grain beetle, rice weevil, maize weevil, and granary weevil



Pantry Patrol™ traps contain two moth pheromones and three beetle pheromones in a grain oil gel to capture stored product insects.

(*S. granarius*) are insects that predominately crawl from one food source to another. The red flour beetle, merchant grain beetle, rice weevil, and maize weevil, can fly, but rarely indoors. To monitor these pests in large facilities:

1. Do not use hanging traps to capture crawling stored food beetles that rarely fly. Do use pitfall traps like the New PC floor trap™, Dome Trap™, and Pantry Patrol trap™. Sticky blunder traps can also be useful.
2. Weevils and grain beetles are more mobile than flour beetles. Place traps for flour beetles 10-15 feet apart and up to 20 feet for the other species.
3. Flour beetles are more active in the dark and occur in patches near food and harborage. Traps should be in more secluded undisturbed areas such as corners, behind posts, under shelves, gondolas, at the base of racking systems, near cracks and crevices, and in dimly lighted areas where food accumulates.
4. Grain beetles are more mobile but tend to follow crevices and edges, so place more traps accordingly near these sites.
5. Weevils are the most mobile when searching for food and can spread in all directions so traps can be more widely placed (e.g. 20 feet).
6. Beetle traps should be in targeted locations such as near food storage and harborage sites or areas of high risk to infestation. Standard grid placement (e.g. every 15 square feet throughout a building) results in many traps with poor catch. Better time can be spent on traps with a high chance of capturing insects.

We Study the Science... To Practice the Art

Toxicity of Propylene Oxide at Low Pressure Against Life Stages of Four Species of Stored Product Insects

by Isikber, Navarro, Finkleman, Rindner, Azrieli and Dias
Journal of Economic Entomology, April 2004, pp. 281-285.

Scientists all over the world are rushing to find alternatives to the ozone depleting substances that will be phased out in 2005. A potential methyl bromide alternative was researched in this paper from these Israeli and Turkish stored product scientists.

Propylene oxide (PPO) is a liquid fumigant under normal temperature pressure with a relatively low boiling point (35° C) and a noticeable ether odor. It is a safe fumigant for use on food as a sterilant because it is quickly converted to non-toxic glycols in the human stomach. PPO is approved by the United States Food and Drug Administration as a fumigant to control microbial contamination on certain dry food products such as dry and shelled walnuts, cocoa powder, and spices. A disadvantage of PPO is that it is flammable from 3 to 37% in air, and therefore, to avoid flammability it should be applied under low pressure or in CO₂ enriched atmospheres.

Results: PPO at a low pressure of 100 mm Hg was toxic to all life stages of the four species of stored product insects tested. Insects included Red flour beetle, Indian meal moth, Saw-toothed grain beetle, and the Almond moth.

Conclusion: The combination of propylene oxide and low pressure can be a potential alternative to MB for quarantine treatment of commodities in which rapid disinfestation and a very high degree of insect mortality are essential.

Quotable Quotes

“It is the nature of man as he grows older to protest against change, particularly for the better. Change is the price of progress.”

—John Steinbeck,
Nobel Price winning author

“You have achieved excellence as a leader when people will follow you everywhere if only out of curiosity.”

— Colin Powell

“Being in power is like being a lady. If you have to tell people you are, you aren’t.”

—Margaret Thatcher

New Phosphine Monitor



The Dräger microPac Plus is an ultra compact gas measuring and warning device used to monitor the ambient air in workplaces. The lightweight monitor can be worn on the lapel, shirt pocket or belt of those who require a warning of the presence of hazardous gas concentrations including low levels of phosphine, CO, H₂S, O₂, or CO₂.

This new microPac Plus can help reduce the cost of breaking multiple tubes to clear a building along with the risk of using glass detection tubes in a food plant.

The cost is \$487 each. The range for phosphine detection is 0-20 PPM. This range is perfect to help check for reentry gas levels before entering a fumigated bin or structure. The oxygen sensor (sold separately) can be used to detect for dangerous areas unsafe to enter.

David Mueller in Thailand



David Mueller visits stored product insect laboratory while in Bangkok.

Indianapolis, IN—David Mueller, president of Insects Limited, Inc. Inc., Westfield, Ind., has been selected by The World Bank to be the International Consultant on its Methyl Bromide Phase-Out Project. The World Bank is an implementing organization for the United Nations based in Washington, D.C. Mueller travels to Bangkok this summer to start working with the Thai Department of Agriculture, The National Ozone Officer and the National Consultant to draft a plan to submit to the Executive Committee of the Montreal Protocol later this year.

Mueller was the Fumigation Expert for Thailand in 1999. Then he designed demonstration projects for replacing the fumigant methyl bromide in rice mills, tapioca warehouses and grain bins. More than 20 percent of the world's exported rice comes from Thailand each year. Thailand uses

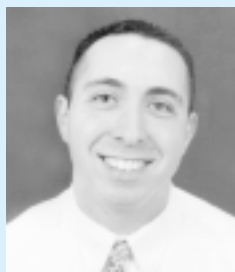
10 Years in Chicago

The FSS Chicago office is celebrating 10 years of providing services in Chicago. Brad Sabin was recently named the new manager of the Chicago Division. He brings over 15 years of experience in the area of commercial service and fumigation. The Chicago region consists of Northern and Central Illinois, Northern Indiana and Southern Wisconsin.

The main services rendered in this region include commercial pest control and fumigation treatments to food processors, warehouses, flour mills, seed companies and bakeries.



Brad Sabin, Chicago Manager



*Ryan Lowery, Dustin Cortlette
Pest Management Specialists in
the Chicago Region.*

The office has experienced and licensed technicians in all aspects of pest control and fumigation needs including Methyl Bromide alternatives such as the new ProFume fumigant, Eco₂Fume, VaporPhos and solid phosphine.

Brad Sabin stated: "We provide all aspects of your pest control needs including export and import fumigation services. Please call us if you have any questions or needs that we can help you with in this area." (815) 937-3197 or Brad's cell (630) 336-0177

methyl bromide on rice, soil, tapioca, food factories, rice mills, cut lumber and maize. The purpose of these demonstrations was to test alternatives in the native developing countries to determine their feasibility.

"What works in a developed country like the U.S. may not work in a developing country. Weather conditions, structures, and the insects are much different in Thailand as a developing country

where everyone works together to find a solution to this serious global challenge to phase out methyl bromide," Mueller stated. "Thailand has been a leader in Asia in looking for alternatives. Thailand, being a developing country, doesn't have to phase-out of this controlled substance until 2015, but with the help of the Montreal Protocol, they are working to eliminate 650 tonnes of methyl bromide ahead of schedule."



...hope to see ya there!

ON-SITE TRAINING

If you would like to have a speaker or complete training session tailored to your needs, call Insects Limited at 1-800-992-1991

July 19-22, 2004*
International Quality Grains Conference, Indianapolis, IN
www.igqc.org

July 23-24, 2004*
Kentucky Feed and Grain Dealers Association Summer Meeting, Kentucky Lake Resort

August 8-12, 2004*
Controlled Atmosphere and Fumigation, Brisbane, Australia

August 15-21, 2004*
International Congress of Entomology, Brisbane, Australia

September 27-30, 2004*
Fifth International Conference on Alternatives to Methyl Bromide, Lisbon, Portugal;
www.europa.eu.int/comm/environmental/ozone/lisbon_conference.htm

October 20, 2004*
Minnesota Food Processors Training Program, Minneapolis, MN

October 20-24, 2004*
National Pest Management Assoc., Waikiki, HI,
www.pestworld.org

October 31-November 3, 2004*
Methyl Bromide Alternatives Outreach, Orlando, FL
www.mbao.org

November 14-17, 2004*
Entomological Society of America Annual Meeting, Salt Lake City, UT, www.entsoc.org/annual_meeting

November 22, 2004*
Ohio Recertification Training, Cleveland, OH

** invited speaker, ** organizing*



March 8-10, 2005** Monterrey, Mexico

www.insectslimited.com

NEWSLETTER

Fumigants & Pheromones is published by Fumigation Service & Supply, Inc. and Insects Limited, Inc. We hope that the information that you receive from this newsletter will help you in your business, and you, in turn, will support our business efforts. If you have an associate who would be interested in receiving this newsletter, please contact the address below. We would welcome any comments or suggestions for topics. Address correspondence to: David K. Mueller, Fumigation Service & Supply, Inc., 16950 Westfield Park Rd., Westfield, IN 46074 USA.



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