

Optimizing Operations

Six-Year Study at Rice Facility Demonstrates Value of Precision Fumigation™ Practices

A California rice mill was just one of the 32 sites chosen to participate in ongoing trial fumigations using ProFume® gas fumigant, developed by Dow AgroSciences. The results after six years demonstrate the efficacy of ProFume as well as the value of using Precision Fumigation™ tools and techniques to optimize operations.

Historically, the rice mill was fumigated once or twice per year with methyl bromide. The first fumigation was usually conducted in late May. Depending upon insect infestation, a second fumigation was conducted in early September. Following standard fumigation practices used in the past with methyl bromide, starting in 1998, the spring fumigation was performed using ProFume. During the following months, insect infestation levels did not require a fall fumigation. In spring 1999, ProFume was again substituted for methyl bromide and administered using Precision Fumigation procedures in conjunction with improved general pest control practices. This practice has resulted in six consecutive years of only a spring fumigation.

Enhancing air circulation strategies helps ensure control throughout the structure

Precision Fumigation practices include enhancing air circulation within the structure during fumigation to help the fumigant distribute quickly and evenly to all areas. By implementing improved air circulation strategies, it is possible to maintain an equilibrium concentration throughout the structure for the duration of the fumigation exposure.

The fumigation team used a duct and fan setup to enhance the circulation of fumigant between the ground and upper floors of the structure and

successfully achieved the target dosage throughout the structure during exposure. The high-low variation in fumigant concentration across the structure without the circulation enhancement was about 29%, compared to a 3-year average of about 8% with the circulation enhancement. With more even distribution of fumigant throughout the structure due to the circulation enhancement, the mill management experienced more consistent control of stored product pests.

“ProFume is very effective on all stages of insects – egg, larva, pupa and adult,” explains the mill’s safety and sanitation supervisor. “We have fumigated once a year and not had any re-infestations.”

The rice facility was able to reduce concentration variability across areas of the mill by about 21% using a strategic introduction and circulation fan set-up. The target dosages were achieved throughout the structure and post-embryonic bioassays confirmed 100% target pest mortality



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By utilizing Precision Fumigation tools and techniques, the rice mill management realized three valuable benefits from ProFume trials at this site.

1. Enhancing air circulation helps ensure control throughout the structure.
2. Taking the time to improve Half-Loss Time (HLT) is worth the investment.
3. ProFume optimizes operations.

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ProFume*

Gas Fumigant

throughout the mill. Mill management has been impressed with the high level of control provided by just a single ProFume fumigation with Precision Fumigation practices, with no additional costs compared to two methyl bromide fumigations per year.

Improving HLT is a worthwhile investment

Another Precision Fumigation practice is investing in the extra efforts to improving the seal of a structure to be fumigated, thereby improving HLT.

HLT is a measure of gas retention; it is the



polyethylene sheeting



spray foam



dog house

amount of time required to lose half of the gas in a structure sealed for fumigation. A greater HLT means that less gas is required for the fumigation (cost saving), or the fumigation can be completed in a shorter time interval with the original dosage (time saving).

To achieve a greater HLT at the rice mill and thus reduce the amount of gas required for the job, fumigators utilized Precision Fumigation sealing techniques. Some examples included polyethylene sheeting adhered around pedestrian and overhead doors using spray adhesive and multi-layering of tape, polyethylene sheeting with spray adhesive

In this rice mill, the HLT doubled from nearly 7 hours to a 3-year average of nearly 14 hours, thereby decreasing gas cost by 36%.

and multi-layering of tape either inside or outside openings of upper-level ventilation systems, and polyethylene sheeting stuffed into conveyer belt and product auger line voids and over-coated with spray foam. In addition, more permanent sealing techniques were used, including spray foam and silicone caulking to cover cracks and unused openings around windows, doors and equipment or electrical conduits through walls, ceilings or junctions penetrating walls to outside or non-fumigated areas.

Substantial sealing efforts were directed at dust collectors and a “dog house” on the roof designed for natural heat-escape from the structure – two areas which, if left unsealed, would allow the fumigant to quickly escape from the structure.

By instituting Precision Fumigation sealing techniques, the mill structure was able to retain the fumigant better, thus improving the HLT and reducing the amount of fumigant needed for the job.

“We’ve never monitored before to know exactly how well our building has been holding fumigant,” said the rice mill’s safety and sanitation supervisor. “We knew we could have improved our seal, but with the Precision Fumigation techniques that accompany ProFume, we saw the results. The additional sealing techniques would be an asset to any fumigation or building.”

The investment in sealing improvements paid off. In this rice mill, the HLT doubled from nearly 7 hours to a 3-year average of nearly 14 hours. The equivalent amount of ProFume gas fumigant required for the fumigation during the established exposure period was reduced by 36%. The savings

in fumigant costs more than offset the amortized increased material and labor costs incurred to achieve the greater HLT.

When asked about the effect of Precision Fumigation sealing practices, the rice mill's plant manager commented, "ProFume is more effective than methyl bromide due to the additional sealing techniques."

ProFume optimizes operations

As the Dow AgroSciences team gained experience with the mill, they decided to plan progressively shorter exposure times than the original 48-hour exposure. The team observed that as a result of targeting lower concentrations over time in addition to increasing the HLT, it was possible to achieve efficacious results with ProFume in a 24- or 36-hour exposure period. Also, due to a more rapid aeration time compared to methyl bromide, the team was able to reduce the total downtime for a 24-hour fumigation from a minimum of 36 hours with methyl bromide, to approximately 28 hours with ProFume.

Millers and fumigators alike were satisfied with the increased fumigation efficiency resulting from

their work with ProFume and Precision Fumigation techniques. Overall, the mill experienced lower annual non-production costs and management has observed no stored product pest problems.

"With ProFume, we have been able to make the fumigation process more efficient," said the mill's plant manager. "We have seen that, with the appropriate preparations, ProFume works very well."

Real results

By utilizing Precision Fumigation tools and techniques, the mill was able to:

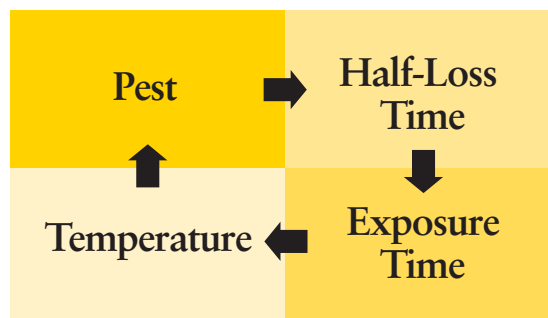
1. Achieve more uniform pest control throughout the structure without adding cost.
2. Improve HLT, thereby decreasing gas costs by 36%.
3. Increase fumigation efficiency as a whole to optimize its operations.

This six-year trial at a California rice facility demonstrates that ProFume gas fumigant, through Precision Fumigation tools and techniques, optimizes operations and delivers effective, reliable control of stored product pests.

Precision Fumigation defined

Precision Fumigation is rooted in four interrelated factors: pest, exposure time, temperature and Half-Loss Time (HLT). By modifying any one factor, others can be changed to meet specific goals. For example, additional sealing techniques can be used to improve HLT. This, in turn, can help achieve control of pests in a shorter exposure time, which could alleviate downtime at the mill and return operations to production sooner.

The four factors of Precision Fumigation



Custom sealing practices

When faced with unique structural features, including dust collectors and a “dog house,” the fumigation team developed customized solutions to improve the structure’s seal.

- The inside of the exhaust pipe of one dust collector was sealed using a PVC frame covered with polyethylene sheeting constructed to fit tightly into the square duct opening, and was held in place with foam and tape. Other dust collector exhausts were sealed externally using polyethylene sheeting and spray adhesive with multi-layered tape.
- In the dog house, solid foam strips were cut to fit into the gaps around the perimeter of the expanded metal floor, and were sealed in place with spray foam. Polyethylene sheeting was placed over the expanded metal floor inside the dog house and sandbags were placed around the edges to provide a better seal.



dust collector



dog house seal

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ProFume[®]

Gas Fumigant

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FUMIGATION™

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ProFume is a federally Restricted Use Pesticide. Always read and follow label directions.