

IMPACT OF SULFURYL FLUORIDE FUMIGATION ON PEST POPULATIONS IN RICE MILLS

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Stored-product insects in food processing and storage facilities are difficult to manage because they often occur in cryptic micro-habitats, such as in the equipment and structure of the building, and move from these sources into the food product. This makes it difficult to monitor pest density and target pest management tactics. As a result, there has been a reliance on fumigants or high temperature treatments that can penetrate into hidden areas and eliminate or reduce populations from structures. These treatments are typically applied on a calendar basis. Methyl bromide has been the most widely used fumigant for post-harvest structural treatments, but its use is being phased out under the 1987 Montreal Protocol to protect the stratospheric ozone layer. Critical use exemptions (CUE) have been granted in the US to enable the continued use of methyl bromide, albeit at reduced levels, until technically or economically feasible alternatives can be identified. In the United States, CUE's have been allowed for structural fumigation of flour mills, pet food manufacturing facilities, and rice mills. Sulfuryl fluoride (ProFume™, Dow AgroSciences) is a potential alternative that has been registered and used in a wide range of food facilities. While information on the technical issues related to the fumigation process and on mortality of bioassay insects is becoming more widely available, information on the impact on resident pest populations, which is ultimately the goal of the treatment, has been very limited.

As part of an ongoing project to evaluate the impact of methyl bromide alternatives on pest populations, pheromone trapping programs have been conducted in food processing facilities around the United States. In this presentation, the protocols that have been developed to conduct this research will be discussed along with the results to date from four rice mills that have conducted sulfuryl fluoride fumigations. The impact of these treatments on pest populations, as measured using pheromone traps, will be evaluated with the focus on both the initial reduction in trap captures and the rate of rebound. Monitoring is focusing on the red flour beetle (*Tribolium castaneum*), which is the major pest species, but impact on other species will also be considered. While it is a challenging undertaking to assess these impacts, it is critical to the development of more effective pest management programs and the adoption of methyl bromide alternatives.