California ProFume® Update 2009

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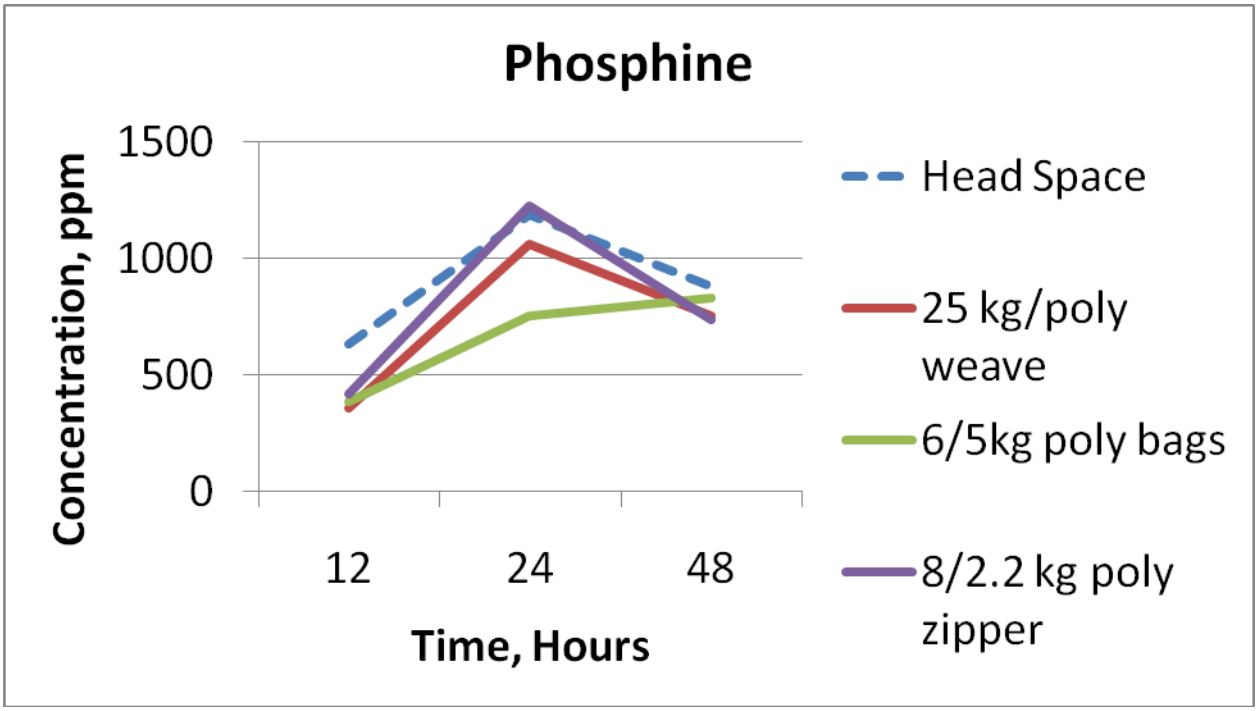
ProFume® Gas Fumigant received the California registration in May 2005, and has successfully replaced methyl bromide as a post-harvest fumigant over a wide variety of commodities. Rice, wheat, corn, raisins, dried plums, walnuts, almonds, pistachios and beans have all been treated with ProFume® in a variety of storage facilities such as chambers, sea containers, truck trailers, silos, bins and warehouses. Many food processing plants, including flour and rice mills have also made this conversion as well. Since ProFume® is a new fumigant in the commodity sector, it has been closely scrutinized by the industry, and most have concluded that it is a cost-effective pest management tool that will remain as their primary fumigant of choice for the future.

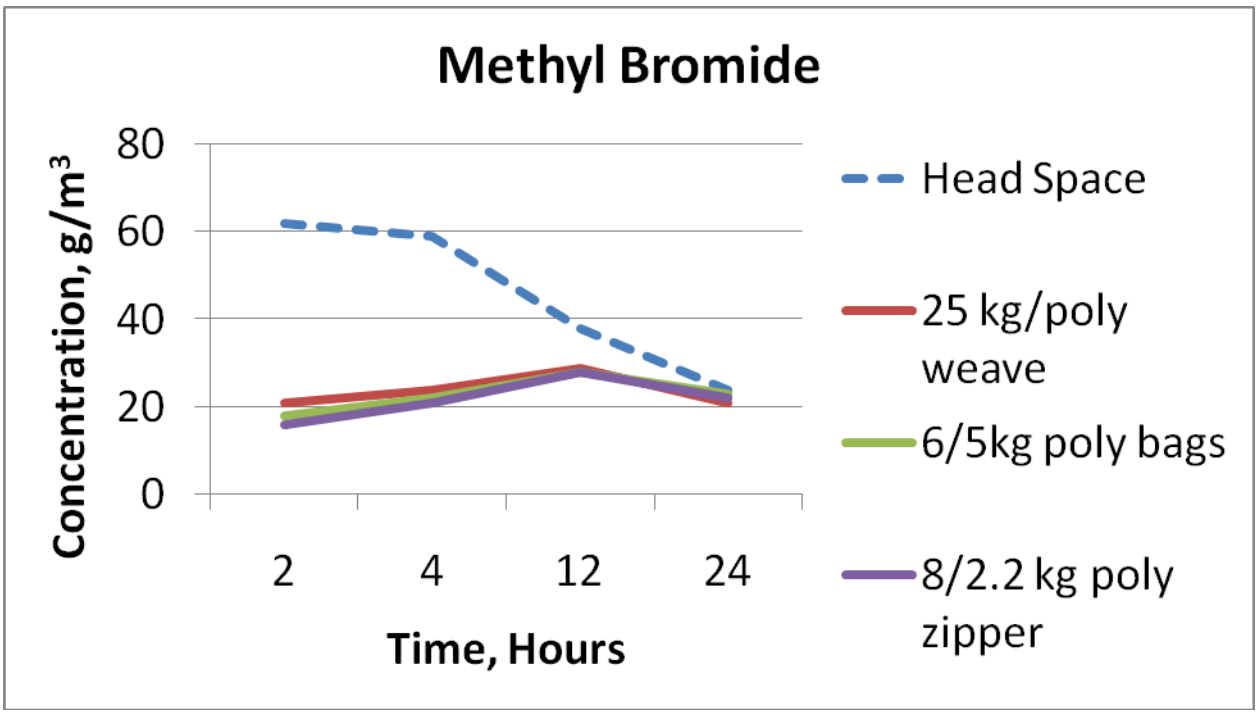
The rice industry was the first to make the transition away from methyl bromide, considering the potential for negative publicity of using an ozone depleting substance. All of the rice mills that once used methyl bromide have used ProFume®, and are very satisfied with the results. In all cases, the cost of fumigation is equivalent to, or less than methyl bromide. Rice storage facilities have been battling phosphine resistance with Rhyzopertha dominica (Lesser grain borer), where multiple fumigations have resulted in survival of all life stages of this insect. We began using ProFume® in bulk rice storage, and have experienced excellent control with ProFume® at relatively low dose rates. ProFume® has quickly become the fumigant of choice, and we have found ways to enhance the application techniques to effectively treat rice in all types of storage facilities.

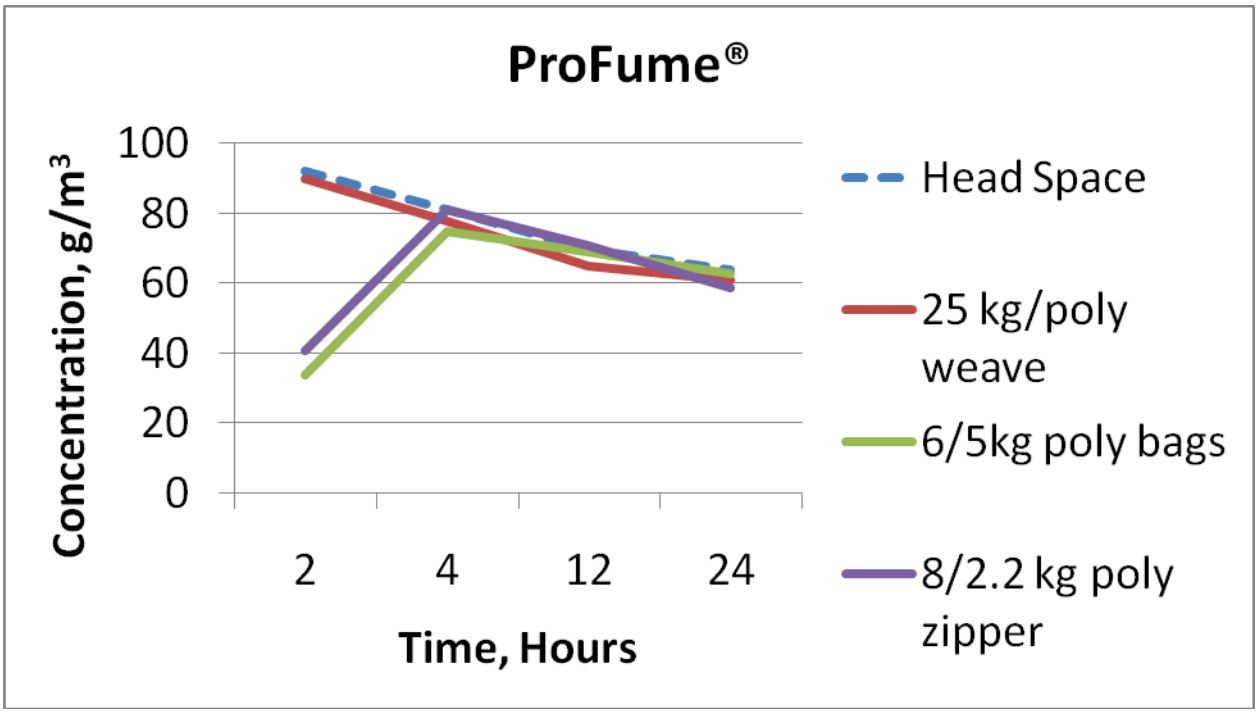
Walnuts began the transition to ProFume® in 2008, and most are completing the movement away from methyl bromide this fall. One of the concerns with some of the major processors was the control of the egg stage of the Navel orangeworm, which is primarily a field pest that comes in with the product after harvest. It has recently been found that it is critical to control the egg stage of the Navel orangeworm, when it was once considered to be a field pest that cannot proliferate in storage. Dow AgroSciences funded a project with the Dried Fruit and Tree Nut Association (American Council for Food Safety and Quality) to evaluate ProFume's® efficacy on walnuts infested with Navel orangeworm eggs. The results showed that ProFume®, when applied under vacuum, will effectively control over 99% of the egg stage. USDA recently performed efficacy studies under similar conditions with methyl bromide, and found egg survival to be 31%-43% depending on the dose. These data created a comfort level for the last few processors to make the conversion to ProFume®.

The almond industry has primarily been using phosphine fumigants since they shifted away from methyl bromide in the 1990's. The low European residue tolerances for inorganic bromide created the need to seek alternative fumigants, and phosphine became the fumigant of choice. We have recently experienced an increase in tolerance to phosphine by Indian meal moth, and many of the almond processors are concerned with this trend. We have converted many of the almond processors to ProFume®, and they are very satisfied with the control, as well as the shorter exposure period.

We have also performed trials of fumigant penetration into food packaging, and the time it takes to reach equilibrium within the packages and the head space within the fumigation enclosure. It was found that both methyl bromide and phosphine took a considerable amount of time to reach equilibrium, 24 hours and 48 hours respectively, while ProFume® reached equilibrium within 4 hours of application. Three different package types were tested; 25 kg poly woven bags, 6 x 5 kg poly bags, boxed and stretch-wrapped on pallets, and 8 x 2 kg poly zip-lock bags, boxed and stretch-wrapped on pallets. Since ProFume® has the ability to penetrate packaging quickly, it will allow for quicker development of CT Product to enhance efficacy.







We continue to find ways to use ProFume® effectively as an alternative to methyl bromide. It has proven to be a very versatile fumigant, with a very encouraging future in post-harvest pest management.