PRECISION FUMIGATIONS IN FOOD PROCESSING PLANTS MANAGING COST EFFICIENCIES

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Five years of field research trials in both Europe and the U.S. by Dow AgroSciences and commercial fumigator personnel evaluating ProFume® gas fumigant for the control of stored product insect pests (SPIP) in food processing plants (FPP) has led to the refinement of precision fumigation techniques and efficiencies. Mean time intervals for gas introduction, exposure, aeration and total fumigation down-time for ProFume vs. standard commercial methyl bromide fumigations are compared.

Managing fumigation costs is a critical consideration within the changing business and regulatory environments of fumigants and the food processing industry. A discussion of the inter-relationships among the variety of fumigation costs of FPPs includes: facility down-time; facility labor in shut-down, cleaning and start-up; fumigation labor in sealing, set-up and breakdown/clean-up; fumigation equipment (e.g., gas introduction, fumigant distribution/air re-circulation and gas aeration systems); and gas costs which are influenced by the structural half-loss-time (HLT), exposure period and target species.

Using the mean HLT of about 10 hours and the mean exposure time of about 24 hours across 20 ProFume field research fumigation trials as a base-line model, the influence of both HLT and exposure time modifications on the resulting amounts of gas needed to achieve a target dosage (CxT Product) are explored. Results demonstrated that incremental increases in either HLT or exposure time or both results in significant gas savings. Increases in HLT, however, have the single greatest impact. At a low HLT of 5 hours, increasing the HLT to 10 hours has a substantially greater impact than increasing exposure time. A 53% savings in gas costs can be achieved by increasing the HLT to 10 hours compared to only a 21% savings by increasing the exposure time to 42 or more hours. From the 10-h HLT and 24-h exposure time base-line, a 50% savings in gas costs also can be achieved with a combination of increasing the HLT to 15 hours and extending the exposure to 42 hours or by increasing the HLT to 20 hours and extending the exposure to 36 hours. Often, improvements made to increase the HLT are permanent and the costs of such one-time efforts can be amortized over several fumigations with the benefit of repeated savings in gas costs.