EFFICACY OF PROFUME™ ON STORED PRODUCT INSECTS UNDER TWO ATMOSPHERIC CONDITIONS

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Methyl bromide (MB) has been a highly successful fumigant for postharvest insect control for many years. However, with more rigorous regulations and recommendations of the Montréal Protocol it may be phased out by 2005. On-going questions that have been perplexing the industry are what, if any, are the alternatives to MB. Extensive research on alternatives to MB has been conducted by many agencies and interested groups throughout the world. In a major effort to help the industry as well as the environment, DFA has contributed considerable data through several major projects that have given answers to many of these post harvest treatment questions.

DFA has spent the past 10 years doing research in this area and has shown promising results with many of the alternatives tested. One of the more promising alternatives is ProFume gas fumigant (99.8% sulfuryl fluoride, or SF). Like MB, ProFume adheres to the principles of "Concentration x Time", or CT product, for efficacy. With time restraints being an important factor when meeting customer demands requiring rapid product turn arounds, a shorter fumigation exposure time may be ideal. Vacuum (VAC) fumigations have far shorter exposure times than normal atmospheric pressure (NAP) fumigations, 2-4 hours for VAC compared to 18-48 hours for NAP. Since SF efficacy is dependent upon CT products, dosages for NAP and VAC can be adjusted based on time, to achieve similar results.

In this work we studied efficacy of ProFume, under two atmospheric conditions (VAC and NAP) in three phases: the first phase was with Indian meal moth (IMM), *Plodia interpunctella* and confused flour beetle (CFB), *Tribolium confusum* eggs and pupae; the second phase was with navel orange worm (NOW), *Amyelois transitella* larvae in unshelled walnuts; and the third phase was with codling moth (CM), *Cydia pomonella* diapausing larvae in unshelled walnuts. The CT product required for 100% control under VAC fumigations was significantly lower than for NAP fumigations, with average reductions in CT product of 53.8%. Results of these tests also show that SF can very adequately replace MB as the quarantine treatment against diapausing CM larvae in unshelled walnuts for the Japanese and Korean export markets.