USE OF THE DEGESCH SPEED BOX TO FUMIGATE FRUIT AS AN ALTERNATIVE TO METHYL BROMIDE

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A traditional method for treating fruit in the past was high dosages of methyl bromide coupled with short exposure periods. This method was recognized as being quick and effective, however, there were numerous disadvantages such as cost, ozone depletion, damaged fruit and residues.

Degesch de Chile has developed an alternative to methyl bromide fumigation for fresh fruit using the Degesch Speed Box Models 2S, 2D or 2 Terreno. The Speed Box has been designed to be used exclusively with Degesch Fumi-Cel® which delivers phosphine, free of ammonia, that is not damaging to fruit. The Speed Box is available in three sizes that can accommodate 50, 100 or 200 Fumi-Cels® and can be used in a mobile or stationary manner requiring only a source of electricity. The device heats the Fumi-Cel® and causes a dramatic increase in the hydrolysis rate of the active ingredient, magnesium phosphide. By increasing this rate, high concentrations of phosphine are generated in a much shorter period of time when compared to traditional applications. An additional feature of the Speed Box is the recirculation of the air/phosphine mixture. Air is drawn from the source to be fumigated, passed through the Speed Box and the mixture injected back into the source. Because of these two advantageous features high concentrations of phosphine are evenly distributed throughout the enclosure. This guarantees an effective phosphine fumigation that can be carried out at low temperatures with significantly shorter exposure periods.

Degesch de Chile has conducted a number of fumigation trials on fresh fruit with the following results.

Fumigation of fresh fruit at low temperature: Peaches, apricots, nectarines, plums and grapes were treated for mealybugs

at the larval, nymph and adult stages in a 600 m^3 refrigerated chamber. The treatment temperature was 1-3°C. The dosage was 2-3 grams/m^3 with a theoretical concentration of 1400-2100 ppm and a target concentration of >1000ppm. The exposure was 24 hours. No damage to the fruit was observed. The target concentration was achieved in approximately 6-8 hours.

Fumigation of fresh fruit at low temperature: Lemons, clementines, tangerines, avocados and persimmons were treated for mealybugs at the larval, nymph and adult stages in a 600 m^3 refrigerated chamber. The treatment temperature was 1-3°C. The dosage was 2-3 grams/m^3 with a theoretical concentration of 1400-2100 ppm and a target concentration >1000 ppm. The exposure was 6 hours. No damage to the fruit was observed. The target concentration was achieved in approximately 4 hours.

Fumigation of refrigerated fruit chamber: An empty refrigerated chamber was treated for experimental purposes. The volume was 174 m^3 and the treatment temperature 3-4°C. The dosage was 4.75 grams/m^3 with a theoretical concentration of 3325ppm and a target concentration of >1000 ppm. The exposure was 24 hours. The target concentration was achieved in approximately 10 hours.

These trials illustrate the rapid hydrolysis of Degesch Fumi-Cels® resulted in reaching the target concentration in anywhere from 4-10 hours. The high concentration coupled with low temperatures has been reported as a proven method for the control of fruit pests.