

Propylene Oxide: A Potential Quarantine and Pre-shipment Fumigant for Disinfestation of Nuts

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Propylene oxide (PPO) was evaluated at a low pressure of 100 mm Hg for toxicity to different life stages of the Indianmeal moth *Plodia interpunctella* (Hübner) in the presence and absence of three species of nuts. Eggs and larvae were generally the most tolerant life stages in empty chambers and on the nut crops. Complete mortality of all life stages was achieved at a concentration x time (CT) product of 61.2 mg h l⁻¹ for empty space fumigation. Dosages of 13.9, 60.3, 72.1 and 93.1 mg l⁻¹ were required to kill 99% of the larvae when fumigation of 4-h duration took place in an empty chamber and in the presence of peanuts, almonds and walnuts, respectively. After an initial dose of 68.7 mg l⁻¹ and a 5-h exposure time, sorption of PPO by peanuts, almonds and walnuts was relatively high, ranging from 87% of the initial concentration for peanuts to 91% for walnuts. PPO residues measured in peanuts, almonds and walnuts were 111, 46 and 80 ppm, respectively, 1 day after termination of fumigation. All of these values were below the 300 ppm maximum tolerance set by the FDA of the United States. These data show that the combination of PPO and low pressure has the potential to replace methyl bromide fumigation for quarantine and pre-shipment purposes.

KEY WORDS: Propylene oxide; nuts; quarantine fumigation; toxicity; *Plodia interpunctella*; sorption.

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