EFFICACY OF PROPYLENE OXIDE FOR CONTROLLING ARTHROPOD PESTS IN FRESH CITRUS

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Bean thrips, *Caliothrips fasciatus* (Pergande), California red scale, (*Aonidiella aurantii* Maskell), and several mites, can be found on citrus at the time of harvest and are of phytosanitary concern in fruit exported to countries such as South Korea, Australia and New Zealand. To mitigate the risk of introducing these species to their countries, if intercepted, the shipment is either fumigated using methyl bromide at the port of entry– an option at the discretion of importing country or rejected. The California citrus industry needs a reliable postharvest treatment to address these concerns while exporting fruit. Although fumigants such as phosphine and ethyl formate are effective, long exposure hours required for phosphine and regulatory and technical issues associated with registering these pesticides for agricultural uses have delayed their availability for the citrus industry. We evaluated the efficacy of fumigant propylene oxide (PPO) in combination with carbon dioxide (PPO: CO2 - 8:92) during a 2-hour fumigation at 15.6°C to generate dose-response mortality data for export concern pests. Results showed that propylene oxide is toxic to all insects and mite species tested and that the response to fumigant varied greatly among species, as well as between life stages. Among the species tested, bean thrips were the most susceptible species and flat mites were the most tolerant species, respectively. Subsequently, sorption of PPO by navel oranges and phytotoxic effects of PPO fumigation on navel oranges and mandarins at the schedule that were effective against export concern pests were tested. Future research will be aimed at testing the efficacy PPO fumigation in a commercial setting. Potential of using PPO as a postharvest fumigant to control export concern species in citrus is discussed.

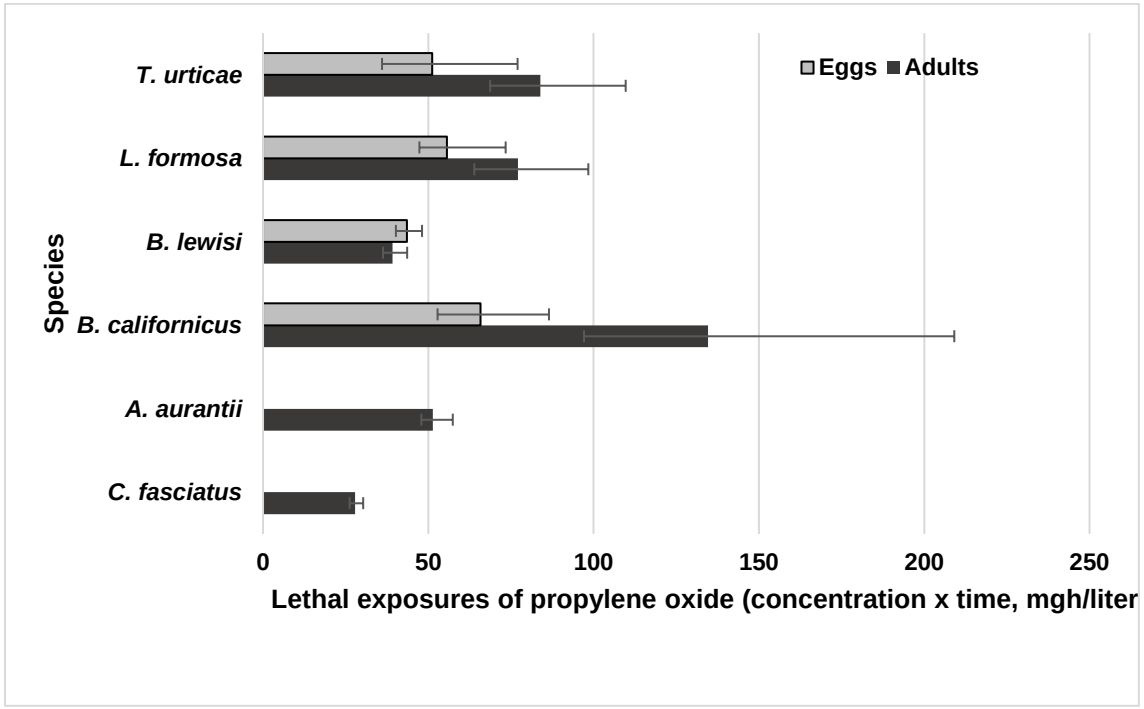

Figure 1. Lethal exposures of propylene oxide required to achieve 99% mortalities of insects and mites during 2-hour fumigations at 15.6°C (60°F)