Oxygenated phosphine fumigation for control of light brown apple moth

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Light brown apple moth (LBAM), *Epiphyas postvittana* (Walker), is potentially an important pest affecting production of fruits and vegetables and their export. LBAM egg is the most tolerant life stage to phosphine. In this study, LBAM eggs were subjected to regular and oxygenated phosphine fumigations at different temperatures to compare their susceptibilities to the two different fumigation methods and determine effective treatments in laboratory tests. Regular fumigations with 250 to 3000 ppm phosphine under the normal oxygen level were conducted at 5, 10°C, and with 500 to 1500 ppm phosphine at 15°C. All oxygenated phosphine fumigations were conducted under 60% oxygen. LBAM eggs were very tolerant of phosphine fumigation and 96 h fumigation treatments at 5, 10, and 15°C failed to achieve complete control of eggs regardless of phosphine concentrations. Furthermore, egg survivorship decreased with increased phosphine concentrations when phosphine concentrations were low. Fumigations with high concentration (3000 ppm) of phosphine resulted in increased egg survivorship in specific treatments. Oxygenated phosphine fumigation was significantly more effective than regular phosphine fumigation. Complete control of LBAM eggs was found in $\leq$72 h at 5 and 10°C. The results from this study suggest that it is feasible to control LBAM eggs with oxygenated phosphine fumigation.