

Title Low pressure for controlling postharvest insects.
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Abstract

The eggs, larvae and pupae of *Tribolium castaneum*, *Plodia interpunctella* and *Rhyzopertha dominica* in glass chambers at 25, 33, 37 and 40 deg C were exposed to low pressure (32.5 mm Hg) for time intervals ranging from 30 minutes to 144 h. Studies on the eggs of *Ephesia cautella* [*Cadra cautella*] were conducted at pressures of 50, 75, 100, 200 and 300 mm Hg under 5, 15, 22.5, 30 and 37.5 deg C. Data were analysed with probit analysis, and exposure times to obtain 99% mortality were compared using the lethal-dose ratio test. A study on the effect of low pressure on the mortality of eggs of *Rhagoletis pomonella* (apple maggots) in apples was conducted by exposing apples infested with the maggot to a low pressure of 25 mm Hg at 25 deg C. Mortality of all life stages increased with increasing temperature in each species. The eggs were the most tolerant among the developmental stages, and *Rhyzopertha dominica* was the most tolerant of the low pressure. The susceptibility of eggs to low pressure varied with age. The youngest and oldest eggs were the most susceptible for *P. interpunctella* and *R. dominica*. Effective levels of mortality were achieved at pressures as high as 300 mm Hg for eggs of the four species. Such mortality rates were obtained only at 30 and 37.5 deg C; higher temperatures significantly reduced lethal time values. A practical treatment of 2-5 days can be achieved with 75 mm Hg at a typical room temperature of 22.5 deg C, but cooler temperatures will require several more days to induce substantial mortality. Treatment of infested apples at 25 deg C for 24 h resulted in approximately 87% mortality, increasing to 96% at 48 h. Mortality data were described by an exponential dose-response curve. Thus, low pressure may be a viable alternative to methyl bromide for the postharvest treatment of fresh fruits.