

### Abstract

The application of a quarantine treatment for most crops in Mexico is a requirement, not only for export markets, but even for some national markets in states free from fruit flies. Currently very few quarantine systems are developed and used. The most important and commonly used system in the country is hot water treatment developed for mango in 1988.<sup>3</sup> Unfortunately, although this system has been used since then in several countries, but it is still limited to mango and has several disadvantages. This presentation will summarize our work developed over a period of about 8 years on the possible use of CA as a quarantine control system for several tropical fruits. Several fruits were investigated, but only mango was sufficiently tolerant for this treatment. Insecticidal CA ( $\leq 0.5$  kPa O<sub>2</sub> +  $\geq 50$  kPa CO<sub>2</sub>) at different temperatures (from 20 to 55°C) and relative humidity (RH) was tested on the tolerance of several fruits including different cultivars of mango, avocados, guavas and papayas, and on the mortality of different stages of the two most important fruit flies in Mexico (*Anastrepha ludens* and *A. obliqua*). Insecticidal CA, especially at high temperatures increased the mortality of different stages of the fruit flies. CA at 43°C and 50% RH for 160 minutes achieved insect mortality in mango (probit 9) without causing negative effects on the fruit. The *in vivo* mortality was faster than the *in vitro* mortality in both insects. Eggs were more tolerant than other stages of the insects. *A. obliqua* is slightly more tolerant than *A. ludens*. The mean estimated temperatures for 50%, 99%, and 99.9968% *in vitro* mortality (LT<sub>50</sub>S, LT<sub>99</sub>S, and LT<sub>99.9968</sub>S) of eggs of *A. obliqua* exposed to 0 kPa O<sub>2</sub> + 50 kPa CO<sub>2</sub> at 51, 54 and 55°C for 240 min were 49.4, 54.8 and 60.9°C, respectively. Other fruits that were investigated but were found to be very sensitive to these atmospheres included avocado and guava.