Title Effects of controlled atmosphere and elevated temperature (CATTS) disinfestations treatment on apple quality

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Abstract

Tasmania is the only state in Australia with access for apples and cherries to Japan. In order to export these fruit to this country, it is necessary for fruit to undergo a methyl bromide fumigation treatment against codling moth. This treatment, as well as being damaging to the ozone layer, has caused fruit damage in many shipments and it is desired to study alternative treatments and their impact on fruit quality.

During 2006, a series of experiments were conducted in experimental CATTS chambers to initiate studies on this treatment and its effects on apple fruit quality. The CATTS treatment utilised involved tempering fruit to 20°C for 24 hours prior to treatment and then placement in the chambers. The CO_2 in the chamber was increased to 10% and this resulted in a drop in the oxygen content, due to displacement, to 15%. After the air was modified the air temperature was increased at 12°C/hour until it reached 47°C and this temperature was maintained until the core temperature of the fruit reached 45°C for 15 minutes after which the fruit were cooled, stored for 5 weeks and then assessed for damage.

It was found that there was only a small amount of fruit damage (4% internal browning) on fruit treated with CATTS within a week of harvest. If fruit were stored (1°C in air) for 2 months prior to treatment, then internal browning was severe (63%) and fruit were commercially not marketable. Studies of stored fruit revealed that internal damage was reduced to (35%) if the maximum air temperature inside the chamber was increased to 49°C, 4 degrees above the target core temperature and damage was virtually eliminated if the rate of heating was increased to 40°C/h. Both these modifications result in a decreased duration of fruit inside the chamber allowing for multiple applications with the one unit in a day.