Title Ethylene ripening of pears by unconventional means: use of experimental thimble-sized ethylene capsules inside cartons and clamshells

Author K.R. Sharrock and R.F. Henzell

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Abstract

This trial is part of a project to develop new ethylene conditioning technologies and improved packaging and handling strategies to supply well ripened, ready-to-eat pears. Key features are customised clamshell packs that protect and display fruit, ripeSense® labels to monitor ripeness, and experimental thimble-sized capsules that slowly release ethylene for several days, thus avoiding dependence on special conditioning facilities and permitting in-transit conditioning. In September 2005, 'Anjou' pears grown near Wenatchee, WA, USA were removed from cold storage 1 week after harvest and packed, along with thimble-sized ethylene release capsules (ERCs), into conventional cartons, Euro-packs and ripeSense® - labelled clamshells, which were then held at 20°C for 1, 3 or 5 days. For comparison, other fruit were pre-warmed and then ethylene-conditioned in a forced-air trailer for 1 day at 20°C, or simply warmed to 20°C for 3 days in each package type (both conditioning treatments used commercially in the Wenatchee area). All fruit were then chilled for 4 days, reducing fruit temperatures to 8-14°C, and transported for 4.5 days in a refrigerated truck from Wenatchee to Raleigh, NC, where they were rated for damage and allowed to ripen fully before comparison by a consumer taste panel. Ethylene from the capsules produced concentrations of 70-160 ppm within 36 h and at least 65 ppm ethylene was maintained in all three package types for 7 days. Some in-transit ethylene conditioning would have occurred in the packages containing capsules while fruit temperatures were above 7°C. All ERC-conditioned fruit gave significantly higher mean flavour and overall liking scores than non-ERC-conditioned fruit. Texture scores were also significantly higher for fruit in cartons with ERCs than for the controls. These results suggest this experimental thimble-sized in-package ERC should provide a useful alternative method for conditioning fruit without the need for specialized facilities, and facilitate in-transit or in-store conditioning.