Title A case study: Potential energy savings using 1-MCP with 'Gala' apples in commercial controlled atmosphere storage

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Abstract

With the recent commercial development of 1-MCP for postharvest use in modem controlled atmosphere storage (CA) facilities there are now considerably more options and questions over exactly which storage regime to use, in particular regarding storage temperatures. When fruit are treated with 1-MCP it seems feasible to hold them under a higher temperature storage regime than is usual, because the very good control of ethylene and ripening processes will still minimise fruit quality loss, but energy savings and a reduced carbon 'footprint' are possible benefits. When storing 1-MCP treated apples at higher CA storage temperatures little is known or published to quantify all the associated risks and/or benefits especially under practical large scale commercial storage situations. Our experiment involves a case study to track the energy usage and fruit quality changes found in apples from two identical CA storage rooms (each 210 t) filled on the same day with fruit from the same origins and stored for 6 months. One CA room was treated with 1-MCP and maintained under a higher temperature regime (at 3.5°C) while the untreated room was kept at 1°C. CA atmosphere conditions in both rooms were kept the same. 5 grower lots each with different fruit quality characteristics were followed over the storage period with regular sampling for the physiological parameters of fruit respiration and ethylene production. Results show very different behaviour for the various growers under the two different storage regimes. A differential energy balance is calculated for the two rooms using the cooling equipment and CO_2 absorber run time records. Fruit quality from both rooms is compared after storage removal and shelf-life at room temperature.