

Abstract

Several cultivars of apple ('Delicious', 'Gala', 'Golden Delicious') and pear ('Bartlett', 'd'Anjou') were used to evaluate how inhibition of ethylene action by 1-MCP impacts fruit response to CA conditions and temperature during storage. In some studies fruit were harvested on multiple dates to incorporate maturity at harvest as another variable. In all studies, fruit were exposed to 1-MCP on the day of harvest for 14-16 h, then transferred to CA chambers and held for 24 h prior to establishment of CA conditions. Studies were conducted using CA systems in which atmosphere were established and maintained using flow-through or static environments. Fruit were removed from CA chambers at either 2 ('Bartlett', 'Gala') or 3 ('d'Anjou', 'Delicious', 'Golden Delicious') month intervals then rated for external color, disorders and decay incidence. After a 7 day period during which fruit were held at 20°C, external (color, disorders, decay) and internal quality were evaluated. For the cultivars evaluated, impacts of higher O₂ and CO₂ CA conditions observed were dependent in part on maturity at harvest and storage duration. For the apples evaluated, exposure to 1-MCP slowed ripening in CA with up to 5 kPa O₂, however, the impact of 1-MCP decreased with increased O₂ concentration and storage duration. Exposure to 1-MCP also slowed ripening at temperatures up to 5°C. Control of superficial scald on 'Delicious' and 'd'Anjou' was not compromised by increased O₂ set points. Accelerated ripening (softening, degreening) of 1-MCP treated 'd'Anjou' pears stored in 3 or 5 kPa O₂ was observed after 6 and 9 months plus 7 days at 20°C, but only after 9 months did fruit soften to less than 26N. Peel degreening increased with CA O₂ concentration but occurred at a slower rate in 1-MCP treated fruit. Development of peel CO₂ injury on 'Golden Delicious' apples was enhanced by 1-MCP treatment.