

#### Abstract:

During the 1998 season, early (14% soluble solids content = SSC) and late harvested (17% SSC) 'Redglobe' grapes were stored in 16 controlled atmospheres of 5, 10, 15, 20, and 25% CO<sub>2</sub> combined with 3, 6, and 12% O<sub>2</sub>. During the 1999 season, 10 or 15% CO<sub>2</sub> combined with 3, 6, and 12% O<sub>2</sub> were tested in comparison with air-stored grapes as control. None of the atmospheres tested for up to 12 weeks at 0°C influenced SSC, titratable acidity (TA), SSC:TA, or berry shatter and browning. Rachis browning was accelerated in grapes exposed to CO<sub>2</sub> levels above 10% and above 15% for early and late harvested 'Redglobe' grapes, respectively. Atmospheres including above 10% CO<sub>2</sub> controlled decay incidence and spread among berries (nesting) independent of O<sub>2</sub> concentrations during storage at 1°C for up to 8 weeks and after three days at 20°C, simulating a retail display period. Based on these data, a combination of 10% CO<sub>2</sub> with 3, 6 or 12% O<sub>2</sub> is suggested for up to 12 weeks storage for late harvested 'Redglobe' grapes. An atmosphere of 10% CO<sub>2</sub> + 6% O<sub>2</sub> is suggested for early commercially harvested 'Redglobe' grapes, but not to exceed 4 weeks.