

**Title** Changes in enzyme activities in abscission zone and berry drop of 'Kyoho' grapes under high O<sub>2</sub> or CO<sub>2</sub> atmospheric storage

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#### **Abstract**

To investigate the effects of high atmospheric O<sub>2</sub> on berry drop in 'Kyoho' grapes (*Vitis vinifera* X *V. labrusca*), changes in fruit detachment force (FDF), berry abscission and enzyme activities in the abscission zone (AZ) were examined during 60 days of storage in air (control), 40% O<sub>2</sub>+30% CO<sub>2</sub> or 80% O<sub>2</sub> at 0 °C and 95% relative humidity. There was a high negative correlation between FDF and berry drop. Cellulase activity increased over time and correlated strongly with berry abscission. Polygalacturonase (PG) activity increased markedly for the first 30 days and then decreased slightly. Pectinesterase (PE) maintained a basal level of activity at low temperatures. Cellulase, PG and PE activities were the lowest in fruits in 80% O<sub>2</sub>, followed by 40% O<sub>2</sub>+30% CO<sub>2</sub> and air storage. Peroxidase (POD) activity dropped firstly and subsequently rose sharply, which promoted by 80% O<sub>2</sub> and inhibited by 40% O<sub>2</sub>+30% CO<sub>2</sub> compared with control. High O<sub>2</sub> suppressed the activities of cellulase, PG and PE, maintained higher FDF, and reduced berry abscission during storage.