

Title Studies of postharvest berry abscission of 'Kyoho' table grapes during cold storage and high oxygen atmospheres

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Abstract

The effects of high O₂ on catabolic enzymes and anatomical structure in abscission zones, fruit detachment force (FDF), and berry drop of grapes were investigated. 'Kyoho' table grapes (*Vitis vinifera* x *V. labrusca*) were subjected to air or 80% O₂ at 0 °C in 95% relative humidity for 60 days. During storage, separation occurred at the berry-pedicel indentation and the abscission layer extended gradually from lateral phloem towards the whole phloem and pith, forming intercellular cavities and leading to berry drop. FDF declined steadily accompanied by an increase in berry drop. Grape abscission was correlated to the increases in activity of hydrolases, in particular cellulase (Cx) and polygalacturonase (PG), in abscission zones. In contrast to air storage, high O₂ inhibited Cx, PG and pectinesterase (PE) activity and the reverse for peroxidase (POD), decreased the degree of swelling and distorting of the abscission cell walls, and tended to keep berry adherence strength high and reduced berry drop. The inhibitory mechanism of high O₂ on berry drop possibly could be explained by the fact that disassembly of the abscission zone cells was delayed by a synergistic impact on degradation enzymes whose activities were affected by high O₂ levels.