

Title Effect of pre-treatments with high-CO₂ atmospheres on preserving quality and reducing decay of 'Ferrovia' sweet cherries

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Abstract

The aim of this work was to evaluate the effect of massive CO₂ concentration and time of pre-treatment on the quality attributes of 'Ferrovia' cherries and on the growth of artificially inoculated *Botrytis cinerea* during storage at 4°C for 15 days. Cherries were exposed to a continuous flow of air, air +40% CO₂, and air+60% CO₂ for 24, 48 and 72 hours; fruits were then stored at 4°C for 15 days. Initially and after 5, 9, and 15 days of storage, respiration rate, weight loss, peduncle dehydration, peduncle browning score, fruit appearance score, color, chlorophyll content, TSS, pH and titratable acidity, acetaldehyde and ethanol production, vitamin C and total phenol content, antioxidant activity and sensory evaluation were assessed. Additional samples were also inoculated with *Botrytis cinerea* and then exposed to the same massive CO₂ treatments. For each fruit the diameter of the lesions and the incidence of decayed fruits were measured. Soon after treatment massive CO₂ reduced the fruit weight loss, and helped to maintain fruit appearance and a high peduncle browning score. During storage, treatments with 40% CO₂ were generally more effective than 60% in controlling peduncle dehydration and peduncle browning, also inducing a better preservation of the chlorophyll content and of cherry appearance. Finally, massive CO₂ treatments reduced the lesion diameters and the incidence of decayed fruit compared to control; after 15 days of storage fruits exposed for 72 showed a smaller growth and a lower incidence. In conclusion, the massive CO₂ treatments can be a feasible technology to preserve quality of cherries, reducing decay.