

Title Sulfur dioxide fumigation alone or in combination with CO₂-enriched atmosphere extends the market life of highbush blueberry fruit

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Abstract

The combined effect of sulfur dioxide (SO₂) fumigation and different carbon dioxide (CO₂)-enriched atmospheres (3% O₂ + 3, 6, 12, or 24% CO₂) on quality attributes, postharvest decay, phytochemical content, and antioxidant capacity of eight fresh blueberry cultivars (*Vaccinium corymbosum* L.) was determined. The SO₂ treatments did not harm berry quality, but did significantly reduce decay incidence, especially when it was followed by storage in elevated CO₂ atmospheres (>6%). However, very high CO₂ atmospheres (24%) induced fruit softening and ‘off-flavors’. *Botrytis* and *Alternaria* spp. were the dominant fungal pathogens causing decay of blueberries during storage, but differences in the species of decay microorganisms were found among cultivars. Postharvest strategies that included SO₂ fumigation and/or enriched CO₂ atmospheres did not negatively affect phytochemical content or antioxidant activity of the fruit; however, the polyphenolic content and total antioxidant activity varied greatly among cultivars. Overall, SO₂ fumigation followed by controlled atmosphere storage (3% O₂ + 6 or 12% CO₂) is a promising postharvest strategy for fresh blueberries to reduce decay, extend market life, and maintain high nutritional value.