

Title Effects of postharvest onion curing parameters on enterobacter bulb decay in storage
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Abstract

Enterobacter bulb decay is a recently described storage disease of onion (*Allium cepa*) bulbs caused by *Enterobacter cloacae*. The disease is generally considered minor but, on occasion, can cause significant losses for onion producers. The impact of postharvest curing temperature and duration on Enterobacter bulb decay of onion was evaluated by inoculating bulbs of the cultivars Redwing and Vaquero with *E. cloacae* after harvest, curing the bulbs at 25, 30, 35, or 40°C for 2 or 14 days, and storing the bulbs at 5°C for 1, 2, or 3 months. Noninoculated bulbs and bulbs injected with sterile water served as control treatments. The trial was completed using bulbs harvested from commercial onion crops grown in the semi-arid Columbia Basin of central Washington in each of 2008–09 (center-pivot irrigated crop) and 2009–10 (drip irrigated crop). Severity of bulb rot was assessed by cutting each bulb down the center from the neck to the basal plate, and rating the percentage of cut surface area with bacterial rot symptoms. Bulb rot severity was negligible for noninoculated bulbs (mean of 0.3% in the 2008–09 storage trial and 1.0% in the 2009–10 storage trial) and bulbs injected with water (0.8% in the 2008–09 trial and 1.3% in the 2009–10 trial) compared to bulbs inoculated with *E. cloacae* (15.3% in 2008–09 and 23.3% in 2009–10). Severity of Enterobacter bulb decay was affected significantly ($P < 0.05$) by season (trial), cultivar, curing temperature, curing duration, and storage duration, with significant interactions among these factors. Enterobacter bulb decay was significantly more severe for bulbs cured at 40°C than for bulbs cured at 25, 30, or 35°C. This effect was even greater when bulbs were cured for 14 days versus 2 days prior to cold storage, and in bulbs stored for 2 or 3 months after curing compared to bulbs stored for 1 month. The increase in bulb rot severity caused by curing bulbs at 40°C for 14 days compared to lower temperatures and shorter durations was greater for Vaquero than Redwing, particularly in the 2008–09 trial. The results suggest that curing temperatures $\leq 35^\circ\text{C}$ should significantly reduce the risk of Enterobacter bulb decay in storage for these cultivars. If higher curing temperatures are used in order to dry onion necks for long-term storage and reduce the risk of fungal diseases such as neck rot

(caused by *Botrytis* spp.), a shorter curing duration may be necessary to minimize the risk of Enterobacter bulb decay in storage.