

Title Almond quality as influenced by radio frequency heat treatments for disinfestation
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Abstract

Increased regulation of chemical fumigants has forced the almond industry to seek alternatives for postharvest control of insect pests in raw almonds. This paper reports developments of non-chemical treatment for postharvest disinfestation of almonds using radio frequency (RF) energy. A pilot-scale 27 MHz RF unit was used to evaluate effects of a RF treatment protocol on quality attributes in treated in-shell and shelled almond samples. The RF treatment protocol used 0.75 kW RF power, a forced hot air at 63 °C, back and forth movements on the conveyor at 0.56 m/min, and single mixing, which all improved the final heating uniformity. RF treatments sharply reduced the heating time from 86 and 137 min for hot air heating to only 6.4 and 8.8 min for the center of 1.5 kg in-shell and 2.4 kg shelled almond samples to reach 63 °C, respectively. Almond quality was not affected by the RF treatments because peroxide values, fatty acid and kernel color of treated almonds were better than or similar to untreated controls after 20 d at 35 °C, simulating 2 years of storage at 4 °C. RF treatments did not significantly affect the kernel moisture content of both types of almonds but reduced the moisture content in the shell. RF treatments may hold great potential to replace chemical fumigation for disinfesting almonds.