

Title Pasteurization process development for controlling *Salmonella* in in-shell almonds using radio frequency energy

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Abstract

Radio frequency (RF) treatment holds potential as a pasteurization method to control *Salmonella* in almonds without causing a substantial loss of product quality. Thermal resistance of *Salmonella* can be reduced by increasing water activity, thus a soaking process was designed prior to RF treatments. A pilot-scale 27 MHz, 6 kW RF heating system was used to rapidly heat 1.7 kg washed in-shell almonds with hot air heating at 55 °C. To achieve appropriate heating rate, constant drying temperature and short time cooling, the RF treatment protocol was obtained using an electrode gap of 13 cm for heating, 14 cm for drying, and followed by forced room air cooling of 5-cm thick samples. The results showed that almond temperatures above 75 °C at 23% moisture contents for 2–4 min RF heating could meet the requirements to achieve 5-log reduction of *Salmonella*. The RF treatment process for 20 min reduced the moisture content to 5.7% w.b. Peroxide value, fatty acids values and kernel colors of the RF treated almonds met good quality standard used by nut industry.