

Title Combined effects of chlorine dioxide, drying, and dry heat treatments in inactivating microorganisms on radish seeds

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Abstract

We determined the combined effectiveness of ClO₂ (200 and 500 µg/ml, 5 min), air drying [25 °C, 40% relative humidity (RH), 2 h], and mild dry heat (55 °C, 23% RH, up to 48 h) treatments in killing total aerobic bacteria (TAB), *Escherichia coli* O157:H7, and molds and yeasts (MY) on radish seeds. A 5.1-log reduction in the number of TAB was achieved on radish seeds treated with 200 or 500 µg/ml ClO₂ followed by air drying for 2 h and dry heat treatment for 48 h or 24 h, respectively. When radish seeds were treated with 200 and 500 µg/ml ClO₂, air dried, and heat treated for 12 h and 6 h, respectively, the initial population of *E. coli* O157:H7 (5.6 log CFU/g) on seeds was reduced to an undetectable level (<0.8 log CFU/g). However, the pathogen was detected in 5-day-old sprouts. The reduction of MY (1.2–1.0 log CFU/g) on radish seeds under similar experimental conditions was not changed significantly during subsequent heat treatment up to 48 h. Results show that treating radish seeds with 500 µg/ml ClO₂, followed by air dried at 25 °C for 2 h and heat treatment at 55 °C for 36 h achieved a >5-log CFU/g reduction of TAB and *E. coli* O157:H7. These observations will be useful when developing effective strategies and practices to enhance the microbiological safety of radish sprouts.