

Title Inactivation of Bacteria, Yeasts and Molds on Palletized Highbush Blueberries Using Chlorine Dioxide Sachets

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Abstract

Chlorine dioxide (ClO₂) gas generated by a dry chemical sachet was tested against three foodborne pathogens, five yeasts and five molds known for spoilage. Initially, five fresh blueberry samples (100 g) were separately inoculated with *Listeria monocytogenes*, *Salmonella*, *Escherichia coli* 0157:H7 (3 strains each), and yeasts and molds (5 strains each) to contain ~10⁶ CFU/g and treated with ClO₂ (4 mg/l) for 12 h in a sealed 20-l container (99.9% RH) at ~22°C (3 replicates). After gassing, blueberries (25 g) were diluted 1:5 in neutralizing buffer, pulsed for 1 min and plated using standard FDA procedures to quantify survivors. This treatment yielded reductions of 3.94, 3.62, 4.25, 3.10, and 3.17 log CFU/g for *L. monocytogenes*, *Salmonella*, *E. coli*, yeasts and molds, respectively. Thereafter, 30 lugs of blueberries (~9.1 kg/lug) were stacked on 4 x 4 ft pallets (5 lugs/level x 6 levels) (6 replicates), tarped, and exposed to ClO₂ (18 mg/l) for 12 h. After gassing, significant (P < 0.05) reductions of 2.12, 1.61, 0.72, 1.76, and 1.55 log CFU/g were seen for mesophilic aerobic bacteria (MAB), yeasts, molds, coliforms, and *E. coli*, respectively, compared to ungassed controls. No significant differences (P > 0.05) in microbial inactivation were seen between lug levels and, with one exception (MAB), between the bottom and top surface of individual lugs. Based on these findings, ClO₂ sachets may provide a simple, economical and effective means of enhancing the microbial shelflife and safety of fresh blueberries.