

Title Effects of high pressure treatment on microbiological and organoleptic quality of fresh-cut vegetables

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Abstract

Effects of high pressure treatment on inactivation of various microorganisms *in vitro* and microbiological and organoleptic quality of fresh-cut vegetables *in vivo* were determined. Five strains each of bacteria and bacterial and fungi isolates from endogenous microflora of vegetables were processed at a high pressure ranging from 300 to 700 MPa for 10 min. Fresh-cut and whole vegetables including carrots, cucumber, and lettuce were subjected to 400 MPa for 10 min. With the *in vitro* study, populations of *Pseudomonas fulva* (7.3 log CFU/ml), *P. mucidolens* (6.5 log CFU/ml), *Enterobacter kobei* (7.9 log CFU/ml), and *Lactococcus lactis* (2.5 log CFU/ml) decreased to below the level of detection at 400 MPa for 10 min, whereas population of *Bacillus cereus* (7.0 log CFU/ml) decreased by only 1 and 1.5 logs at 400 and 700 MPa for 10 min, respectively. Populations of endogenous bacteria (3.7 to 6.1 log CFU/ml) and fungi (3.7 to 4.8 log CFU/ml) isolated from some vegetables decreased to below the detection level and undetectable level, respectively, at 400 MPa for 10 min. With the *in vivo* study, treatment of 400 MPa for 10 min resulted in reductions of 1.6 to > 2.6 logs of bacteria and 3.5 to 5.3 logs of fungi in fresh-cut carrots, cucumber, and lettuce. However, fresh-cut carrots and cucumber showed softened appearance and fresh-cut lettuce become brown after pressure treatment. When whole carrots and cucumber were pressurized at 400 MPa for 10 min and then cut into slices, reduction in the microbial activity was observed with the fresh-cuts and the loss of organoleptic quality was reduced as compared to fresh-cuts that were pressurized after cutting. These results indicate that the high pressure at 400 MPa for 10 min was effective in decreasing microbial activity *in vitro* and *in vivo*, except for spore-former such as *Bacillus cereus*, but caused deterioration of surface of fresh-cut vegetables, which was less appealing than whole vegetables pressurized and then cut.