

SURVIVAL OF *LISTERIA MONOCYTOGENES* ON COOKED HIGH PRESSURE TREATED BACON

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I. OBJECTIVES

Industrially produced cooked bacon product is exposed to the environment post-lethality and handled prior to final packaging after exiting continuous cooking ovens. There is a lack of information in the literature on the efficacy of high pressure processing (HPP) as a control intervention for recontamination and subsequent growth of *Listeria monocytogenes* on cooked bacon. The purpose of this study was to determine the survival of *L. monocytogenes* on cooked high pressure processed bacon strips water activity (a_w) (0.805 ± 0.072 and 0.824 ± 0.042) and bits (a_w 0.807 ± 0.052 and 0.840 ± 0.019) during a 150-d storage period at 4°C.

II. MATERIALS AND METHODS

Bacon strips and bits with 2 a_w levels (99 g) were inoculated with a 5-strain *L. monocytogenes* cocktail at ca. 2.0-log₁₀ CFU/g and then packaged under 100% nitrogen gas and high pressure processed at 86,000 psi for 5 min. Inoculated samples were held at 4°C, and duplicate samples were analyzed at 1, 15, 30, 45, 60, 90, 120, and 150 d by direct spiral plating on modified Oxford medium. Un-inoculated samples ($n=8$) were analyzed for lactic acid bacteria and aerobic total plate counts. Data were analyzed using SPSS version 27 (IBM Corp., Armonk, NY) and one-way analysis of variance. Triangle tests were performed using untrained panelists to determine whether flavor differences existed between un-inoculated HPP and non-HPP samples and analyzed using the chi-squared distribution.

III. RESULTS

There were no significant differences in *L. monocytogenes* populations between bacon strips and bits or between samples with different a_w ($P > 0.05$). HPP resulted in an initial decrease (measured at 24 h) of ca. 1.0-log₁₀ CFU/g compared to non-HPP samples ($P < 0.05$). Detection limit was 20 CFU/g. The *L. monocytogenes* population declined over the course of 150 d in non-HPP samples by 1.0-log₁₀ CFU/g ($P < 0.05$) but did not significantly decline over time in the HPP bacon. HPP and non-HPP bits and low a_w strips were not statistically different in flavor, as determined by triangle testing. The higher a_w strips, however, were statistically different ($P < 0.05$), with up to 31% of the population able to discern between HPP and non-HPP product. Additionally, the HPP bits tended to be compressed and clumped together in the package.

IV. CONCLUSION

These data suggest that HPP may be effective in reducing *L. monocytogenes* populations in cooked bacon strips and bits. However, the reduction was small, and sensory differences in bacon strips and severe clumping in bits may preclude its use from a practical standpoint.

Keywords: cooked bacon, high pressure processing, *Listeria monocytogenes*, sensory analysis