Title Effects of X-ray radiation on *Escherichia coli* O157:H7, *Listeria monocytogenes*, *Salmonella enterica* and *Shigella flexneri* inoculated on shredded iceberg lettuce

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Abstract

The main goal of this investigation was to study the efficacy of X-ray doses (0.1, 0.2, 0.3, 0.5, 0.75, 1.0, 1.5 and 2.0 kGy) on inoculated *Escherichia coli* O157: H7, *Listeria monocytogenes*, *Salmonella enterica and Shigella flexneri* on shredded iceberg lettuce. The second goal was to study the effect of X-ray on the inherent microflora counts and visual color of shredded iceberg lettuce during storage at 4 °C for 30 days. Treatment with 1.0 kGy X-ray significantly reduced the population of *E. coli* O157: H7, *L. monocytogenes*, *Salmonella enterica* and *S. flexneri* on shredded iceberg lettuce by 4.4, 4.1, 4.8 and 4.4-log CFU 5 cm^{-2}, respectively. Furthermore, more than a 5 log CFU reduction of *E. coli* O157: H7, *L. monocytogenes*, *S. enterica* and *S. flexneri* was achieved with 2.0 kGy X-ray. Treatment with X-ray reduced the initial microflora on iceberg lettuce and kept them significantly ($p < 0.05$) lower than the control during storage at 4 °C and 90% RH for 30 days. Treatment with X-ray did not significantly ($p > 0.05$) change the green color of iceberg lettuce leaves. Treatment with X-ray significantly reduced selected pathogens and inherent microorganisms on shredded iceberg lettuce leaves, which could be a good alternative to other technologies for produce (lettuce) industry.