

Title Cold atmospheric gas plasma disinfection of chicken meat and chicken skin contaminated with *Listeria innocua*

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Abstract

Gas plasmas generated at atmospheric pressure and ambient temperatures offer a possible decontamination method for poultry products. The efficacy of cold atmospheric gas plasmas for decontaminating chicken skin and muscle inoculated with *Listeria innocua* was examined. Optimization of operating conditions for maximal bacterial inactivation was first achieved using membrane filters on which *L. innocua* had been deposited. Higher values of AC voltage, excitation frequency and the presence of oxygen in the carrier gas resulted in the greatest inactivation efficiency, and this was confirmed with further studies on chicken muscle and skin. Under optimal conditions, a 10 s treatment gave > 3 log reductions of *L. innocua* on membrane filters, an 8 min treatment gave 1 log reduction on skin, and a 4 min treatment gave > 3 log reductions on muscle. These results show that the efficacy of gas plasma treatment is greatly affected by surface topography. Scanning electron microscopy (SEM) images of chicken muscle and skin revealed surface features wherein bacteria could effectively be protected from the chemical species generated within the gas plasma. The developments in gas plasma technology necessary for its commercial application to foods are discussed.