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Validation of Interventions on Raw Ground Beef Components; Cheek Meat and Weasand

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Objectives

Interventions are commonly used to treat carcasses to reduce microbial loads, but little information is available on the use of these interventions on cheek meat and weasand, which can be used as raw ground beef components. Due to their anatomical location, they could have a high risk of contamination. The objective of this study was to determine the efficacy of 2 antimicrobial interventions strategies; 4% lactic acid (LA), and 1,000 ppm Acidified Sodium Chlorite (ASC), to reduce pathogens in raw ground beef components; cheek meat and weasand.

Materials and Methods

The experiment was a randomized complete split-plot design with individual Cheek meat ($N = 36$) and Weasand ($N = 36$), defined as experimental units. The 2 components were challenged with a 3-strain cocktail mixture of each of the pathogen; *Escherichia coli* O157: H7 (Strains 944, 966, and 922) STECS (nonO157 STEC serogroups; 045, 0145, and 0121) and *Salmonella* (Typhimurium, Enteritidis, and Newport) 7.1, 7.2, and 6.8 log₁₀ CFU/ml respectively, for 20 min. All the strains were obtained from the Texas Tech University Food Microbiology Laboratory stock collection (Lubbock). For every pathogen, a total of 12 units of each component were used. The units of each component inoculated with a pathogen were further divided into 4 subgroups, each group consisting of 3 pieces; I) Inoculated but nontreated (used to determine recovery of pathogens), ii) Ambient water (CTRL), iii) 4% lactic acid (LA) and iv) Acidified Sodium Chlorite (ASC).

On d 0, the interventions consisting; Ambient water (pH = 6.87), 4% lactic acid (pH = 2.03) and Acidified Sodium Chlorite (pH = 2.91, 1,000 ppm). were sprayed onto the surface of the product at room temperature, as they move down the belt, inside a 6-nozzle trim-sanitizing spray. Following treatment, 50 cm² of each sample was swabbed by using 10 mL Buffered Peptone Water (BPW) swabs and sterile template and subjected to bacterial enumeration on thin-overlaid selective media. These samples were held at 4°C, for 24 h, separate area was swabbed and enumerated. Data were analyzed in R-Studio (version 3.3.1).

Results

On d 0, LA reduced *E. coli*, STECS and *Salmonella* in cheek meat and weasand on average by 0.90, 0.93, and 0.89 log₁₀ CFU/cm² respectively, when compared with the initial level of the pathogens in inoculated and non-treated samples. Similarly, ASC reduced pathogens on average by 0.79, 0.87, and 0.78 log₁₀ CFU/cm², respectively. Samples treated with ambient water gave lower surface counts of the pathogens when compared to untreated samples, however, the reduction was not significant. Both LA and ASC treatment maintained bacterial reduction even after 24 h.

Conclusion

The LA and ASC treatments can be used as intervention alternatives for cheek meat and weasand, as these components can potentially become a high-risk source of contamination.