



International Journal of Meat Science

ISSN 2071-7113

science
alert

ANSI*net*
an open access publisher
<http://ansinet.com>

The Efficacy of the Citrilow™ Antimicrobial¹ (pH = 1.3) as a 5 Sec Spray for Killing *Escherichia coli* O157:H7 on Beef Primals

P.E. Cook, K.L. Beers and C.W. Coleman

MCA Services, 200 S. First Street, Rogers, AR 72756, USA²

ABSTRACT

The USDA/FSIS compliance guidelines will be initiating a regulation that will require a critical control point to be implemented on beef primal and/or sub-primal processing lines. The objective of the following study was to evaluate the microbial efficacy of Citrilow™ (an acid-based product marketed by Safe Foods Corporation, N. Little Rock, AR) for reducing contamination of *Escherichia coli* O157:H7 on beef primal and sub-primal pieces before they are cut for commercial sale. The goal was to achieve at least a 1 log reduction in the organism of concern, *Escherichia coli* O157:H7. Twenty whole beef primals were obtained from a local beef processing plant and were transported on ice to MCA Services (Rogers, AR). Upon arrival at the laboratory, the primals were removed from their wrapping material and were placed on a wire rack with the meat-side facing up. Each primal was cut into three, 5 inch by 5 inch pieces, for a total of 60 samples. After cutting, the samples were placed individually in large sterile holding bags and were held at 40° F for 4 h. Each of the 60 meat samples was then removed from the refrigeration unit and from their sterile bags. Samples were then placed, cut-side down, on a sanitized wire rack. The top, uncut surface of each sample was inoculated with 10,000 cells of *Escherichia coli* O157:H7 by inoculating 100 µL of a previously enumerated inoculum onto 10 different areas of each individual meat sample. The inoculum was allowed to attach for 20 min. The 60 inoculated samples were then randomly divided into three groups of 20 samples each. One group served as a control to which no further treatment was implemented. The second group was treated with a room temperature water spray for 5 sec at a rate of 0.5 gallons/hour. The third group of samples was sprayed at a rate of 0.5 gallons/hour for 5 sec with Citrilow™ (pH = 1.3). All groups were allowed to sit undisturbed for 2 min and were then microbiologically sampled using sterile SpongeSicles™³ moistened in Butterfield's Phosphate Diluent. SpongeSicles™ were broken off into 25 mL of Butterfield's Phosphate Diluent. All samples were serially diluted and enumerated for *Escherichia coli* O157:H7 on SOBA⁴ plates. The control group of primals that received no treatment had a log *Escherichia coli* count of 3.9; the water only treatment group had a log count of 3.8 and the Citrilow™-treated group of primals had a significantly lower log count of 2.8. Thus, the goal of the study was accomplished, in that a greater than 1 log reduction in *Escherichia coli* O157:H7 was achieved. Therefore, the USDA-approved (USDA 7120 Suitable Ingredients List), commercially available and very cost effective Citrilow™ antimicrobial can be utilized as an effective antimicrobial to control *Escherichia coli* O157:H7 on beef primals.

Key words: Citrilow™, beef primals, *Escherichia coli* O157:H7, cost effective

¹Safe Foods Corporation, N. Little Rock, AR 72118, USA

²Address correspondence to: alwaldroup@safefoods.net

³Biotrace International BioProducts, Redmond, WA 98052, USA

⁴Edge Biologicals, Memphis, TN 38105, USA