



## Effects of Electrostatic Spray and Natural Antioxidants on Chemical Quality of Grass-Finished Beef Strips Steaks

H. T. Thames<sup>1\*</sup>, D. Sajeev<sup>1</sup>, H. C. Cobb<sup>2</sup>, A. T. Sukumaran<sup>3</sup>, A. J. Holtcamp<sup>2</sup>, and T. T. N. Dinh<sup>2</sup>

<sup>1</sup>Animal & Dairy Sciences, Mississippi State University, Mississippi State, MS, USA

<sup>2</sup>Animal & Dairy Sciences, Mississippi State University, Starkville, MS, USA

<sup>3</sup>Poultry Science, Mississippi State University, Starkville, MS, USA

\*Corresponding author. Email: htthames@gmail.com (H. T. Thames)

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### Objectives

This study was aimed to determine how electrostatic spray of natural antioxidants impacts chemical quality of grass-finished beef strip steaks.

### Materials and Methods

Twenty certified grass-finished beef loins from ten animals were purchased from a certified grass-fed beef purveyor. Two loins of the same animals were cut into sixteen 2.5-cm thick steaks (eight steaks per loin) without the *gluteus medius* muscle. A factorial arrangement of 4 treatments, including a negative control (no spraying; NEG) and 1000-ppm of electrostatic spray of cherry extract rich in ascorbic acid (ES-ACE), electrostatic spray of rosemary and green tea extract rich in polyphenols (ES-RGT), and pressurized spray of ACE (PS-ACE), and 2 retail time points (0 and 5 d) was randomized within an animal, resulting in two steaks receiving a treatment × day combination within an animal. Five loins were randomly selected for chemical analyses ( $n = 10$  per treatment × day combination). Meat antioxidants were extracted in methanol. The extracted antioxidants were reacted with ABTS<sup>+</sup> radical cation (2,2'-azino-bis(3-ethylbenzthiazoline)-6-sulphonic acid diammonium salt) solution diluted to an absorbance of 0.85 to measure Trolox Equivalent Antioxidant Capacity (TEAC) at 734 nm. The extract was also reacted with

Folin-Ciocalteu (FC) reagent to measure total phenolic compounds at 765 nm. Thiobarbituric acid reactive substances (TBARS) were extracted in 10% trichloroacetic acid and reacted with thiobarbituric acid and the resulted pigment was measured at 532 nm. Data were analyzed by the GLIMMIX procedure of SAS v9.4 and actual probability was reported.

### Results

On d 0, NEG steaks had less FC values than all treatment steaks ( $P < 0.001$ ), of which the ES\_ ACE steaks had 14 and 100% more than PS\_ ACE and ES\_ RGT steaks, respectively ( $P \leq 0.005$ ). Only ES\_ ACE steaks had greater FC value than NEG steaks on d 5 ( $P < 0.001$ ). As a result, TEAC value of ES\_ ACE steaks was 17 and 75% more than that of PS\_ ACE and ES\_ RGT steaks ( $P \leq 0.005$ ) and remained greater than that of NEG steaks on d 5 ( $P = 0.064$ ). Greater antioxidant capacity in ES\_ ACE and PS\_ ACE steaks decreased lipid oxidation by 56% (0.9  $\mu\text{g}$  MDA/kg less in ES\_ ACE and PS\_ ACE on d 5) as compared with NEG steaks in ES\_ ACE steaks in contrast to the other treatments ( $P < 0.001$ ).

### Conclusion

Electrostatic spray of cherry extract rich in ascorbic acid was the most effective antioxidant application to prevent lipid oxidation in grass-finished beef strips steaks.