

Microbiology and Pathogen Reduction

Evaluation of a Computerized Colorimetry System (Labworks Software®) for Rapid Determination of Total Microbial Load and Coliforms in Ground Beef.

J.M. Racz, D.P. Cornforth and G.H. Richardson, Department of Nutrition and Food Sciences, Utah State University, Logan, UT 84322-8700.

Total microbial load and coliforms were measured in retail ground beef by standard and rapid colorimetry methods. Ground beef (2.2 kg/trial; 3 trials) was held for 0, 8, 16, 24 or 32 hr at 22°C to obtain variable microbial load. For rapid microbial load determination, a 1:100 sample dilution was inoculated into tubes containing standards methods broth and the indicator dye triphenyltetrazolium chloride, which turns red upon reduction associated with increasing microbial growth. For coliforms, inoculation was made into a bromocresol purple broth which turned yellow with decreasing pH. Within 20 hr, total microbial load and coliforms, respectively, could be determined by measuring colorimetric changes in a^* (redness) and b^* (yellowness) values. Standard plate count was done on standard plate count agar. Values were obtained after 48 hr at 37°C. Standard coliform enumeration was done on Violet Red Bile agar. Results were obtained after 24 hr at 37°C. Correlation for total microbial load between the standard and colorimetric methods was 0.845.

Influence of Ozone Concentration and Exposure Time on Survival of *Escherichia coli* and *Pseudomonas*.

B.S. Smith, K.W. McMillin, W.J. Lyon, A.J. Beyer, D.B. Fuselier and T.A. Stringer, Louisiana State University Agricultural Center, Baton Rouge, LA 70803.

The lethality of ozone gas on *Escherichia coli* α DH5 and *Pseudomonas aeruginosa* was examined with factorial treatment arrangements of ozone concentration (0, 100, 1000, 5000 ppm) and exposure time (1, 10, 50 min) in a completely randomized design. Barrier pouches containing tryptic soy agar in Petri dishes inoculated with ~ 2.8 log CFU/ml by spread plate techniques were evacuated (50% vacuum), sealed, and filled with ozone generated from

bottled gas (20% CO₂, 2.5% O₂, 77.5% N₂) through a septum to a uniform pouch height. Pouches were opened at the exposure times and incubated at 35°C in air for 24 h. Data analyses (GLM procedures of SAS) showed no differences with exposure times or among the lower levels of ozone, but 5,000 ppm ozone resulted in lower ($P < 0.01$) log CFU/ml. Another experiment with 0, 1000, 2500 and 5000 ppm ozone and the same exposure times gave similar results. Ozone gas (2500 and 5000 ppm) decreased ($P < 0.01$) the number of viable microbial cells inoculated on agar by 93% compared with controls in both experiments.

Key words: *E. coli*, Ozone, Survival

Microbiological, Sensory and Chemical Characteristics of Vacuum-Packaged Cooked Beef Top Rounds Treated with Sodium Lactate and Sodium Propionate.

J.V. Maca, R.K. Miller, J.D. Maca and G.R. Acuff, Texas A&M University, College Station, TX 77843-2471.

The objectives of this study were to examine the effects of sodium lactate and sodium propionate on the microbiological, sensory and chemical characteristics of vacuum-packaged cooked beef top rounds. Top rounds containing 3% sodium lactate (NaL) or 3% or 4% NaL in combination with 0.1% or 0.2% sodium propionate (NaP) were stored for up to 84 d at 4°C. Addition of any of the treatments to the roasts greatly reduced total APCs (Aerobic Plate Counts). Positive flavor notes associated with fresh beef were enhanced by ingredient addition and tended to be highest in roasts containing 3% NaL + 0.2% NaP. Cooked roast beef color was enhanced by the addition of NaL alone or in combination with 0.1% NaP. Lipid oxidation and water activity were decreased by the addition of NaL in combination with NaP and pH and cooked yield were increased with any level and combination of ingredient addition. Based on the results of this study, addition of no more than 3% sodium lactate plus 0.1% sodium propionate would be recommended to increase the microbiological shelf-life of vacuum-packaged cooked beef top rounds, while maintaining positive flavor and color sensory characteristics.

Key words: Sodium lactate, Sodium propionate, Shelf-life.