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The use of Verdad® Avanta™ F250 with multiple functionalities to extend the shelf life of fresh beef patties (#601)Edwin V. Harmelen¹, Apostolos Papageorgiou¹, Janneke Wijman¹, Karin Beekmann-Metselaar¹, Garrett McCoy², Saurabh Kumar²¹ Corbion NL, Gorinchem, Netherlands; ² Corbion USA, Lenexa, US**Introduction**

Fresh meat is a highly perishable product with a typical shelf life of less than a week at refrigerated storage. Shelf life extension of fresh red meat involves both inhibition of oxymyoglobin oxidation, which results in loss of the red meat color (Coma V. 2008), as well as inhibition of microbial growth. Shelf life can be extended only by controlling both of these aspects. With the increasing demand of clean and clear label ingredients, the use of 'kitchen cupboard ingredients' like plant extracts, spices and vinegars with more than one functionality is increasing in popularity (McMillin KW. 2008). Several extracts and spices were therefore assessed on antimicrobial activity and color stability. An optimized ratio with synergistic effect of antioxidant and vinegar powder was developed as a promising clean label solution for fresh red meat preparations. The aim of this study was to evaluate the efficacy of Verdad® Avanta™F250 (AVB) to extend color stability, inhibit bacterial growth and maintenance of taste in fresh beef patties.

Methods

Beef patties were produced, with and without the addition of 0.3% AVB. Samples to determine color stability were packaged in duplicate and each set (n=2) was placed on a different tray in a show cabinet to imitate display conditions. Each tray and location had the same light intensity and display conditions were set at: 1000 lux 16 hours on, 8 hours off. Pictures were taken at the same settings and light conditions at different time points to allow for visual comparison. Sensory evaluation was done on grilled patties by a sensory quality method using a Difference From Control (DFC) test. Burgers were evaluated with a small trained sensory panel (n=7). Ratings were done on a scale from 1 to 10 as a difference against a previously determined rating for the reference. Microbial growth inhibition was determined by a shelf life study. Beef patties were packaged and stored dark at 4°C. At appropriate time intervals, samples of the burger were aseptically taken for microbiological analyses. After homogenization and dilution, the samples were plated on BHI agar for total plate counts, MRS agar for lactic acid bacteria counts and VRBG agar for counts of Gram negative bacteria.

Results

The color stability test showed that 0.3% AVB resulted in a longer stability of the red meat color compared to the control (Figure 1). After 8 days the control discolored greatly, indicating the formation of metmyoglobin while 0.3 AVB was able to prevent the oxidation reaction and maintain the red color of fresh meat up to 17 days. AVB prevented the formation of metmyoglobin, improv-

ing the color stability of beef patties throughout the 17 day display period.

The sensory test indicated that there was no impact on flavor of 0.3% AVB compared to the control (Figure 2). There was a slight increase in bitter taste perception but all other parameters were unchanged.

From Figure 3 results, it can be seen that the addition of 0.3% AVB can extend the shelf life of fresh beef patties. Total plate counts and growth of LAB until a level that is generally accepted to cause spoilage (~7 log cfu/g) are delayed. Also the maximum number of cells is approximately 2 log cfu/g lower for the beef patties with AVB compared to the control. Growth parameters for total plate counts and LAB are very similar, indicating that total plate counts are most likely dominated by LAB. Gram negative bacteria are even completely inhibited over a period of 18 days in the AVB patties, while the control samples show outgrowth of Gram negatives over the same time period (Figure 3C).

Conclusion

The combination of sensory evaluation, color stability test and microbiological testing showed that 0.3% AVB is a promising clean label solution to extend the shelf life of fresh beef patties. The overall shelf life solution, AVB, is not only microbiologically active but also prevents oxidation, and thus improvement of color stability, thereby providing overall stability of fresh meat. Unlike many alternatives which are known to impact sensory profile negatively, AVB treatment maintained the sensory profile acceptance. In addition to preventing spoilage, AVB solution also contributes to food safety enhancement by inhibiting the pathogenic gram negative bacteria.

Notes



Figure 2.
Results of the DFC sensory test of grilled fresh beef patties with and without 0.3% AVB.

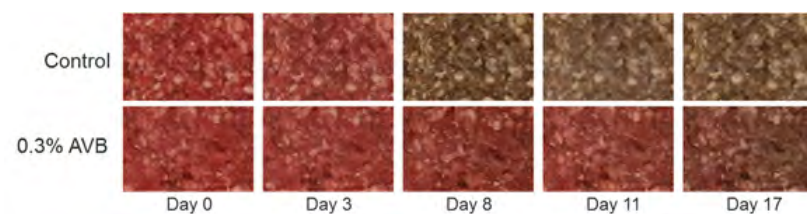


Figure 1.
Results of the color stability test of fresh beef patties with and without 0.3% AVB.

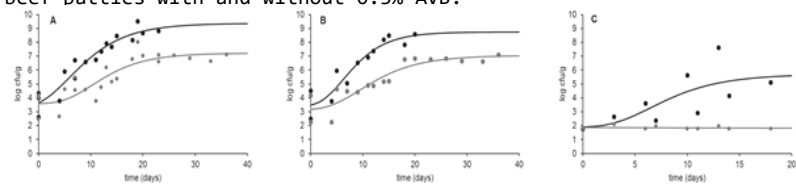


Figure 3.
Microbial growth of naturally contaminated fresh beef patties without (black) and with 0.3

Notes