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Ascorbic Acid and Ground Beef Display Life

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Summary

Adding 0.05 and 0.10% ascorbic acid to ground beef resulted in brighter color and longer display life, more intense taste panel beef flavor and less rancidity. Those advantages should encourage centralized retail cutting and packaging by reducing spoilage and loss.

Ground beef with 25% fat had brighter color scores and lower microbial counts but was more off-flavor than 20% fat ground beef.

Introduction

Shoppers often use meat color as a quality indicator. A cherry red color is preferred, but display conditions lead to rapid discoloration, especially when beef is ground. Color changes occur much sooner than flavor changes or spoilage. Ascorbic acid (vitamin C) is used in processed meat (ham, bacon, bologna, wieners, etc.), but is not allowed in fresh meat. By slowing discoloration without masking other quality deterioration, adding ascorbic acid to ground beef could reduce losses. We looked at the effects of adding low levels of ascorbic acid to ground beef of two fat levels.

Experimental Procedure

We added ascorbic acid at levels of 0, 0.1, 0.05 and 0.10% to ground beef that was 20 or 25% fat. Packages were displayed under retail conditions. At 0, 1, 3, 5 or 10 days of display, color was evaluated visually and by reflectance measurements. Taste panel traits, microbial counts, and chemical rancidity (thiobarbituric acid) were also determined for each treatment.

Results and Discussion

The higher ascorbic acid treatments (0.05 and 0.10%) were brighter red visually than the 0 and 0.01% treatments, and 25% fat ground beef was brighter red than 20%. Reflectance measurements supported the color panel findings.

A trained taste panel found more off-flavor in the higher fat ground beef (25%), and off-flavor scores were not affected by addition of ascorbic acid. Beef flavor was scored as more intense for ground beef containing 0.05 and 0.10% ascorbic acid. Chemical rancidity was greater for the 0 and 0.01% ascorbic acid treatments than the 0.05 and 0.10% treatments. Ascorbic acid did not affect microbial counts, but the 25% fat product had lower microbial counts than 20%.

By using 0.05 and 0.10% ascorbic acid, we obtained a 5 day display life for ground beef of both 20 and 25% fat. Presently, ground beef has a 2 to 3 day display life. Thus, adding ascorbic acid to ground beef could decrease product rework and loss, and make centralized ground beef production more feasible.



Color is hard to describe, except by comparing to a color with which we are familiar -- "cherry red" is the preferred color for beef. But sensitivity to color varies between people. This is a reflectance spectrophotometer that translates color into a set of numbers that describe beef color precisely and accurately.