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Meat and Muscle Biology™

Consumer Perception Towards the Enhanced Color of Atypical Dark-Cutting Beef by Nitrite-Embedded Packaging

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Objectives

Meat color is often seen by consumers as an indicator of freshness and wholesomeness. Nitrite-embedded (NE) packaging forms nitric oxide myoglobin, which imparts a bright red color similar to oxymyoglobin. However, limited research has determined the effects of NE packaging to improve the appearance of atypically dark cutting beef. Consumers' perception of NE packaging ultimately determines its success in the market. Educating consumers through infographics can transfer knowledge more effectively than text alone, potentially being a useful method to introduce and simplify the complexity of NE packaging's role in improving the surface color of beef steaks. The objectives of this study were to evaluate FreshCase® nitrite-embedded packaging's effect on atypical dark-cutting beef steaks and to evaluate student consumer perception of nitrite-embedded packaging improving the surface color of beef before and after exposure to infographics containing equal content.

Materials and Methods

Atypical dark-cutting (n = 13, pH 5.70 ± 0.09) and normal-pH (n = 13, pH = 5.57 ± 0.1) USDA Low Choice beef strip loins were selected 3 d postharvest. Atypical dark-cutting loins were cut into 2.54 cm thick steaks and randomly packaged in polyvinyl chloride film (PVC) or NE film. Normal-pH control loins were cut 2.54 cm and randomly packaged in PVC overwrap. Packages were placed in a coffin-style retail case under fluorescent lighting for 6 d. Instrumental color was observed every 24 h using a HunterLab MiniScan XE spectrophotometer. The color was determined as a* values and chroma. In the second objective, surveys using a ten-point Likert sliding scale (0 = not familiar at all, 10 = extremely familiar) were randomly allocated and emailed via Qualtrics to students enrolled in the Introduction to Animal Science course at Oklahoma State University. These surveys used a pre-questionnaire to evaluate students' pre-perception of their knowledge of beef color and NE packaging. After the pre-perception questionnaire students were provided one of the following: a static infographic presented as a still image with annotated graphics, a 46 s video infographic with audio and animated graphics, or both infographic formats. A post-questionnaire followed exposure to students' respective infographic to evaluate changes in the perception of knowledge.

Results

Atypical dark-cutting steaks treated in NE packaging had higher (P < 0.05, more red intensity) chroma and a* values compared to atypical dark-cutting steaks in PVC on d 4, 5, and 6. There was a significant difference (P < 0.05) in the students' (n = 288) pre- and post-questionnaire self-assessment of their familiarity with NE packaging. Prior to randomly viewing infographics, students were less familiar (= 3.18) with NE packaging than after viewing infographics (= 6.46). However, there was no significant difference in perceptions (P = 0.22) between viewing the different infographic formats.

Conclusion

The results suggest that NE packaging with consumer education can improve their perceptions and knowledge and enhance the appearance of atypical dark-cutting beef.