



Comparison of Oxidizing Solutions in the Evaluation of Metmyoglobin Reducing Activity in Dark-Cutting Beef

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Objectives

Metmyoglobin reducing activity (MRA) is an inherent muscle biochemical property that can influence color stability. Hence, MRA is used in color research to better understand meat color changes. A greater post-mortem muscle pH can affect inherent biochemical properties, including the conventional methodologies to determine MRA. The MRA methodology described in the American Meat Science Association Color Guide utilize changes in nitric oxide induced-metmyoglobin level pre- and post-incubation. However, a greater muscle pH can limit initial metmyoglobin formation. Hence, the methodology discussed in the AMSA color guide may not provide accurate results. Therefore, the objectives of this research were to compare different conditions to induce initial metmyoglobin formation.

Materials and Methods

In the first objective, normal-pH and dark-cutting steaks were dipped in 0.3% (level recommended in the AMSA color guide) and 1% nitrite solution to in-

duce metmyoglobin formation. Metmyoglobin formed steaks were blotted dry, vacuum packaged, and incubated at 30°C to induce metmyoglobin reduction. In the second experiment, 1% ferricyanide solution was used as an oxidizing agent. The methodology used in objective 1 was used to measure MRA. The experiments were replicated three times and the data were analyzed using the Mixed Procedure of SAS.

Results

There was no effect ($P > 0.05$) of nitrite concentration on MRA of dark-cutting beef. However, when 1% ferricyanide was used as an oxidizing agent, initial metmyoglobin was more ($P < 0.05$) in dark-cutting beef compared with 0.3% sodium nitrite solution.

Conclusion

The results suggest that the use of a strong oxidizing agent can impart more metmyoglobin formation in high-pH/dark-cutting beef.