

Extension

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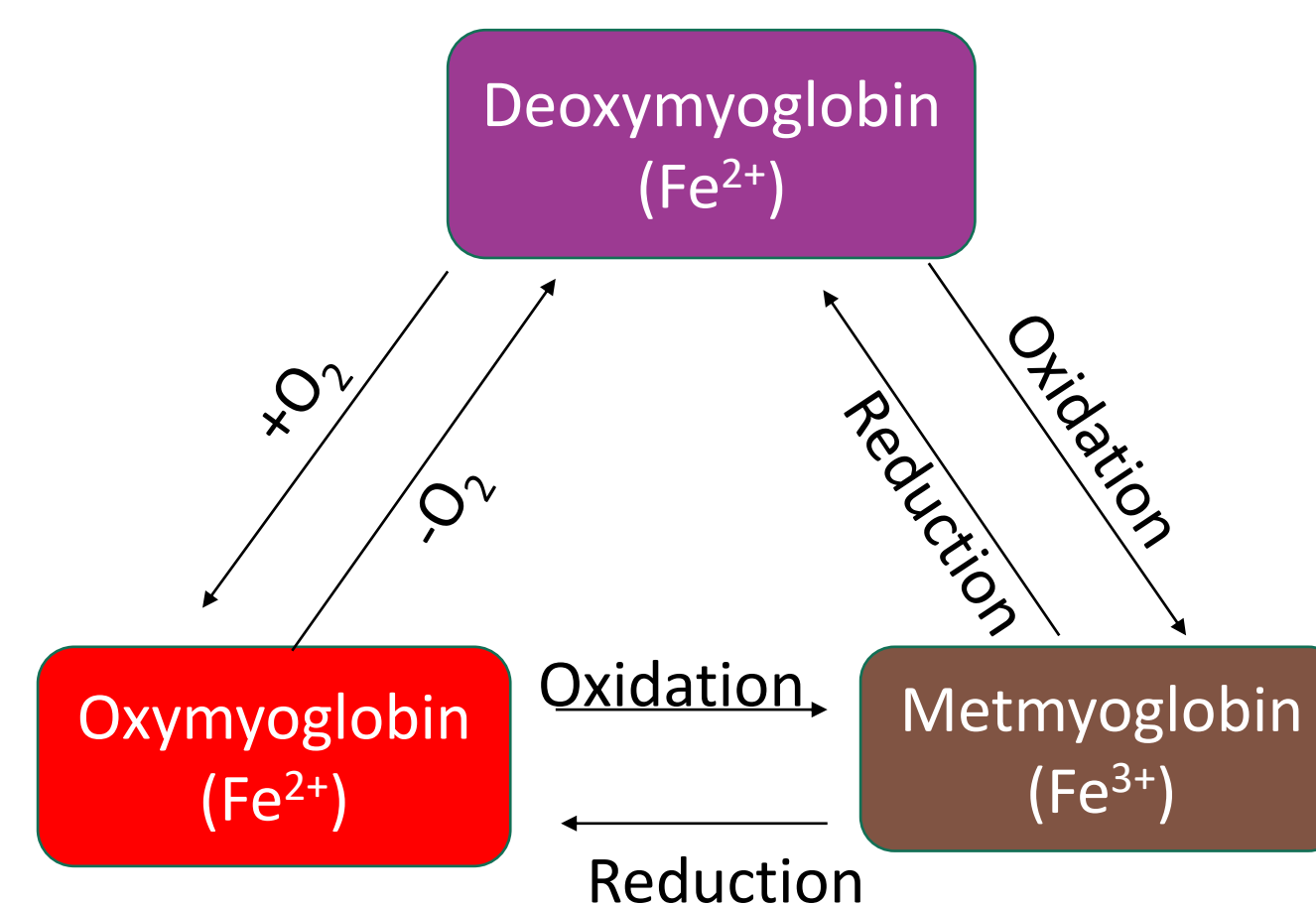


Introduction

- Despite similar production practices, beef cattle exhibit undesirable variation in steak color.
- Consumers consider steak color to be an important quality of meat (1).
- Stressors before harvest, premortem stress, may play a role in variation of steak color as a result of oxidation in the tissues.
- Several factors may result in premortem stress such as handling, transportation, morbidity, mixing with unfamiliar animals, and being introduced to a new environment.
- Oxidation of myoglobin, the pigment of meat, results in brownish red colored steak that consumers are less likely to purchase.



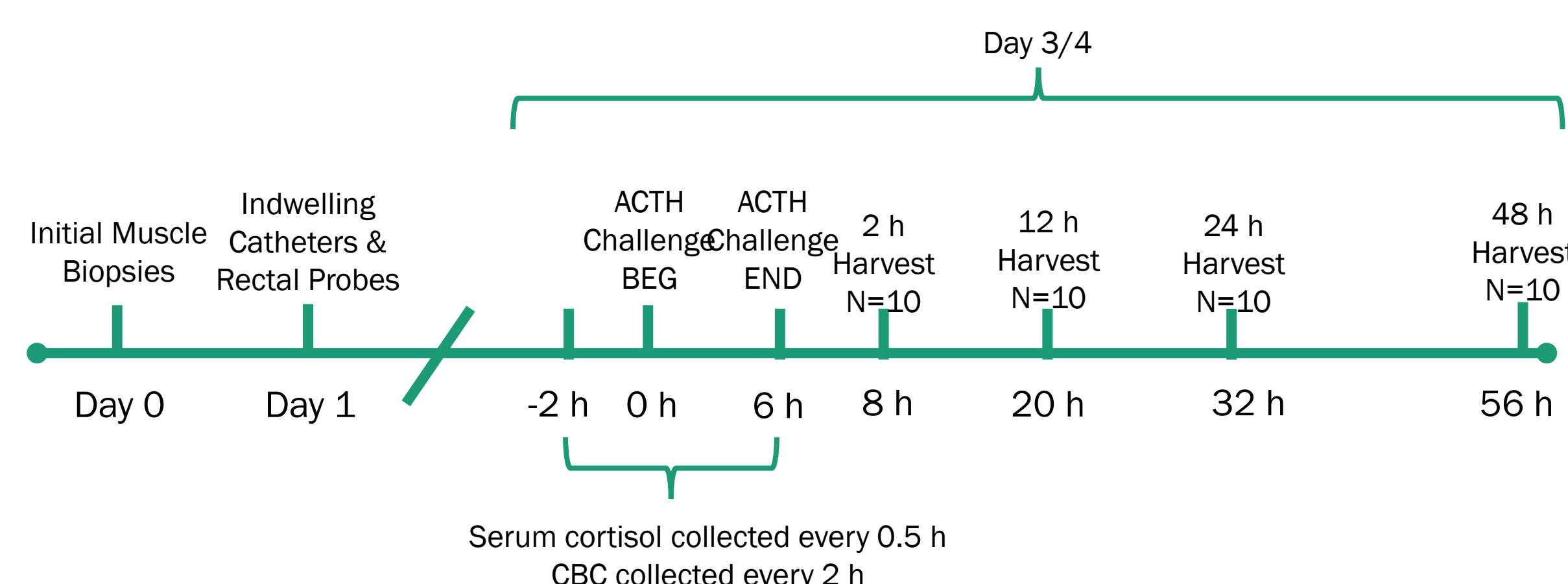
The steak on the left demonstrates oxymyoglobin while the steak on the right demonstrates metmyoglobin



Objective & Hypothesis

- The objective of this study was to determine the role of oxidative stress relative to meat quality following a stressful event prior to harvest.
- Our hypothesis is that premortem stress will increase oxidative stress within skeletal muscle post-mortem, which will result in reduced meat color stability

Methods



- ACTH was administered to animals at a dose of 0.1 IU/kg of body weight
- During exsanguination blood samples were collected and processed to produce serum
- After 14 d of aging, steaks were collected from the *longissimus lumborum* and steak color was analyzed on days 0, 1, 2, 3, and 4 retail day of display

Effects of premortem stress on steak color in the *longissimus lumborum* of Holstein steers following harvest

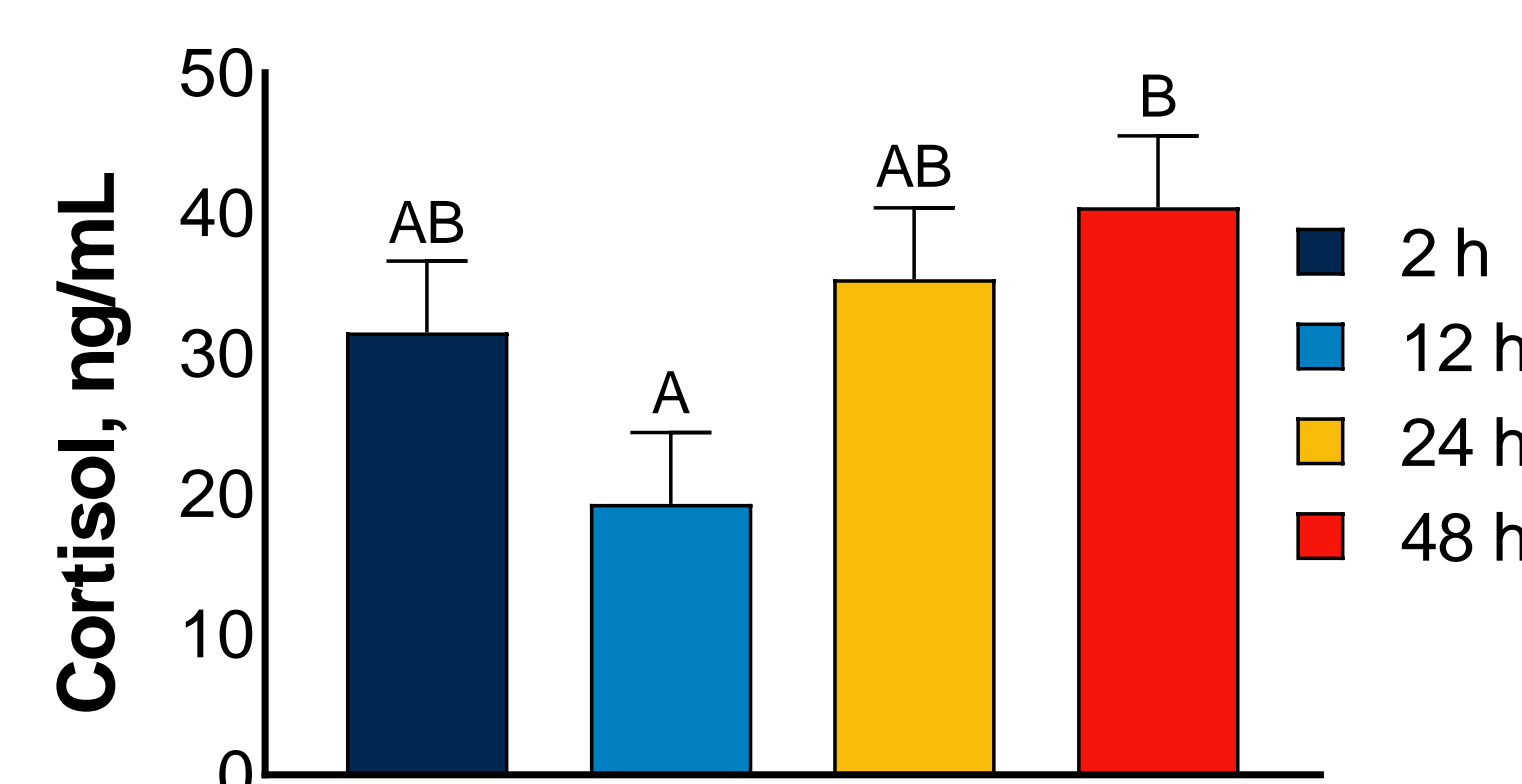
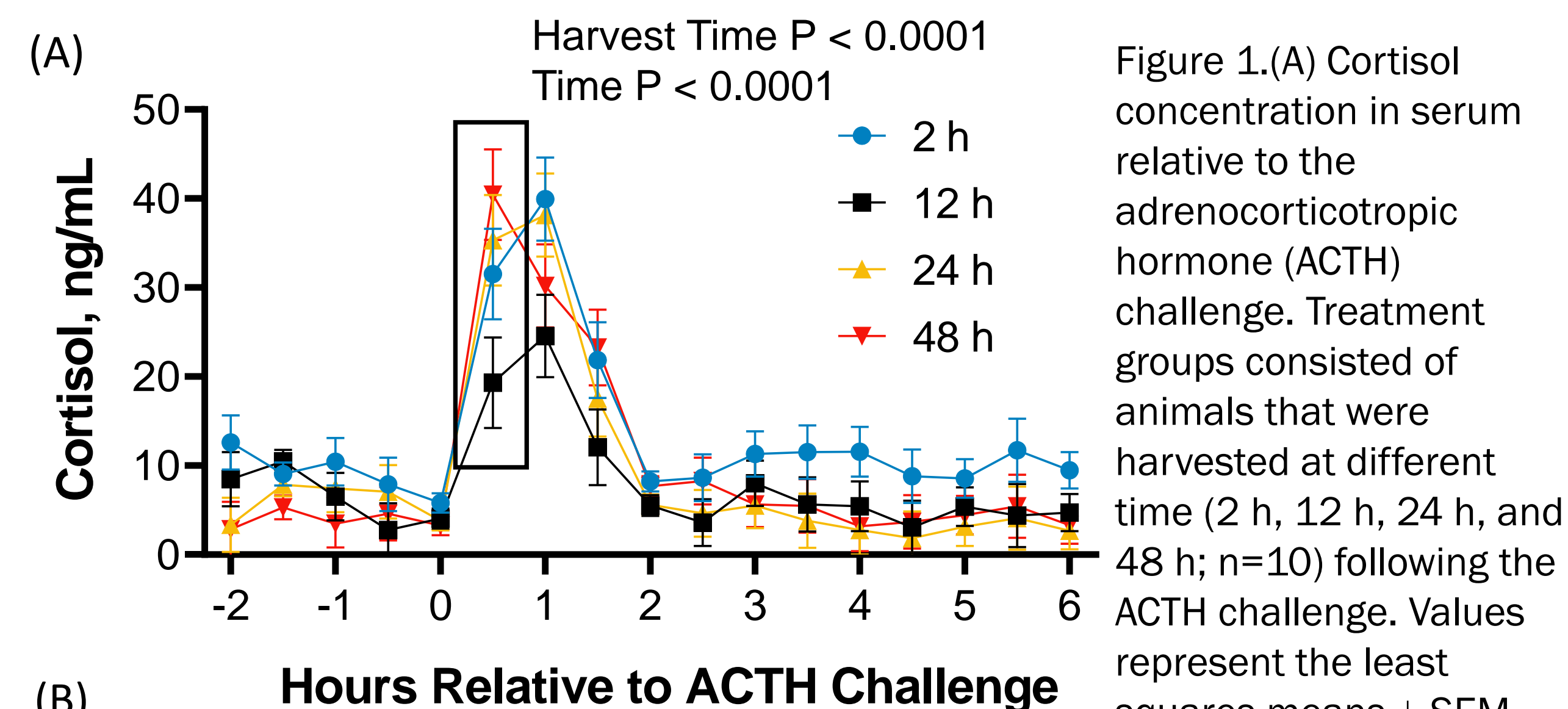
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Cortisol Results



- The initiation of the ACTH challenge caused a spike in cortisol concentration
- Cortisol concentration was increased 0.5 h after initiation of the ACTH challenge in animals that were to be harvested 48 h after the ACTH challenge
- Cortisol concentration did not differ between treatment groups at the end of the ACTH challenge

Summary

- These data suggest that a stressful event before harvest impacts steak color of the *longissimus lumborum*
- Waiting 2 h to 12 h rather than 24 h to 48 h to harvest beef animals after a stressful event may result in improved steak color

Acknowledgements

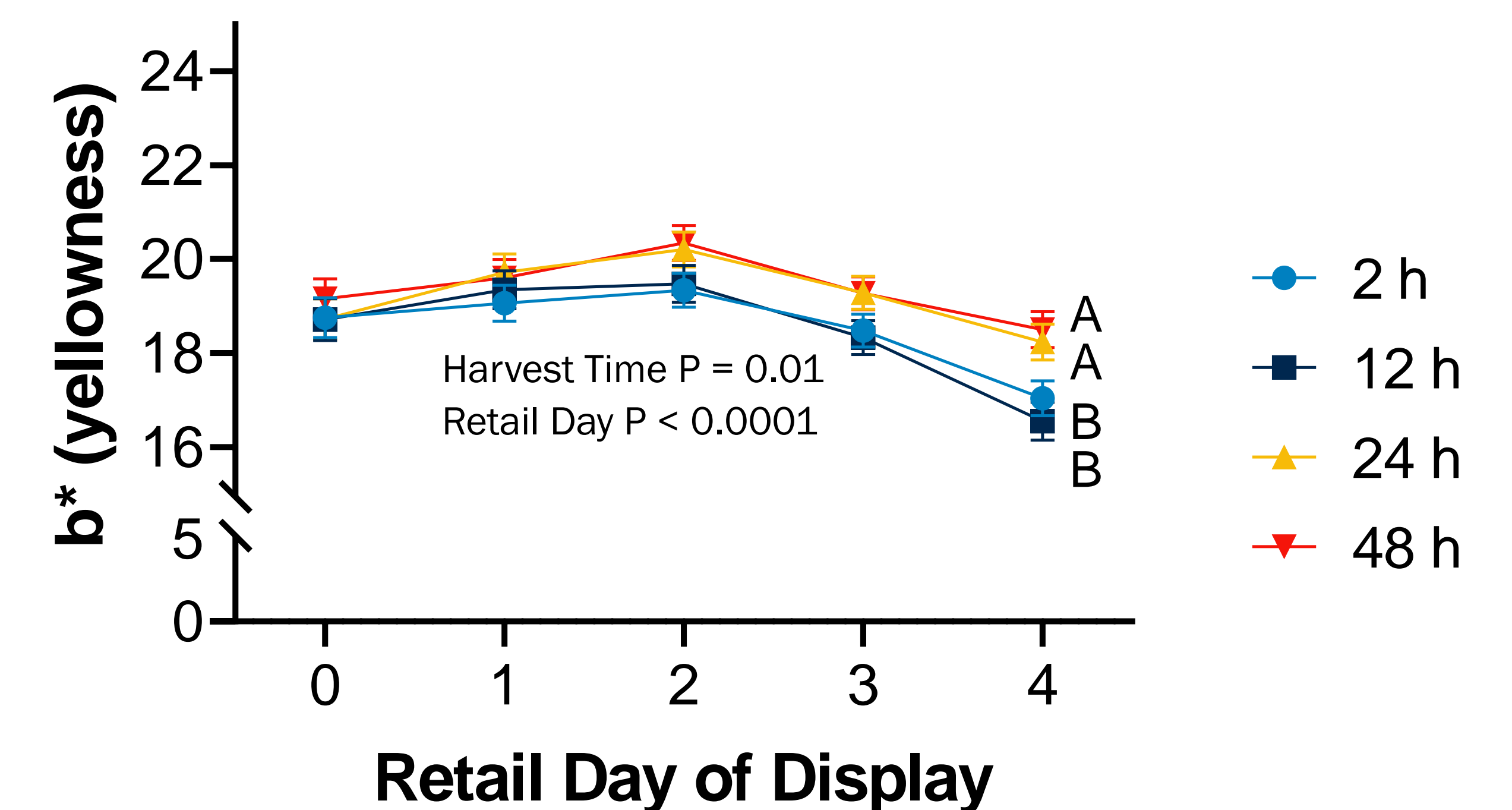
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References

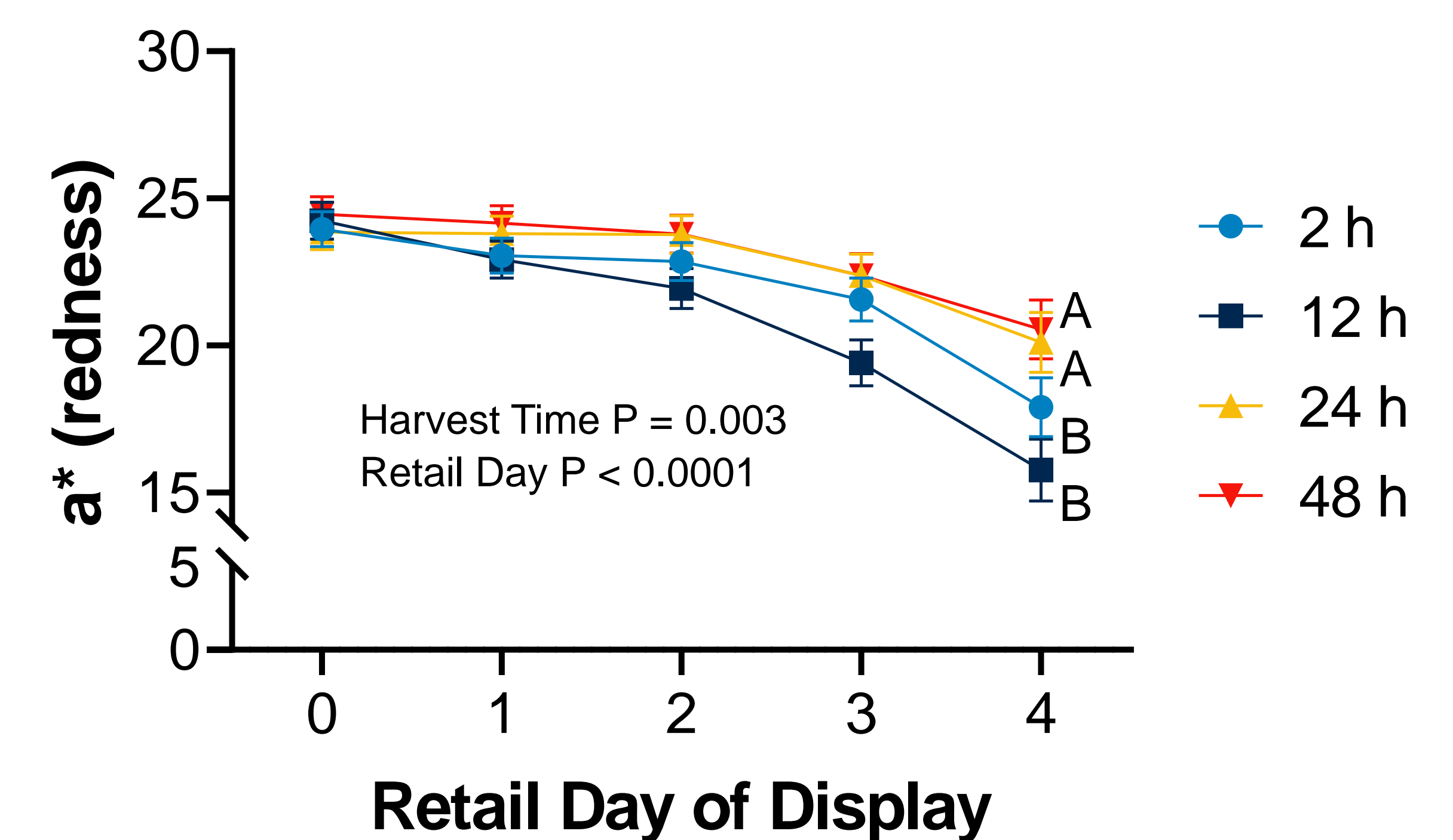
(1) Suman, S. P., & Joseph, P. (2013). Myoglobin Chemistry and Meat Color. Annual Review of Food Science and Technology, 4(1), 79–99.

Steak Color: b* (Yellowness)



- Animals that were harvested 24 h and 48 h after the ACTH challenge had yellower steaks than animals harvested 2 h and 12 h after the ACTH challenge

Steak Color: a* (Redness)



- Animals that were harvested 24 h and 48 h after the ACTH challenge had redder steaks than animals harvested 2 h and 12 h after the ACTH challenge