Long-term frozen storage effects on ground beef originating from steers fed an omega-3 enriched finishing diet

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Introduction

- As consumers become more health conscious, beef producers are interested in increasing beef omega-3 content through custom-designed diets
- Previous studies indicate increasing beef omega-3 content detrimentally impacted product oxidation and palatability
- Limited research available regarding omega-3 enhanced products placed in frozen storage

Objective

- Determine frozen storage impact on oxidation and palatability ratings of ground Round and Chuck patties originating from steers fed greatOplus® during finishing

Statistical Analysis

- Each primal was analyzed separately as a completely randomized design with a 2 × 4 factorial arrangement
  - Experimental unit: carcass
  - Fixed effects: Treatment × Time, Treatment, Time
- Statistical significance determined at $P \leq 0.05$

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Abstract 151

Methods

1. Weighed, stratified, & allocated to 28 pens
   $N = 25$ head/pen
2. Pens randomly assigned to treatments
   $n = 14$/treatment
   - **CON** conventional feedlot diet
   - **OMG** CON + 10% greatOplus
3. After 173 d on feed, harvested at a commercial abattoir
   $n = 28$
4. Vacuum packaged subprimals shipped to UGA
5. 21 and 23 d postmortem, respectively, Rounds were ground targeting 90/10 beef and Chucks targeting 80/20 beef, producing 112 patties per primal and carcass
6. Patties were blast frozen (-40˚C), layered into storage boxes, and frozen (-20˚C) for 0, 30, 60, and 90 d with random allocation to TBARS, cooked measures, and trained sensory at each time point

Acknowledgements

NCBA

NBO3 Naturally Better Omega-3

BEEF

Results

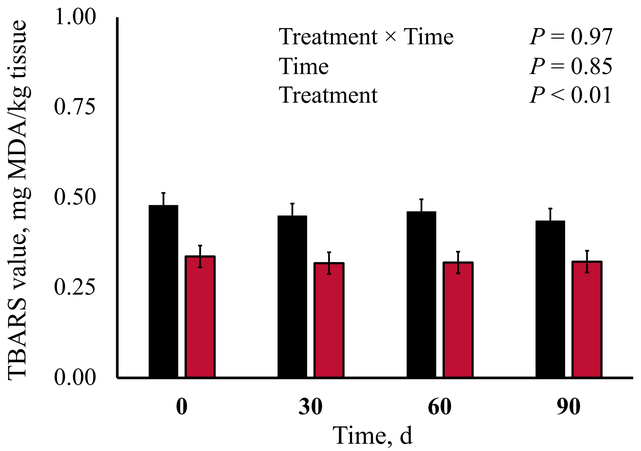


Figure 1. Thiobarbituric Acid Reactive Substances (TBARS) values for Round beef patties

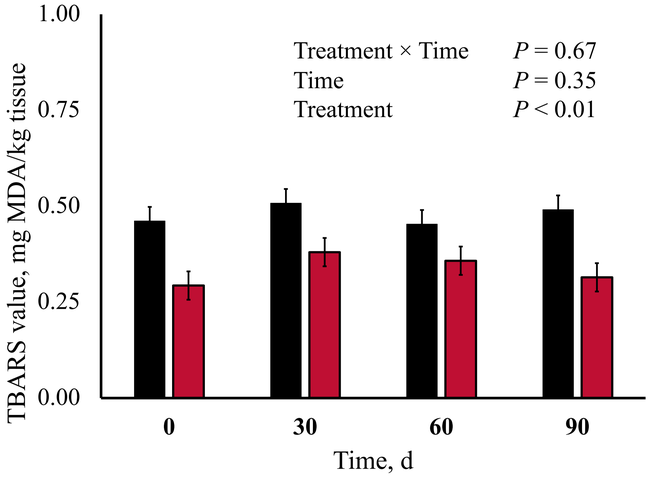
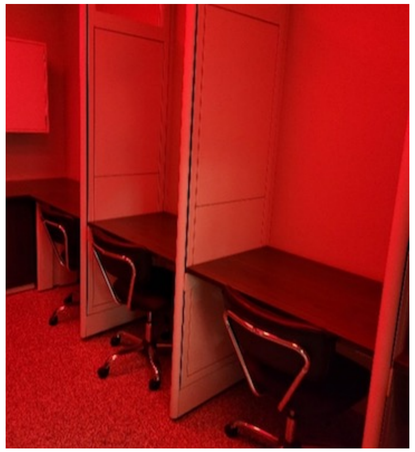
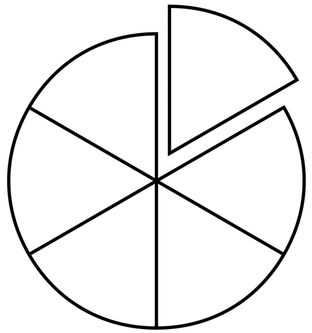


Figure 2. Thiobarbituric Acid Reactive Substances (TBARS) values for Chuck beef patties

Sensory panels were conducted in a sensory room with red lighting and positive airflow



Patties cooked at 204˚C to an internal temperature of 71˚C and divided into 6 wedges



Trained panelists (N = 8) were oriented via training sessions. Round and Chuck patties were randomly assigned to sensory sessions over 4 d with panelists evaluating 4 palatability attributes using 100-pt line scales collected by Qualtrics software running on iPads

7 Sessions
N = 56 samples

8 Samples/session

4 CON

4 OMG

Juiciness

Cohesion

Beef Flavor

Off-flavor

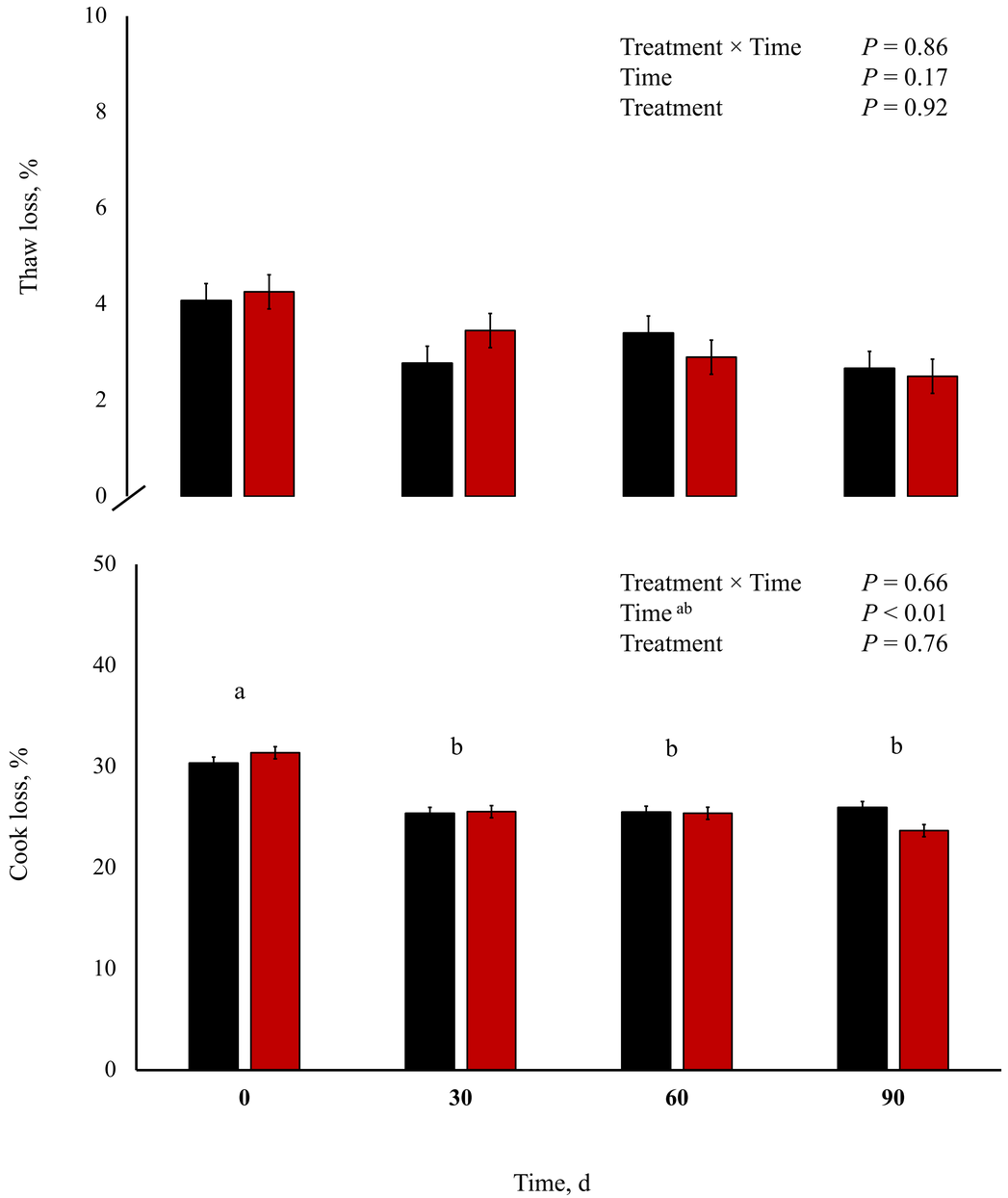


Figure 3. Thaw loss and cook loss percentages for Round beef patties

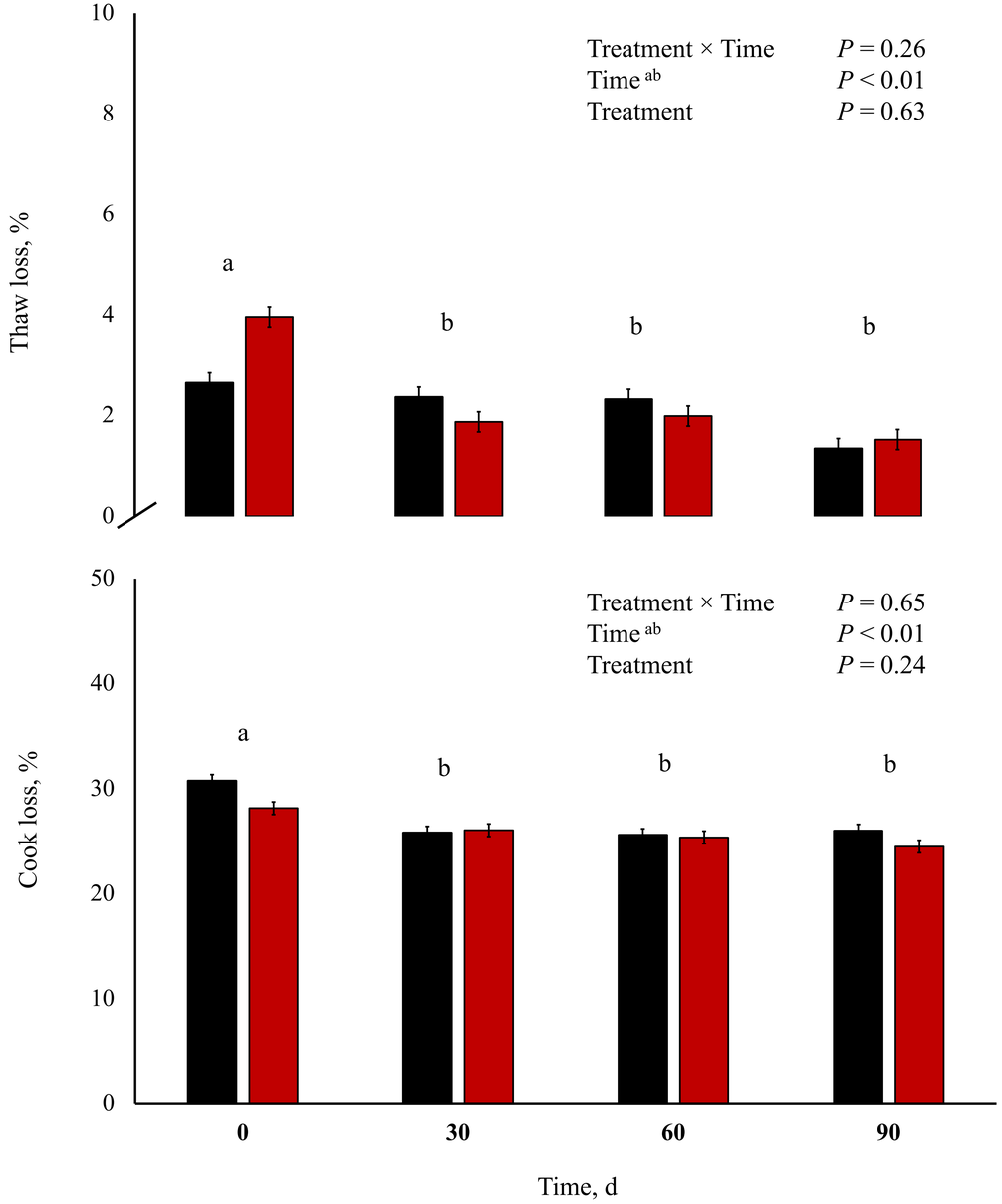


Figure 4. Thaw loss and cook loss percentages for Chuck beef patties

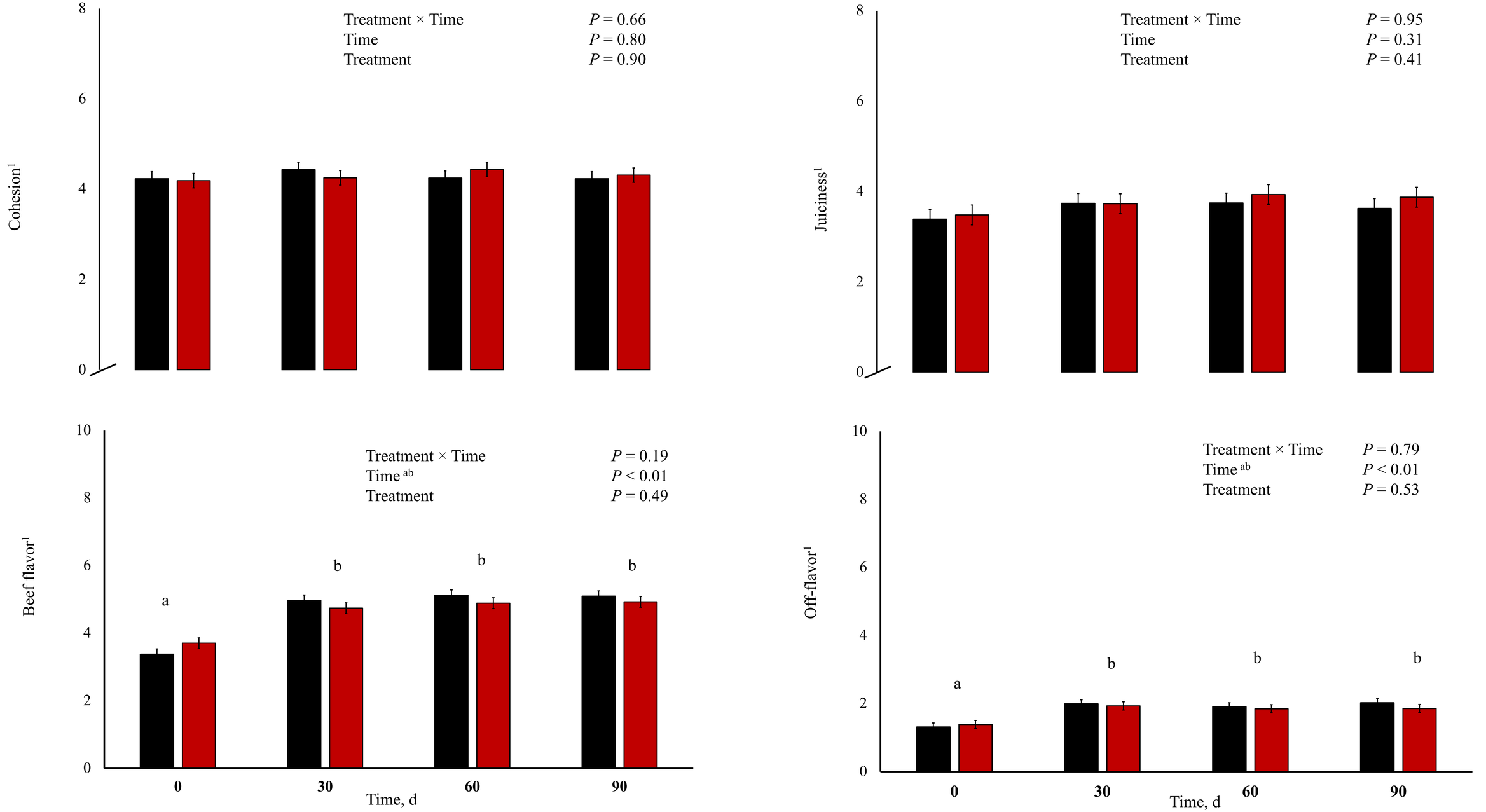


Figure 5. Trained sensory ratings for Round beef patties

[1]1, extremely dry/fragile/bland/no off-flavor, ; 5 = slightly bound/juicy/beefy/off-flavor; 10 = extreme cohesion/juiciness/beef/off-flavor.

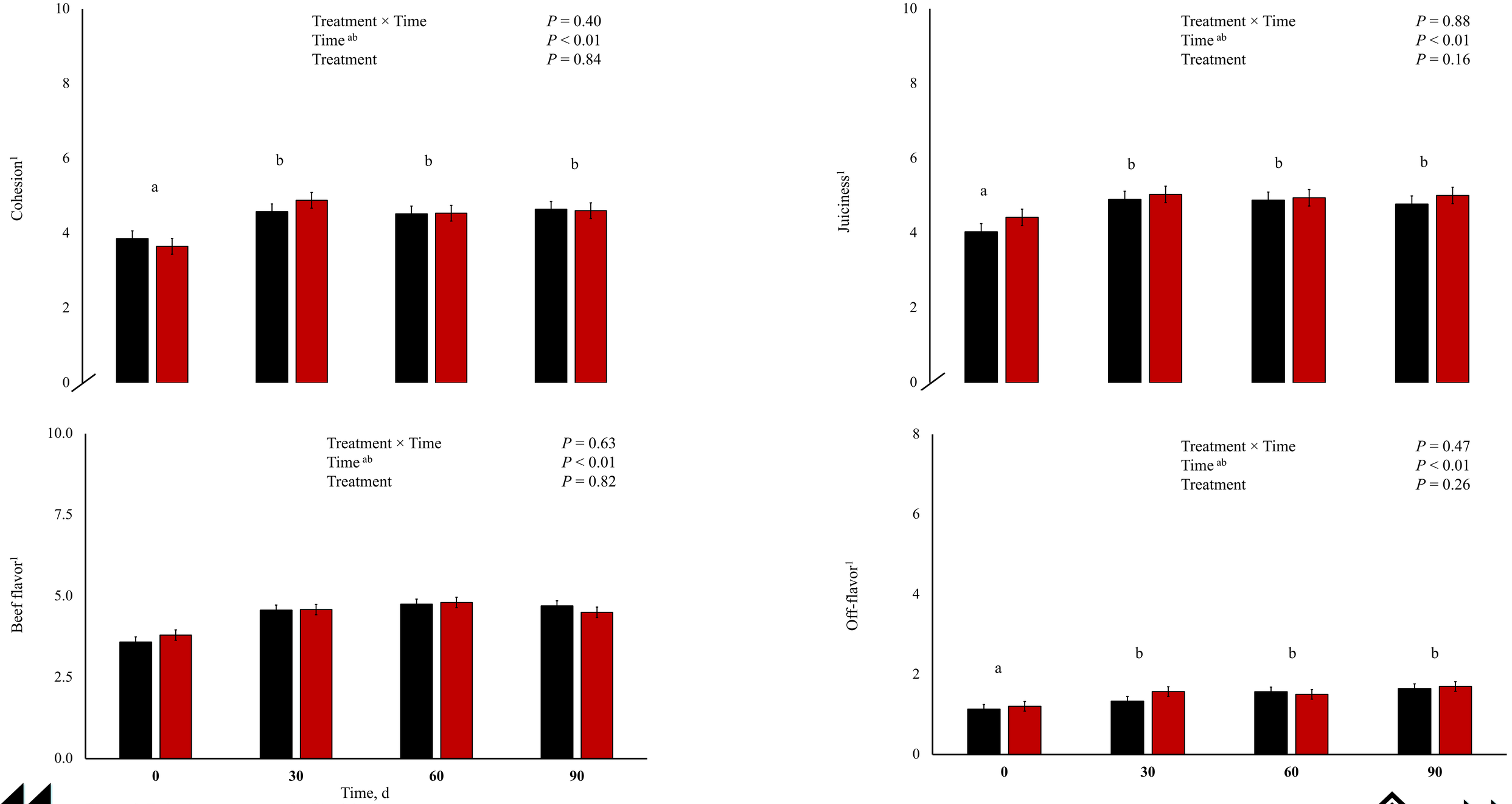


Figure 6. Trained sensory ratings for Chuck beef patties

[1]1, extremely dry/fragile/bland/no off-flavor, ; 5 = slightly bound/juicy/beefy/off-flavor; 10 = extreme cohesion/juiciness/beef/off-flavor.