Influence of aging time and technique (dry- vs. wet-aging) on tenderness, color and lipid stability of Belgian Blue beef

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Influence of aging time and technique (dry- vs. wet-aging) on tenderness, color and lipid stability of Belgian Blue beef

INTRODUCTION

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Post-mortem aging is a process that occurs naturally in all muscle tissues, which improves palatability attributes of meat such as flavor and tenderness.

**Wet-aging**

Meat aged in sealed barrier vacuum packages at refrigerated temperatures.

**Dry-aging**

Unpacked wholesale cuts aged at controlled temperature and relative humidity.

- unique flavor and superior quality
- destined to high-end consumers
To evaluate the potential effect of:

- aging technique (dry-aging vs. wet-aging),
- aging time (0, 21, 42 and 63 days), and
- packaging during display (vacuum vs. shrinkable film wrapping) on

the pH, tenderness, and pigment and lipid stability of Belgian Blue beef.
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**Samples**

- 3 x ½ longissimus dorsi (wet aging)
- 3 x ½ longissimus dorsi (dry aging)

from 2 Belgian Blue cows (6.5 and 3.5 yr)

**Experimental design**

**Samples**

- 3 x ½ longissimus dorsi (wet aging)
- 3 x ½ longissimus dorsi (dry aging)

from 2 Belgian Blue cows (6.5 and 3.5 yr)

**Experimental design**

- Aging conditions
  - wet-aging (WA)
  - dry-aging (DA)

- Display conditions
  - vacuum (VP)
  - shrinkable film wrapping (FW)

(4 days at 4 °C + 8 days at 8 °C)

**Analysis**

- pH
- Tenderness (Warner-Bratzler peak shear force)
- Color (redness) (CIE L*a*b*)
- Myoglobin oxidation (K/S 572/525 ratio)
- Lipid oxidation (TBARS: mg MDA-equivalent/kg)
- Statistics (ANOVA + Tukey test)
RESULTS AND DISCUSSION
EFFECT OF PREVIOUS AGING TIME

- No effect of aging time on pH, redness (a*) and myoglobin oxidation (K/S_{572}:K/S_{525} ratio) in samples after 21, 42 or 63 days of aging at 2 °C + 12 days of display (4 days at 4 °C + 8 days at 8 °C).

- Previous aging time favored lipid oxidation (increase in mg MDA-equivalent/kg) during display.
EFFECT OF AGING TECHNIQUE

- The difference in pH (DA > WA) could be related to the growth of proteolitical bacteria (e.g. *Pseudomonas*) in aerobic conditions and of lactic acid bacteria in low-oxygen conditions.

- No effect of aging time on redness, myoglobin oxidation and lipid oxidation in samples after WA or DA at 2 °C + 12 days of display (4 days at 4 °C + 8 days at 8 °C).
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**EFFECT OF RETAIL PACKAGING**

- The difference in pH (FW > VP) could be related to the growth of proteolityc bacteria (e.g. *Pseudomonas*) in aerobic conditions and of lactic acid bacteria in low-oxygen conditions.

- Samples before display (orange bars) and samples after a twelve-day display under vacuum conditions (dark green bars) presented no statistically significant differences in redness, myoglobin oxidation and lipid oxidation. The contact with atmospheric air in FW samples (display time = 12 days) may have contributed to meat discoloration, myoglobin oxidation and lipid oxidation.
- Increase in tenderness (decrease in WBSF values) during the first 21 days of aging.

- No influence of the aging technique on tenderness.
- The physico-chemical quality of samples did not change after repackaging under vacuum and 12 days of display (4 days at 4 °C + 8 days at 8 °C).

- A higher sensitivity to oxidation was observed with shrink wrap packaging during display.

- Twenty-one days of aging permitted to achieve the maximum tenderness observed and would be compatible with a subsequent 12-day display under vacuum.

- Further research will be conducted to study the microbiological quality of these meats as well as their antioxidant capacity.
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