FARAH Day 2016
Liège, October 21st 2016

Effect of aging time, aging technique (dry- *vs*. wet-aging) and packaging on tenderness, pigment and lipid stability of Belgian Blue beef

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INTRODUCTION

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.

(http://modifiedatmospherepackaging.com/modified-atmosphere-packaging-resources/vacuum-packaging)

Dry-aging

Unpacked wholesale cuts aged at controlled temperature and relative humidity.

⇨ unique flavor and superior quality

⇨ destined to high-end consumers

(http://ercanet.com.tr/icerik/627/dry-aged.html)

AIM

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

MATERIALS AND METHODS

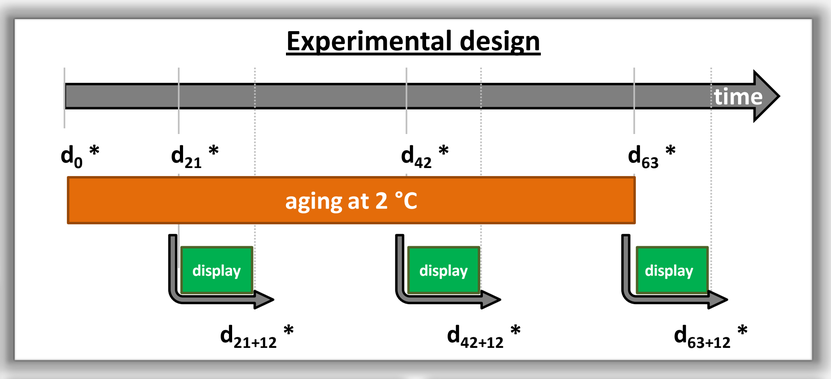
Samples

- 3 x ½ *longissimus dorsi* (wet aging)
+
- 3 x ½ *longissimus dorsi* (dry aging)
from
2 Belgian Blue cows

* Analysis

- pH
- Tenderness only before display (Warner-Bratzler 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)

Experimental design



Aging conditions

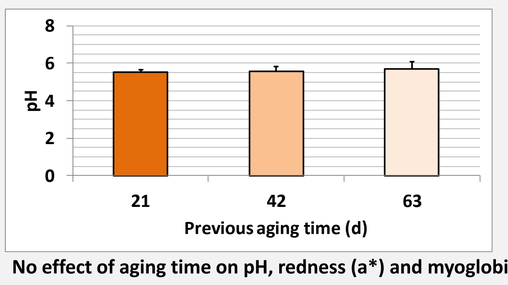
wet-aging (WA) or
dry-aging (DA)

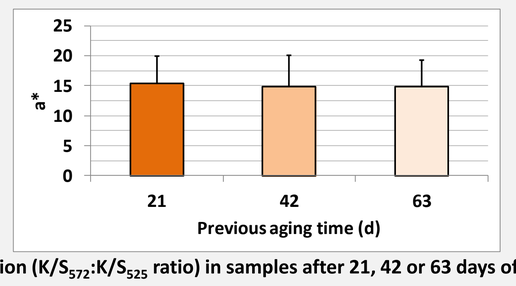
Display conditions

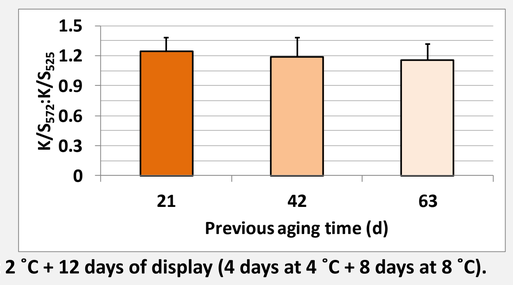
vacuum (VP) or
shrinkable film wrapping (FW)
(4 days at 4 ˚C + 8 days at 8 ˚C)

RESULTS AND DISCUSSION

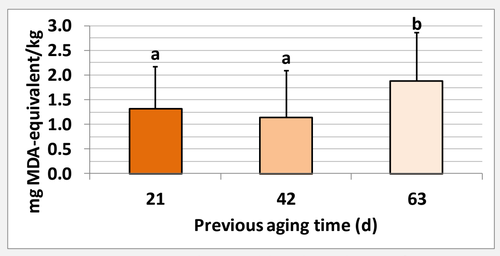
Effect of previous aging time





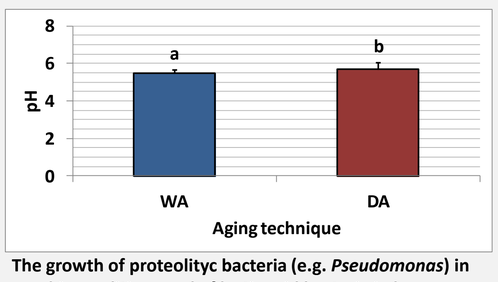


No effect of aging time on pH, redness (a*) and myoglobin oxidation (K/S_{572}:K/S_{525} ratio) in samples after 21, 42 or 63 days of aging at 2 ˚C + 12 days of display (4 days at 4 ˚C + 8 days at 8 ˚C).

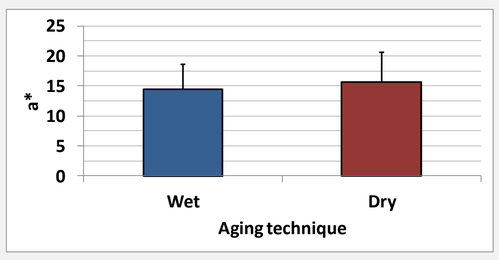


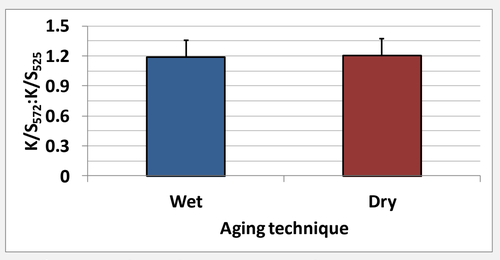
Previous aging time favored lipid oxidation (increase in mg MDA-equivalent/kg) during display.

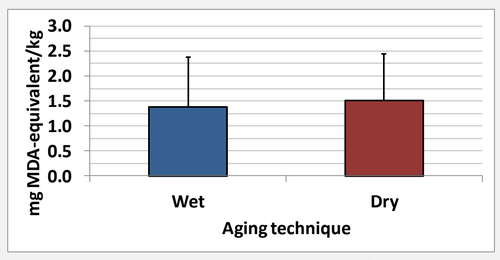
Effect of aging technique



The growth of proteolityc bacteria (e.g. *Pseudomonas*) in aerobic conditions and of lactic acid bacteria in low-oxygen conditions may have contributed to the difference in pH.

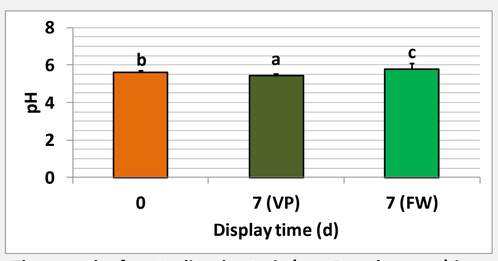




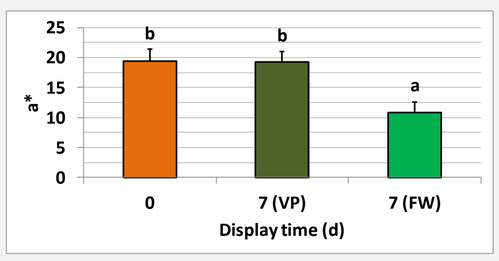


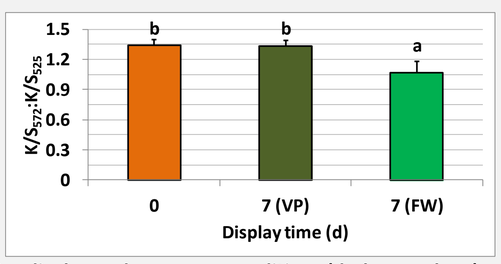
No effect of aging time on redness (a*), myoglobin oxidation (K/S_{572}:K/S_{525} ratio) and lipid oxidation (mg MDA-equivalent/kg) in samples after 21, 42 or 63 days of aging at 2 ˚C + 12 days of display (4 days at 4 ˚C + 8 days at 8 ˚C).

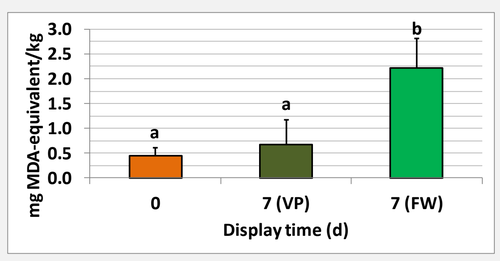
Effect of retail packaging



The growth of proteolityc bacteria (e.g. *Pseudomonas*) in aerobic conditions and of lactic acid bacteria in low-oxygen conditions may have contributed to the differences in pH.

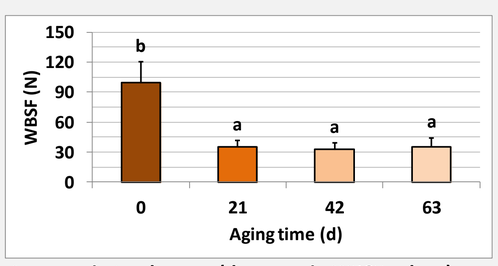






Samples before display (orange bars) and samples after a seven-day display under vacuum conditions (dark green bars) presented no statistically significant differences in redness (a*), myoglobin oxidation (K/S_{572}:K/S_{525} ratio) and lipid oxidation (mg MDA-equivalent/kg). The contact with atmospheric air in FW samples (display time = 7 days) may have contributed to meat discoloration (decrease in chromaticity a*), myoglobin oxidation (decrease in K/S_{572}:K/S_{525} ratio) and lipid oxidation (increase in mg MDA-equivalent/kg).

Effect of aging on tenderness



Increase in tenderness (decrease in WBSF values) during the first 21 days of aging.

CONCLUSIONS

A higher sensitivity to oxidation was observed with shrink wrap packaging during display.
Twenty-one days of aging allowed 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.