Effects of lactic acid dipped beef trimmings and post-grinding age on subjective and objective color of ground beef in retail display.

J. M. Guana1, E. N. Mahalite2, J. C. Brooks2, M. F. Miller4
1Zamorano University (SOWER scholar), Food Science and Technology, Tecugralpa, Honduras.
2Texas Tech University, Department of Animal and Food Sciences, Lubbock, TX, 79409

INTRODUCTION

- Color is an indicator of product quality in relation to wholesomeness and eating acceptability of meat.
- Antimicrobial interventions and product age can affect the visual quality of fresh beef.
- Dip application can be effective to reduce pathogens but can affect visual sensory properties. (Ellebracht et al. 1999).
- Lactic acid could be used as an antimicrobial with a dosage of 2% to 4% without unfavorable effects on color (Jime nez J et al. 2003).
- Unequally acceptable results in economic loss (Melcón et al. 2017).

OBJECTIVE

- To evaluate objective and subjective color of ground beef in retail display produced from lactic acid (2%) dipped beef trimmings aged 7 or 21 d post-grinding.
- Ground beef (n = 28; 16% fat) representing two treatments (lactic acid dipped (LA)) or untreated control (CON) were further aged for 7 or 21 d at Texas Tech University, Lubbock.
- After regrinding, 454 g loaf formed samples were wrapped over polystyrene tray with low-barrier polylvinylchloride film.
- Packages were displayed in a coffin-style retail case maintained at 2 – 4°C and continuously exposed to an average of 1900 lux of fluorescent lighting.
- CIE L*, a*, b* values were measured with a handheld spectrophotometer at three random package locations every 12 h for 3 d in retail display.
- Trained panelists (n = 6) evaluated worst-point lean color on an 8-point hedonic scale with half-point increments (1 = very bright red; 8 = tan to brown) following the same timeline as objective color.
- Data were analyzed as a 2 × 2 factorial design using the GLIMMIX procedure SAS with fixed effects of lactic acid treatment, age and their interaction. Treatment least squares means were separated using the PDIFF option of SAS at a significance level of P < 0.05.

METHODS

RESULTS

Table 1. LS means for trained panelist worst-point score (n=28) of ground beef in retail display (h) of two ages x two treatment (TRT) types.

<table>
<thead>
<tr>
<th>Age</th>
<th>TRT</th>
<th>0</th>
<th>7</th>
<th>14</th>
<th>21</th>
<th>34</th>
<th>56</th>
<th>72</th>
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</thead>
<tbody>
<tr>
<td>7</td>
<td>CON</td>
<td>1.58</td>
<td>1.59</td>
<td>1.60</td>
<td>1.61</td>
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<td>1.63</td>
<td>1.64</td>
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<tr>
<td>7</td>
<td>LA</td>
<td>2.98</td>
<td>3.00</td>
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<td>3.04</td>
<td>3.06</td>
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<td>7</td>
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<td>P-value</td>
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</table>

Figure 1. Worst-point lean color scale

Figure 2. Ground beef in retail display

Figure 3. Re-grinding ground beef

Figure 4. Objective evaluation

CONCLUSION

- At subjective evaluations, there was no difference (P > 0.05) between treatments, however the interaction between age and treatment differs (P = 0.05) at retail hour 36.
- L* values at retail hour 36 for 21 d LA were higher (P < 0.05) than all other interactions. Between treatments, LA had higher (P < 0.05) values than CON at hour 0 and 24. Retail hour 60 and 72 had no differences (P > 0.05) between age.
- Age × treatment a* values, with 21 d CON was lower (P < 0.05) than all other interactions, which means a less red color. Between treatments, LA appears to be more red (P < 0.05) than CON. At hour 12, 7 d was more red (P < 0.001) than 21 d.
- No differences (P > 0.05) were found for b* values between treatments at retail hour 0 and 12. Age 7 had higher values (P < 0.01) at hour 24 and 48 than 21 d.

REFERENCES