The Influence of Retail Display Lighting and Packaging System on Beef Flavor
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Introduction
• Meat flavor can be affected by the retail display lighting and packaging system.
• Characteristics of color, lipid oxidation, and sensory can be altered depending on the type of packaging used.

Objective
The objective of this investigation is to determine the effect that the different types of packaging may have on meat as well as the retail displaying lighting.

Materials and Methods
• Subprimals were collected from USDA choice beef carcasses.
• At 7d postmortem muscles were sliced to 1” steaks which were assigned (n = 120/muscle) to packaging treatments.
• Steaks were stored an additional 13 days prior to retail display.
• Retail display occurred for 72 hours under fluorescent lights (FL) or light-emitting diodes (LED), with a third treatment remaining in dark storage (DARK).
• Steaks were cooked to a medium doneness (71°C) and cut to 0.5” cubes.
• Consumers (n=300) rated flavor, juiciness, tenderness, and overall liking on a 100 point scale (0 = dislike strongly, 100 = like strongly).

Methods
• Packages used were: Carbon monoxide, CO; high-oxygen modified atmosphere, HIOX; traditional overwrap, OW; vacuum rollstock, ROLL.

Results

Table 1. The effect of package type on trained sensory panel flavor attributes.

<table>
<thead>
<tr>
<th>Package</th>
<th>Beef ID</th>
<th>Browned Roasted</th>
<th>Bloody/ Serum</th>
<th>Fat-like</th>
<th>Oxidized</th>
<th>Carbohydrate</th>
<th>Umami</th>
<th>Sweet</th>
<th>Salty</th>
<th>Bitter</th>
<th>Sour</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>50.1b</td>
<td>45.0b</td>
<td>13.4b</td>
<td>17.0b</td>
<td>24.5b</td>
<td>10.4b</td>
<td>34.6b</td>
<td>7.4b</td>
<td>9.9b</td>
<td>13.9b</td>
<td>13.5b</td>
</tr>
<tr>
<td>HIOX</td>
<td>48.8b</td>
<td>46.2b</td>
<td>11.8b</td>
<td>17.0b</td>
<td>29.1b</td>
<td>12.4b</td>
<td>33.6b</td>
<td>6.5b</td>
<td>9.8b</td>
<td>15.0b</td>
<td>14.5b</td>
</tr>
<tr>
<td>OW</td>
<td>50.8b</td>
<td>44.9b</td>
<td>13.9b</td>
<td>17.5b</td>
<td>23.4b</td>
<td>9.9b</td>
<td>35.2b</td>
<td>7.7b</td>
<td>10.2b</td>
<td>13.4b</td>
<td>12.4b</td>
</tr>
<tr>
<td>ROLL</td>
<td>53.5b</td>
<td>43.9b</td>
<td>16.2b</td>
<td>18.7b</td>
<td>20.9b</td>
<td>8.3b</td>
<td>38.6b</td>
<td>8.6b</td>
<td>11.2b</td>
<td>12.0b</td>
<td>12.2b</td>
</tr>
</tbody>
</table>

*p-value* <0.0001 <0.0025 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001 <0.0001

1Carbon monoxide, CO; high-oxygen modified atmosphere, HIOX; traditional overwrap, OW; vacuum rollstock, ROLL.
2Least squares means within a column lacking a common superscript differ (*P < 0.05*).

Conclusion
• Overall, vacuum rollstock had the highest score in beef id attribute. HIOX had the highest scores in undesirable attributes such as oxidized, bitter and sour.
• Dark storage had the best likability in three out of five muscles.

References
• AMI/FMI. 2012. "The Power of Meat". Published by AMI and FMI