Sodium Reduction in Meat Products

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Sodium Consumption

Institute of Medicine recommended a reduction in sodium intake in 2010. Large companies promised decreases in sodium content in food products over the next 5 years.
When Reducing Sodium in Meat Products, Must Consider Alternatives to:

- Sodium Flavor
- Water-Holding Capacity
- Cooking Yields
- Product Texture
- Product Cost
- Food Safety
When Reducing Sodium, Must Also Consider:

Consumer acceptance
- Clean labels
- Willingness to try

Feasibility of applying technology

Allergenic ingredients

Cost of implementing
General Considerations

To minimize obvious changes in products to the consumer...

- recommend gradual reductions in sodium content over time...
- monitor quality and safety with each incremental reduction.
Flavor Alternatives

Flake salt
Reduce sugar content
Many flavor enhancing ingredients available

- acceptability on labels?
Sodium Flavor:

If current sodium flavor is maintained…

…consumers will not adapt to reduced sodium flavors.

Gradual reduction of sodium

- Consumer adaptation to reduced sodium flavors
- Minimize rejection of the new products.
Water-Holding Capacity Alternatives
Maximize Functionality of Meat

- Synergism of salt and alkaline phosphates
  - 2.5 - 1.5% salt
  - Increase pH - 5.8-6.3

E. Puolanne & M. Ruusunen, 2009
Water-Holding Capacity Alternatives
Maximize Functionality of Meat

- Pre-Rigor or Preblended Meat
- Vacuum Mixing, Tumbling
- Vacuum Stuffing
- Increase fat content
  - reduced juiciness
Water-Holding Capacity Alternatives

Binders and extenders to hold additional water.

- Collagen
- Carrot or Oat Fiber
- Potato Starch
- Kappa Carrageenan
### Cost Comparison

Calculate cost to hold water.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Cost/lb.</th>
<th>Hydration Ratio (Protein:Water)</th>
<th>To hold 100 lbs. water</th>
<th>Cost to hold 100 lbs. water</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrageenan</td>
<td>$5-6.00</td>
<td>1:25</td>
<td>4 lbs.</td>
<td>$20-24</td>
<td></td>
</tr>
<tr>
<td>Carrot fiber</td>
<td>$1.70</td>
<td>1:18</td>
<td>5.5 lbs.</td>
<td>$9.35</td>
<td>1%, clean label, sausage only</td>
</tr>
<tr>
<td>Dehydrated Pork Stock</td>
<td>$3.50</td>
<td>1:20</td>
<td>5 lbs.</td>
<td>$17.50</td>
<td>0.5-1.0% Inject or add to mixer with lean meat (sausage), clean label</td>
</tr>
<tr>
<td>Potato Starch</td>
<td>$0.80-1.50</td>
<td>1:5</td>
<td>20 lbs.</td>
<td>$16-30</td>
<td></td>
</tr>
<tr>
<td>Soy isolate</td>
<td>$2.70</td>
<td>1:5</td>
<td>20 lbs.</td>
<td>$54</td>
<td>Sensitive to salt</td>
</tr>
</tbody>
</table>
Antimicrobial Alternatives

Octanoic acid
Lauric arginate
Post-Packaging Pasteurization
High-Pressure Processing
Sodium Lactate
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