Detection and Incidence of *Salmonella* sp. In Feed and Pet Treats

Kristi McCallum

AAFCO Mid-year Meeting 2015
What do you get when you mix a scientist with a government employee?

OMG!

WTH is she talking about?
What do you know already?

We are annoying to eat with

Is that chicken cooked to 170 degrees? Are you going to eat those sprouts? They’re a haven for bacteria!

Why microbiologists hardly ever get a second dinner date.

Seen it at a restaurant!
### Current Leading Causes of Foodborne Illness in the United States - CDC 2013

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Cases</th>
<th>Hospitalizations</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bacteria</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campylobacter</td>
<td>6,621</td>
<td>1,010</td>
<td>12</td>
</tr>
<tr>
<td>Listeria</td>
<td>123</td>
<td>112</td>
<td>24</td>
</tr>
<tr>
<td>Salmonella</td>
<td>7,277</td>
<td>2,003</td>
<td>27</td>
</tr>
<tr>
<td>Shigella</td>
<td>2,309</td>
<td>450</td>
<td>3</td>
</tr>
<tr>
<td>E. Coli O157</td>
<td>552</td>
<td>210</td>
<td>2</td>
</tr>
<tr>
<td>Non-O157STEC</td>
<td>561</td>
<td>76</td>
<td>2</td>
</tr>
<tr>
<td>Vibrio</td>
<td>242</td>
<td>55</td>
<td>2</td>
</tr>
<tr>
<td>Yersinia</td>
<td>171</td>
<td>55</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>19,056</td>
<td>4,200</td>
<td>80</td>
</tr>
</tbody>
</table>

*Per 100,000 population according to CDC

Source: CDC MMWR, Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food — Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006–2013April 18, 2014 / 63(15);328-332
Microbial Ecology of Salmonella

- Found globally in feces of mammals, birds, reptiles as well as soil and water
- Heat resistant, pH tolerant and tolerates dehydration
- Thrives in a wet/dry cycle environment
  - Is of special concern in food manufacturing facilities that operate under dry conditions (cereals, spices, nuts, powdered milk, cheese, etc.)
  - Spread by poor hygiene and poor food handling practices
- **Over 2300 different serovars**
  - **ALL** serotypes are pathogenic to humans – still the leading cause of death related to foodborne illness
- Nontyphoidal serotypes cause severe abdominal cramps, fever, diarrhea, vomiting, dehydration especially in elderly, very young and those with compromised immune systems
Detection Methodology

- FDA BAM with the exception of the pre-enrichment
  - Performed a validation to replace Lactose broth with Universal Pre-enrichment Broth.

- Screening is performed using AOAC OMA 2004.03 VIDAS Automated Immunoassay

- All VIDAS positive samples are isolated and confirmed using FDA BAM method

- Isolates are sent to FDA Denver District Laboratory for serology and PFGE
  - MOU is in place between our agency and FDA for this testing
## What have we found?

### Isolated Salmonella from Feed and Pet Treats: 2010-2015

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Salmonella Positive</th>
<th>No. of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat/Bone Meal</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Pig Ears</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Jerky Treats</td>
<td>6</td>
<td>55</td>
</tr>
<tr>
<td>Bully Stick</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>Other Pet Treats (rawhide, bones, lamb chews)</td>
<td>6</td>
<td>170</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
<td><strong>284</strong></td>
</tr>
</tbody>
</table>

### National Recall Cases

- 4

Source: Colorado Dept. of Agriculture, ICS, BCL
Concerns

- Human handling of pet treats
  - Do you wash your hands? Do your children?
  - **Lab personnel also need to be aware of risks when handling**

- FERN FDA Study: “576 samples analyzed during Phase 2, 66 samples were positive for Listeria (32 of those were Listeria monocytogenes) and 15 samples positive for Salmonella. These pathogens were isolated from raw foods and jerky-type treats, not the exotic animal dry feeds.” - Foodborne Pathogens and Disease 05/2014
Thank you!

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References

- CDC MMWR, Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food — Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006–2013April 18, 2014 / 63(15);328-332
- http://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm272372.htm#final
- http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6202a1.htm#Fig
- www.n2growth.com