Familiar Faces, New Places

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Outline

• Advances in detection methodology
• Changing marketplace
• What does the future hold?

Advances in Detection Methodology
2014 Salmonellosis Nut Butter - Identification in Reverse

- Routine inspection of facility
  - January 2014
  - Isolates *Salmonella Braenderup*
    - PFGE fingerprinting
    - Whole genome sequencing (WGS)
- Search PulseNet for cases
  - January (2), February, March, April, May
- Epidemiology
- Re-inspection, re-isolation July 2015
  - *Salmonella Braenderup*
- 6 months product recall

http://www.cdc.gov/salmonella/braenderup-08-14/

Survival of *Salmonella* in tree nuts (representative of low moisture foods)


RAW Meal Organic Shake & Meal Products Sprouted Chia Seed in multiple products

2016

2014

“Made exclusively from RAW natural, plant-based, whole foods – uncooked, untreated, unadulterated”

*Salmonella* Virchow
- 27 cases, 20 states
- December 2015 through March 2016

*Salmonella* Newport, *Salmonella* Hartford, *Salmonella* Oranienburg
- 31 cases, 16 states
- January through July 2014
Listeriosis associated with stone fruit 2014

MA isolate close match to isolates from nectarines
MD isolate close match to isolates from peach

Photo credit: Almond Board of California, M. D. Danvik

2014 Listeriosis – Caramel Apples

- Commercially produced, prepackaged caramel apples
- Linked to single California packing facility
- PFGE, WGS, link outbreak and environmental strains
- 35 illnesses/7 deaths; 12 states; Manitoba
- Unlikely food attribution – ho history
  - Whole apple surface dry
  - pH apple flesh: 3.6 to 4.0
  - Aw caramel: <0.80, hot application ~95°C
  - Limits of growth for L. monocytogenes
    - pH 4.4
    - Aw of 0.92

Kathy Glass, University of Wisconsin
- Apples
- Stick/No stick
- Caramel 80°C/195°F
  - Dip (stick or tongs)
- Storage
  - 25 and 7°C

Hypothesis:
- Increased water activity and pH under caramel layer
- Growth in microenvironment at interface

Improving the safety of caramel apples

- **Short term solution**
  - Limited out of refrigeration storage
    - E.g. <24 h display
  - Consumer labeling to refrigerate
  - Packinghouse environmental controls

- **Future research**
  - Additional of growth inhibitors
    - Caramel dip
    - Apple wax

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Raw Changing Marketplace

- **Artinsial**
  - **BUY LOCAL**
  - **CLEAN LABEL**

- **Fermented**

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Salmonellosis 2014

- **Salmonella Stanley**
  - 17 cases, 3 states
  - Raw “fermented” cashews

- **Recall**
  - 6 flavors of refrigerated “raw cashew cheese”

- **Unlicensed facility**
  - Multiple “raw” products, many without adequate food safety controls
**Salmonella Paratyphi B**

- Linked to Sprouted Nut Butter Spreads

- 13 cases, 10 states, July to November 2015

  Almonds imported to avoid mandatory "pasteurization" required by Almond Board of California

  *variant L(+) tartrate(+) (does not cause typhoid fever)

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**Growth of Salmonella in soaked almonds**

- Water Inoculated
- Almond Inoculated
- Control

[Graph showing growth of Salmonella with Log CFU/g on the y-axis and Time (hours) on the x-axis]

Harris, unpublished
**Maple Bacon Jam in Cronut Burgers Caused Food Poisoning Outbreak**

The Cronut was innocent.

August 2013
Toronto, Ontario
Canadian National Exhibition
220 people
*Staphylococcus aureus*

<table>
<thead>
<tr>
<th>Control</th>
<th>Not controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH 4.3</td>
<td>pH &gt;4.6</td>
</tr>
<tr>
<td>A$_w$ 0.93</td>
<td>A$_w$ &gt;0.94</td>
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Future?

Raw, minimally processed,
small scale (with rapid growth)

**Delivery To Your Door Is Free**

Reducing Consumer Food Waste: What impacts on food safety? Food industry risks?