

Familiar Faces, New Places



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Outline

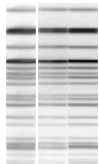
- Advances in detection methodology
- Changing marketplace
- What does the future hold?

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Advances in Detection Methodology



PulseNet connects the dots to detect foodborne outbreaks and **prevent over 270,000 illnesses** from Salmonella, E. coli and Listeria every year.



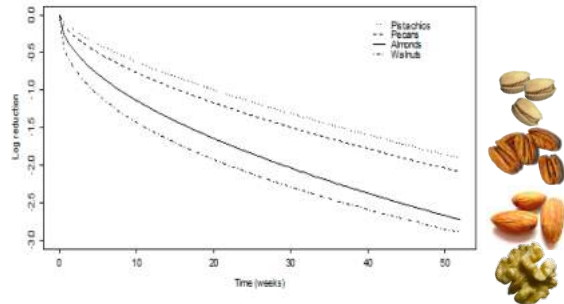
2014 Salmonellosis Nut Butter - Identification in Reverse

- 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)



Santillana Farakos et al., 2016. Int. J. Food Microbiol. 227:41-50

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

2016

2014

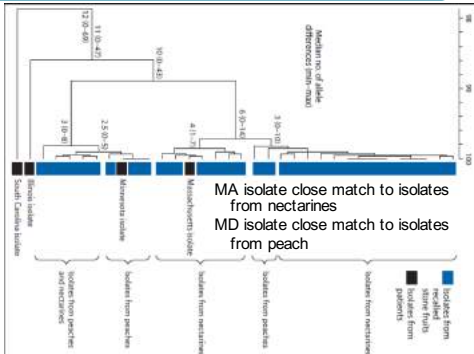
"Made exclusively from RAW natural, plant-based, whole foods – uncooked, untreated, unadulterated"

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

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Listeriosis associated with stone fruit 2014



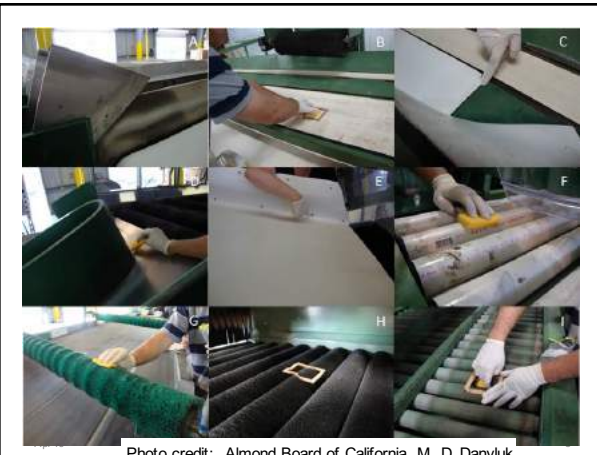
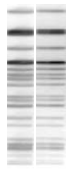


Photo credit: Almond Board of California, M. D. Danyluk

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

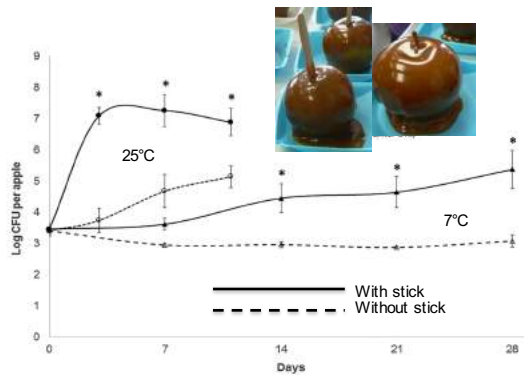


Kathy Glass, University of Wisconsin

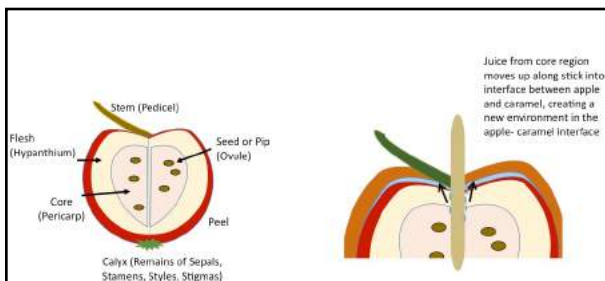
- Apples
- Stick/No stick
- Caramel 90°C/195°F
 - Dip (stick or tongs)
- Storage
 - 25 and 7°C



University of Wisconsin-Madison, kglass@wisc.edu



Glass et al., 2015. mBio 6(5): e01232-15. doi:10.1128/mBio.01232-15. 11



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

Glass et al., 2015. mBio 6(5): e01232-15. doi:10.1128/mBio.01232-15. 12

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



FERMENTED

Artisinal

BUY LOCAL

CLEAN LABEL

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



Habanero Cilantro Lime Cashew Cheese



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Salmonella Paratyphi B* Linked to Sprouted Nut Butter Spreads

- 13 cases, 10 states, July to November 2015

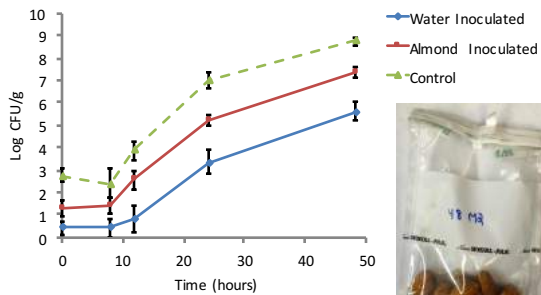
Almonds imported to avoid mandatory "pasteurization" required by Almond Board of California

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

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Growth of Salmonella in soaked almonds



Harris, unpublished

FOOD & DRINK

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

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Control

Not controlled

pH 4.3
A_w 0.93

pH >4.6
A_w 0.93

pH 4.3
A_w >0.94

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?

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