# PPS ‘TOUR’ – 2013

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# Subjects

- Post Pasteurization Additions
- Aflatoxin Testing
- Food Safety Modernization Act Update
- Environmental Testing and Preventive Controls
- General Food Safety Issues

# Post Pasteurization Additions

- All milk and milk products, i.e., milk solids, whey, nonfat dry milk, condensed milk, cream, skim milk, etc., eggs, egg products, cocoa, cocoa products, emulsifiers, stabilizers, vitamins and liquid sweeteners shall be added prior to pasteurization.
- **Pasteurization Temperature vs. Time**
- 63ºC (145ºF) * 30 minutes
- 72ºC (161ºF) * 15 seconds
- 89ºC (191ºF) 1.0 second
- 90ºC (194ºF) 0.5 seconds
- 94ºC (201ºF) 0.1 seconds
- 96ºC (204ºF) 0.05 seconds
- 100ºC (212ºF) 0.01 seconds

# Post Pasteurization Additions

- Ingredients permitted by the CFR standards of identity when considering a standardized milk or milk product:
- Fresh fruits and vegetables added to cultured milk and milk products provided the resultant equilibrium pH level (4.6 or below when measured at 24 C (75 F)) of the finished product is reached without undue delay and is maintained during the shelf life of the product.
- Ingredients subjected to prior heating or other technology, which has been demonstrated to FDA to be sufficient to destroy or remove pathogenic microorganisms;
- Ingredients having a aw of 0.85 or less;
- Ingredients having a high acid content (pH level of 4.6 or below when measured at 24 C (75 F)) or high alkalinity (pH level greater than 11 when measured at 24 C (75 F))

# Post Pasteurization Additions

- Roasted nuts;
- Dry sugars and salts;
- Flavor extracts having a high alcohol content;
- Safe and suitable bacterial cultures and enzymes; and
- Ingredients, which have been found to be safe and suitable by FDA.
- All such additions shall be made in a sanitary manner, which prevents the contamination of the added ingredient or the milk or milk product.

# Post Pasteurization Additions

- Any variance from the aforementioned procedures requires a Process Authority Review
  - Scientific study usually required at company's expense
  - Review of data by State/FDA recognized Process Authority
  - State or FDA still would have to approve request after scientific review and justification

# Aflatoxin Testing

- naturally occurring mycotoxins that are produced by many species of *Aspergillus*, a fungus
- The most notable ones being *Aspergillus flavus* and *Aspergillus parasiticus*.
- Aflatoxins are toxic and among the most carcinogenic substances known.

# Aflatoxin Testing

- The native habitat of *Aspergillus* is in soil, decaying vegetation, hay, and grains undergoing microbiological deterioration.
- Invades all types of organic substrates whenever conditions are favorable for its growth.
- Favorable conditions include high moisture content (at least 7%) and high temperature.
- The toxin can also be found in the milk of animals that are fed contaminated feed.

# Aflatoxin Testing

- Currently the only test method recognized by the FDA as a validated confirmatory test for aflatoxin in milk, is High Performance Liquid Chromatography (HPLC).
- While this method is an acceptable quantitative test for aflatoxin, due to the technical complexity of the equipment and procedure, it is presently not an available testing option in New York State.
- Some manufacturers of animal drug testing equipment have developed rapid aflatoxin screening methods but, to date, only the Charm SLAFQM method has been independently evaluated by a collaborative study which has been peer reviewed and published in the Association of Official Analytical Chemists (AOAC) International Journal. Because of this validation by a recognized scientific body, several states have authorized the Charm SLAFQM method for official testing of milk.
- Until such time as other test methods are similarly validated, the Department will only authorize testing by the Charm SLAFQM method as acceptable for official testing of loads of prepasteurized comingled milk and producer milk samples.

# Aflatoxin Testing

- Milk processors choosing to screen milk supplies for aflatoxin must notify the Department of their intent to test and adhere to the protocol:
- Prior to commencing a screening program, the testing laboratory must create a document outlining the analytical procedures which will be followed as well as the actions which will be taken in the event of an initial or presumptive positive test. Laboratories are responsible for training analysts and maintaining a list of trained analysts.
- Manufacturer instructions for using the Charm SLAFQM test must be followed.
- An initial positive test result must be followed by two more tests on the same sample along with the testing of controls.
- If all three test results are positive, the milk is positive for aflatoxin above the FDA safe level.
- If less than three test results are positive, the milk is reported as “not found” and may be released for processing.
- The Department must be notified of confirmed positive test results.
- Load information, load testing, and producer traceback testing must be documented in a tracking report which is sent to the Division of Milk Control’s Regional Supervisor.

# Aflatoxin Testing

- **Loads of milk confirmed positive for aflatoxin are considered adulterated and must be disposed of in a manner which ensures that they are not used for either human or animal consumption.**
  - Unlike Appendix N animal drug residues, FDA does not permit use of milk contaminated with aflatoxin to be tested at a 1:100 dilution factor and, if residues are not found, used as medicated animal feed. Disposal information will be documented in the tracking report.
- Department Laboratory Evaluation Officers will evaluate and document analyst proficiency as soon as practical. LEO evaluation is not required prior to beginning a testing program as long as items (1) through (6) above are followed. Laboratories conducting aflatoxin testing will be expected to participate in and satisfactorily perform proficiency sample testing (split samples) when available.
- Milk processors intending to test for aflatoxin or those which have questions or comments regarding this policy may contact Charles Lindberg at charles.lindberg@agriculture.ny.gov or Casey McCue at casey.mccue@agriculture.ny.gov

# Food Safety Modernization Act

- **F.2.5 Who is affected by these fees?**
  Only those parties in the food and feed industry whose non-compliance results in the following activities:
- Facility reinspections – follow-up inspections conducted by FDA subsequent to a previous facility inspection that identified noncompliance materially related to a food safety requirement of the Federal Food, Drug, and Cosmetic Act (the Act). The reinspection must be conducted specifically to determine that compliance has been achieved.
- Recalls – food recall activities performed by FDA that are associated with a recall order with which a responsible party has not complied.
- Importer reinspections -- follow-up inspections of a food offered for import conducted by FDA subsequent to a previous inspection that identified noncompliance materially related to a food safety requirement of the Act. The reinspection must be conducted specifically to determine that compliance has been achieved. As discussed in F.2.2., these fees will not be assessed until the agency has resolved issues associated with these fees and the public has been notified by the agency.

# Who is Covered?

- Facilities that manufacture, process, pack or hold human food
- In general, facilities required to register with FDA under sec. 415 of the FD&C Act
- Applies to domestic and imported food
- Some exemptions and modified requirements are being proposed

# Required Records

- Written food safety plan
- Records that document monitoring of the preventive controls
- Records that document corrective actions
- Records that document verification
- Records that document training for the qualified individual

# Overview of Key FSMA Provisions

*Provisions that were effective immediately:*

- New FDA authority for mandatory recalls
- Expanded FDA authority to request records re: “food of concern”
- New whistle-blower employee protection provisions
- New mandatory facility inspection schedule for FDA
- New FDA authority to collect fees for facility re-inspections and recall activities by the FDA if mandatory recall request is not complied with

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# Overview of Key FSMA Provisions (con't)

*Provisions which became effective at later dates:*

- New requirement for facility re-registrations every two years and new FDA authority to suspend registrations
- New requirements for facility hazard analyses and risk-based preventive controls
- Lower standard for FDA administrative detention of food
- Numerous other changes to FDA's regulatory scheme, including:
  - New regulations to protect against intentional adulteration
  - New recordkeeping requirements for "high risk" foods
  - Changes to the "reportable food" requirements

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# New Mandatory Recall Authority

- Covers adulterated or misbranded food that could cause serious adverse health consequences or death
- FDA will give the facility the opportunity to recall voluntarily
- If facility does not cooperate, FDA can issue an order requiring the responsible party to cease distribution
- If requested, FDA will hold an informal hearing on the "cease distribution" order

  - If FDA determines that it did not have adequate grounds, order must be vacated or modified

  - If FDA determines recall is necessary, recall order is issued

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# New Mandatory Recall Authority (con't)

- FDA can bring criminal prosecutions, request injunctive relief (court order requiring certain action), and seek civil penalties for failure to comply with an order
- Civil penalties for failure to comply with a recall order can be up to $50,000 for individuals and $250,000 for businesses
- FDA can collect "fees" to cover the recall-related costs it incurs when a responsible party does not comply with a recall order
- Under consideration: compensation of agricultural producers for recall-related costs when mandatory recalls of agricultural commodities are later determined to be erroneous

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# Expanded Authority to Request Records Regarding "Food of Concern"

- Prior to the FSMA, FDA had authority to request records regarding "food of concern" (adulterated food that could cause serious adverse health consequences or death) *to the extent necessary to assist in determining whether the food was adulterated and posed a risk*
- FDA now has expanded authority to request *all records* regarding such "food of concern" and "any other article of food that [it] reasonably believes is likely to be affected in a similar manner"

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# New Facility Inspection Schedules for FDA

- FDA must conduct initial inspections of “high risk” facilities within 5 years and follow-up inspections every 3 years thereafter
- FDA must conduct initial inspections of facilities that are not “high risk” within 7 years and follow-up inspections every 5 years thereafter
- FDA will consider a variety of factors in the determination of whether a facility is “high risk”
- FDA may rely on other Federal, State, or local agencies to conduct the inspections
- FDA examining whether it should exempt on-farm activities by small and very small businesses

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# New Authority to Collect Fees

- FDA authorized to collect fees from any facilities requiring re-inspection to determine whether previously identified instances of non-compliance has been satisfactorily addressed
- Fees cover 100% of the FDA's re-inspection costs
- As discussed, FDA also has authority to collect fees to cover the recall-related costs it incurs when a responsible party does not comply with a recall order

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# New Facility Re-Registration Requirement, New Authority to Suspend Registrations

- Under the FSMA, facilities must re-register every 2 years and registrants must consent to FDA inspections
- When new provisions take effect, FDA will have authority to suspend a facility's registration if it determines that food handled at that facility could cause serious adverse health consequences or death
- If requested, FDA will hold an informal hearing on the suspension order

  - If FDA determines that it did not have adequate grounds, order must be vacated or modified

  - If FDA determines suspension is necessary, registrant must prepare a corrective action plan

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# New Facility Re-Registration Requirement, New Authority to Suspend Registrations (con't)

- Facilities under suspension orders cannot distribute food
- FDA can bring criminal prosecutions and request injunctive relief (court order requiring certain action) for failure to comply with a suspension order
- New provisions took effect 180 days from enactment of the FSMA (early July 2011)

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# New Requirements for Hazard Analyses and Preventive Controls

- Focus of the new requirements is on prevention
- All registered facilities are required to:

  - Conduct a *hazard analysis*

  - Develop and implement *preventive controls* to address identified hazards

  - Establish procedures for *corrective action* in the event preventive controls are not implemented or are ineffective

  - Conduct *follow-up hazard analyses* every 3 years or earlier if changes may result in new hazards or increased the risk of identified hazards
- Facilities must prepare a written plan documenting its hazard analysis, preventive controls, and corrective action procedures

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# Lower Standard for FDA Administrative Detention of Food

- FDA now has authority to detain food if it had "***credible evidence***" that the food presents a threat of serious adverse health consequences or death
- When new provisions take effect, FDA will have the authority to detain food if it has "***reason to believe***" that the food presents a threat of serious adverse health consequences or death
- This new provision took effect 180 days after enactment of FSMA (early July 2011)

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# FSMA's Other Changes to FDA's Food Safety Regulatory Scheme

*The FSMA will result in other changes to FDA's regulatory scheme:*

- New regulations to protect against the intentional adulteration of food, due within 18 months of enactment of FSMA (early July 2012), will not apply to farms EXCEPT farms that produce milk
- New regulations to establish recordkeeping requirements for facilities that handle "high risk" foods, due within 2 years of enactment of FSMA (early January 2013), FDA will identify "high risk" foods within 1 year
- FDA will have new authority to require "consumer oriented information" when a responsible party makes a "reportable food" report to FDA, started18 months after enactment (early July 2012)
- Plus other new requirements and new FDA authorities

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# Seven Steps in HACCP (aka Food Safety Plan)

1. Conduct a Hazard Analysis (HA)
2. Identify the Critical Control Points (CCP)
3. Establish ***critical limits*** or thresholds which must be met at each CCP
4. Establish procedures to ***monitor*** CCPs
5. Establish the ***corrective action*** taken when critical limits are exceeded.
6. Establish procedures to ***verify*** that the HACCP system is working
7. Establish effective ***record keeping*** that will document the HACCP

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# Attribution of Foodborne Illnesses, Hospitalizations, and Deaths to Food Commodities by using Outbreak Data, United States, 1998–2008

John A. Painter, Robert M. Hoekstra, Tracy Ayers, Robert V. Tauxe, Christopher R. Braden, Frederick J. Angulo, and Patricia M. Griffin

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 19, No. 3, March 2013

each of 17 food commodities. We attributed 46% of illnesses to produce and found that more deaths were attributed to poultry than to any other commodity. To the extent that these

in complex foods. After leafy vegetables, the commodities linked to the most illnesses were dairy (1.3 million [14%]), fruits-nuts (1.1 million [12%]), and poultry (900,000 [10%]). Norovirus comprised 57% of all illnesses.

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ties for 22%. Dairy accounted for the most hospitalizations (16%), followed by leafy vegetables (14%), poultry (12%), and vine-stalk vegetables (10%) (Figure 2, panel

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# CDC report: Dairy a leading cause in foodborne illnesses

Cheese Market News, February 1, 2013

# Nonpasteurized Dairy Products, Disease Outbreaks, and State Laws—United States, 1993–2006

Adam J. Langer, Tracy Ayers, Julian Grass, Michael Lynch, Frederick J. Angulo, and Barbara E. Mahon

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 18, No. 3, March 2012

- Non-pasteurized products are approx. 150 times more likely to causes disease outbreaks as compared to non-pasteurized products

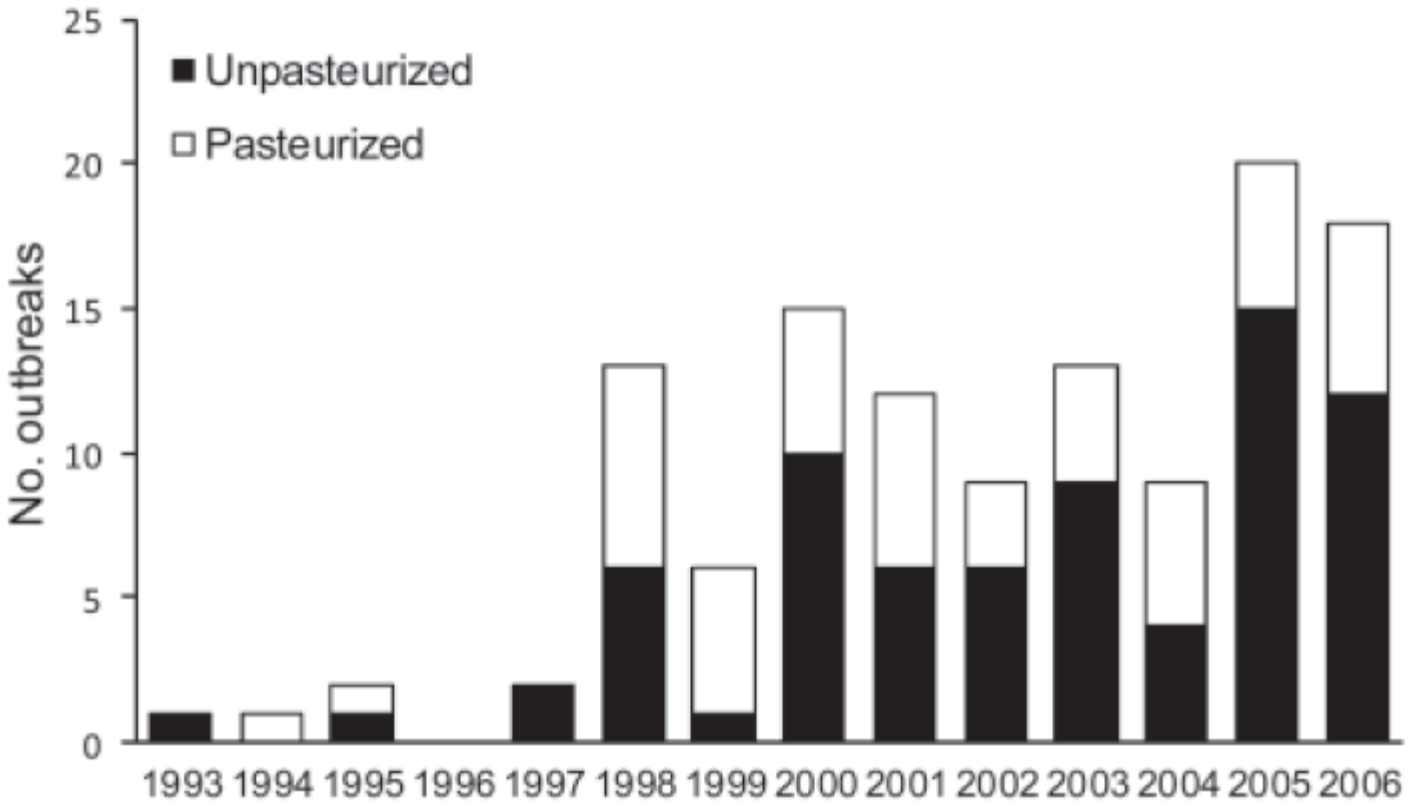


Figure 1. Number of dairy product–associated outbreaks, by year and pasteurization status of product, United States, 1993–2006.

# Attribution of Foodborne Illnesses, Hospitalizations, and Deaths to Food Commodities by using Outbreak Data, United States, 1998–2008

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Table 1. Estimates of annual domestically acquired foodborne illnesses attributed to specific food commodities and commodity groups, by pathogen type, United States, 1998–2008*

| Commodity or commodity group | No. (%) illnesses | | | | |
|---|---|---|---|---|---|
| | All agents | Bacterial | Chemical | Parasitic | Viral |
| Aquatic animals† | 589,310 (6.1) | 142,415 (3.9) | 153,488 (61.6) | 77,795 (33.3) | 215,613 (3.9) |
| Fish | 258,314 (2.7) | 15,362 (0.4) | 148,958 (59.8) | 955 (0.4) | 93,040 (1.7) |
| Shellfish† | 330,997 (3.4) | 127,053 (3.5) | 4,531 (1.8) | 76,840 (32.9) | 122,573 (2.2) |
| Crustaceans | 46,528 (0.5) | 32,626 (0.9) | 1,247 (0.5) | | 12,654 (0.2) |
| Mollusks | 284,469 (3.0) | 94,427 (2.6) | 3,283 (1.3) | 76,840 (32.9) | 109,919 (2.0) |
| Land animals† | 4,021,839 (41.7) | 2,334,000 (64.0) | 33,031 (13.3) | 156 (0.1) | 1,654,651 (30.0) |
| Dairy | 1,330,098 (13.8) | 656,951 (18.0) | 3,773 (1.5) | | 669,374 (12.1) |

Table 3. Estimates of annual deaths resulting from domestically acquired foodborne illnesses attributed to specific food commodities and commodity groups, by pathogen type, United States, 1998–2008*

| Commodity or commodity group | No. (%) deaths | | | | |
|---|---|---|---|---|---|
| | All agents | Bacterial | Chemical | Parasitic | Viral |
| Aquatic animals† | 94 (6.4) | 24 (2.8) | 61 (61.6) | 2 (0.7) | 6 (3.7) |
| Fish | 71 (4.9) | 8 (1.0) | 60 (59.8) | 0 (0.1) | 2 (1.4) |
| Shellfish† | 23 (1.6) | 16 (1.8) | 2 (1.8) | 2 (0.6) | 4 (2.3) |
| Crustaceans | 3 (0.2) | 2 (0.2) | 0 (0.5) | | 0 (0.2) |
| Mollusks | 20 (1.4) | 14 (1.6) | 1 (1.3) | 2 (0.6) | 3 (2.1) |
| Land animals† | 629 (43.3) | 570 (66.2) | 13 (13.3) | 0 | 45 (29.0) |
| Dairy | 140 (9.7) | 121 (14.0) | 2 (1.5) | | 18 (11.8) |

# The pathogens

- Dairy associated outbreaks included in this reported were caused by:
  - *B. cereus*: 35 outbreaks
  - *Brucella*: 4 outbreaks
  - *Campylobacter*:  78 outbreaks
  - *C. perfringens*: 93 outbreaks
  - *E. coli* O157: 23 outbreaks
  - *L. monocytogenes*: 7 outbreaks
  - *Salmonella*: 210 outbreaks
  - *Staph. aureus*: 118 outbreaks
  - Norovirus: 545 outbreaks

*Journal of Medical Microbiology* (2012), **61**, 743–745 DOI 10.1099/jmm.0.038547-0

Case Report

# *Bacillus cereus*, an unusual cause of fulminant liver failure: diagnosis may prevent liver transplantation

Mohamed Saleh,[1,2]† Malik Al Nakib,[2,3]† Alexandra Doloy,[3] Sébastien Jacqmin,[1] Sébastien Ghiglione,[1] Nicolas Verroust,[1] Claire Poyart[2,3] and Yves Ozier[1,2]

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# Norwalk like viruses

- Total: 23 million cases and 310 deaths
- Foodborne: 9.2 million cases and 120 deaths
- Up to 1 to 10 billion norovirus particles per g feces and 1 million  infectious particles per ml of vomit
- Very low infectious dose (1/100,000 of 1/10,000 ml of vomit may contain enough virus to cause disease

# Norwalk-like viruses: a case study

- In January 1999, an outbreak of viral gastroenteritis affected more than 300 people who attended a metropolitan concert hall over a 5-day period.
- The first case was a concert attendee who vomited in the auditorium and adjacent male toilet
  - Gastrointestinal illness occurred among members of 8/15 school parties who attended the following day.
  - Children who sat on the same level of the auditorium as the first case were much more likely to be ill than those seated elsewhere
  - Transmission most likely occurred through direct contact with contaminated fomites ("*any inanimate object or substance capable of absorbing, retaining, and transporting contagious or infectious organisms from one individual to another*").

# What's the relevance of this?

- The usually suspects are still a problem
  - *Listeria monocytogenes* and *Salmonella* will continue to be a focus of the dairy industry
- Contamination of milk and dairy products at any point in the food chain is a problem
  - Post-processing contamination a concern

# Overview

- New CDC data on foodborne illnesses by commodity
- **Selected 2012 Food Safety Issues**
  - *Listeria monocytogenes*
  - Non O157 shiga toxin producing *E. coli*
  - Risk assessment for raw milk soft-ripened cheese

# Multistate outbreak of listeriosis linked to imported Frescolina Marte brand ricotta salata cheese

- Mar to Sep 2012.
- As of 11 Oct 2012, a total of 20 persons from 12 states and DC have been linked to this outbreak
  - 19 ill persons reported being hospitalized
  - 4 deaths and one fetal loss
- On 14 Sep 2012, *Forever Cheese* issued an expanded recall of all lots of Frescolina Marte brand ricotta salata cheese and a market withdrawal of all cheeses that were produced by the Italian cheese exporter.

# Outbreak in the outback

- Two deaths, one miscarriage and 18 illnesses in Australia
- Linked to cheese produced by Jindi Cheese LTD
  - Initial recall included 1 kg brie and camembert cheese branded Jindi, the 1 kg Wattle Valley double brie, and the 1 kg Wattle Valley camembert with a best before date of 21 Dec
  - The company subsequently recalled all cheese products made in the plant prior to January 7, 2013

*Journal of Food Protection, Vol. 75, No. 1, 2012, Pages 71–78*
doi:10.4315/0362-028X.JFP-11-236
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# Widespread Listeriosis Outbreak Attributable to Pasteurized Cheese, Which Led to Extensive Cross-Contamination Affecting Cheese Retailers, Quebec, Canada, 2008

COLETTE GAULIN,[1]* DANIELLE RAMSAY,[2] AND SADJIA BEKAL[3]

- 38 cases; pasteurized washed rind cheese incriminated as outbreak source
- Cross contamination at retail as a major issue

FOODBORNE PATHOGENS AND DISEASE
Volume 7, Number 12, 2010
© Mary Ann Liebert, Inc.
DOI: 10.1089/fpd.2010.0631

# Large Listeriosis Outbreak Linked to Cheese Made from Pasteurized Milk, Germany, 2006–2007

Judith Koch,[1] Regine Dworak,[2] Rita Prager,[3] Biserka Becker,[4] Stefan Brockmann,[5] Amal Wicke,[6] Heidi Wichmann-Schauer,[7] Herbert Hof,[8] Dirk Werber,[1] and Klaus Stark[1]

- Outbreak with likely >50 cases linked to commercial cheese (acid curd) made from pasteurized milk (“Harzer Kaese”; ripened with a red smear, *Brevibacterium linens*)

# Environmental Testing: How to address *L. monocytogenes*

- Control strategies need to focus on preventing post kill step re-contamination of products (at plants as well as at retail)
  - Sanitary equipment design
  - Appropriately designed and implemented SSOPs (sanitation standard operating procedures)
  - Environmental testing
- Limited risk in foods that do not support growth
  - at $1 \times 10^{10}$ cfu/serving, the dose-response model predicts a median death rate of 1 in 667 servings for pregnancy associated/neonatal listeriosis

| Plant A2 | 2/28/01 | 3/26/01 | 4/24/01 | 5/22/01 | 6/19/01 | 7/17/01 | 8/14/01 | 9/18/01 | 10/9/01 | 11/6/01 | 12/12/01 | 1/29/02 | 2/25/02 | 3/5/02 | 4/2/02 | 4/16/02 | 5/14/02 | 6/10/02 | 7/1/02 | 7/23/02 | 8/20/02 | 9/17/02 | 10/15/02 | 11/12/02 | 12/10/02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 1-L.spp | | | 2-L.spp | | | 1-L.spp | | | | | 1-L.spp |
| **Raw Product Samples** | 1062D | 1060A | - | - | - | - | - | - | - | L.spp | - | L.spp | | 1025A | - | | 1053C | - | - | 1039C | - | - | - | - | 1039C |
| | 1 of 6 | 1 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 3 of 6 | 6 of 6 | 1 of 6 | | 1 of 6 | 6 of 6 | | 1 of 6 | 6 of 6 | 6 of 6 | 1 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 1 of 6 |
| **Raw/In-Process Areas** | | | | | | | | | | | | | | | | | | | | | | | | | |
| E3: Floor drain, raw salmon ro | 1053A | - | - | - | - | - | - | - | - | L.spp | L.spp | L.spp | | 1053A | - | | - | - | - | - | - | - | - | - | - |
| Salmon receiving floor drain | | | | - | - | L.spp | 1053A | - | - | L.spp | - | - | | L. spp | - | | - | - | - | L.spp | L.spp | L.spp | - | - | - |
| Raw salmon room, Drain (SB-FD1) | | | | | | | | | | | | | | 1053A | 1053A | | - | - | 1053a | 1053A | - | 1053A | 1062A | L.spp | 1053A |
| Raw salmon room, Drain (SB-FD2) | | | | | | | | | | | | | | 1053A | 1053A | | 1053A | - | L.spp | 1053A | 1053A | L.spp | | | - |
| Raw salmon room, 3 floor mats | | | | | | | | | | | | | | 1053A | 1053A | | | 1053A | 1053A | 1053A | 1053A | 1053A | 1053A | 1053A | 1053A |
| RawSalmon room, mats- post cleaning | | | | | | | | | | | | | | | | 1053A | 1053A | | | | | | | | |
| Raw salmon room, platic pallet | | | | | | | | | | | | | | 1053A | - | | | - | L.spp | - | - | - | - | - | - |
| Raw Salmon room, pallet, post cleaning | | | | | | | | | | | | | | | | - | - | | | | | | | | |
| Raw salmon room, pallet jacket handle | | | | | | | | | | | | | | - | - | | - | - | - | - | - | - | - | - | - |
| E8: Apron, employee in raw are | 1062D | - | - | 1053A | - | 1053A | 1025A | - | 1053A | - | 1053A | - | | - | - | | - | - | - | - | - | - | - | - | - |
| Incoming raw material packaging | | | | | | | | | | | | - | | - | - | | - | - | - | - | - | L.spp | - | L.spp | - |
| **Finished Product Areas** | | | | | | | | | | | | | | | | | | | | | | | | | |
| E1: Trench Drain, processing r | L.spp | - | - | 116-693 | L.spp | L.spp | L.spp | - | L.spp | L.spp | - | L.spp | | 1042C | L.spp | | 1042C | L.spp | - | - | L.spp | L.spp | L.spp | L.spp | L. spp |
| E2: Trench Drain, smoke room | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | | - | - | L.spp | - | - | L.spp | - | - | L. spp |
| Smoke room trench drain, in use | | | | | | | | | | | | | | | | 1053A | - | - | - | - | - | - | - | - | - |
| E4: Cart wheels, for box transp | L.spp | - | - | - | - | - | - | L.spp | - | L.spp | - | - | | - | - | | - | - | - | - | - | L.spp | L.spp | - | L. spp |
| E5: Floor, under conveyor belt | L.spp | - | - | - | - | L.spp | L.spp | L.spp | L.spp | L.spp | L.spp | - | | - | - | | - | - | - | - | - | - | 1053 | 1053 | - |
| Finish Room, floor mats #1 | | | | | | | | | | | | | L.spp | | | | | | | | | | | | |
| Finish room, floor mats #2 | | | | | | | | | | | | | L.spp | | | | | | | | | | | | |
| Finish room, floor mats, reg. Clean | | | | | | | | | | | | | | L.spp | L.spp | L.spp | L.spp | L.spp | L.spp | L.spp | L.spp | 1042B | L.spp | L.spp | L. spp |
| Finish room, floor mats, reg. Clean | | | | | | | | | | | | | L.spp | | | | | | | | | | | | |
| Finish room, 1200 ppm Quat, weekend | | | | | | | | | | | | | L.spp | | | | | | | | | | | | |
| Finish room, 1200 ppm Quat, weekend | | | | | | | | | | | | | - | | | | | | | | | | | | |
| Bootdip valve cover, processin | - | - | L.spp | | | | | | | | | | | | | | | | | | | | | | |
| E6: Platform under Geba #1 sli | - | - | - | - | - | - | L.spp | L.spp | L.spp | - | - | - | | - | - | | - | - | - | - | - | - | - | - | - |
| E9: Sliding door handle, skinni | L.spp | - | - | - | - | - | - | 1053A | L.spp | - | - | - | | - | - | | - | - | - | L.spp | - | - | - | - | - |
| **Food Contact Surfaces** | | | | | | | | | | | | | | | | | | | | | | | | | |
| E7: Gloved hands, finish prod. | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | | - | - | - | - | - | - | 1053 | - | L. spp |
| E10: Skinning machine | L.spp | - | L.spp | - | - | - | L.spp | L.spp | L.spp | - | L.spp | - | | L.spp | - | | - | - | - | - | - | L.spp | - | L. spp | - |
| E11: Geba #5 slicer | L.spp | - | - | - | - | - | - | - | - | - | L.spp | - | | - | - | | - | - | - | - | - | - | 1053 | - | - |
| E12: 20/20 vac belt | - | - | - | L.spp | - | - | - | - | - | - | - | - | | - | - | | - | - | - | - | - | - | - | - | - |
| | 6 of 6 | 6 of 6 | 6of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | | 6 of 6 | 6 of 6 | | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 6 of 6 | 1 of 6 | 6 of 6 |
| **Finished Product Sample** | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | | - | - | - | - | - | - | - | 1039A | - |

# Environmental sampling plans – the need for written procedures and plans for corrections

- Written plans for corrections that need to be performed after positive samples are essential
  - Plans need to be plant specific
  - Each positive sample should be followed up with additional investigations
- All corrections need to be documented in writing

# *E. Coli* O103 outbreak linked to raw milk cheese

- Three people became sick with E. coli O103 after consuming cheese made with unpasteurized cow's milk.
- Raw milk cheese form implicated facility tested positive for Shiga-toxin *E. coli* (often referred to as STEC)
  - Cheese had been aged 60 + days

# Non O157 EHEC

- Disease and transmission similar to O157:H7
- Approx. 112,700 human cases and 270 hospitalizations annually in US (2011 data)
- Big Six" – O26, O45, O103, O111, O121, O145
- May be declared an adulterant soon?
- Tests for non O157 STEC/EHEC are currently being pilot tested
- Previous outbreaks have occured in US, including one E. coli O157:NM outbreak linked to raw milk (2008)

# FDA Draft Risk Assessment on Listeriosis from Soft-Ripened Cheese

- Released on February 11, 2013 (189 pages!)
  - Covers Brie and Camembert
  - Focus on farmstead cheeses
- Joint effort by FDA and Health Canada
- **Key finding**: the risk of listeriosis from soft-ripened cheeses made with raw milk was estimated to be 112 times higher than that from soft-ripened cheese made with pasteurized milk.

# Things We're Working On

- Acid Whey mitigation
- Growing the milk supply in NY State
- Supporting new plants under construction
- Supporting existing plants in technical problem solving
- Myriads of committees and task forces
- Public Health education
- Genesee Community College degree program
- Webinar availability of classroom portions of certificate program

# Cornell Dairy Foods Extension Certificate Program

## *Core Competencies & Learning Objectives*

**Basic Dairy Sanitation & Safety Certificate (3-day course):**

Basic Dairy Microbiology/Food Safety Overview

Milk Composition & Unit Processing Operations

Good Manufacturing Practices / Dairy Sanitation

Dairy Regulations/Food Safety Modernization Act

**Required Prerequisite Course for Dairy Foods Extension Certificate Programs. Offered as a stand-alone GMP training program.*

### Fluid Milk Processing for Quality & Safety Certificate

Core Competencies:

- Regulations for Grade "A" Milk
- Milk Microbiology from Farm to Table
- Factors Influencing Raw Milk Quality
- Unit Operations for Processing & Packaging Fluid Milk
- Quality & Shelf-life of Fluid Milk
- Evaluating Milk Shelf-life & Quality; Trouble Shooting Defects
- Procedures to Improve & Maintain Optimum Shelf-life
- Ensuring Product Safety through HACCP and GMP Principles

### Yogurt and Fermented Dairy Products (Basic/Advanced Certificate)

Core Competencies (Basic):

- Milk Quality & Basic Chemistry
- Basic Dairy Microbiology
- Starter Cultures for Fermented Products
- Product Processing & Formulation
- Product Evaluation & Defects
- Product Safety & Protection
- Record Keeping/Observations
- Dairy Sanitation

Core Competencies (Advanced*):

- Advanced Applications in Fermented Milk Processing Technology
- Product Development
- Product Evaluation & Quality Assurance

* in development

### Cheese and Cheese Products (Basic/Advanced Certificate)

Core Competencies (Basic):

- Milk Quality & Basic Chemistry
- Basic Dairy Microbiology
- Starter Cultures for Cheese Varieties
- Standardization & Processing Options
- Curd Handling Techniques
- Molding, Brining & Curing
- Record Keeping/Observations
- Dairy Sanitation

Core Competencies (Advanced*):

- Advanced Concepts in Cheese Manufacture
- Cheese Grading & Quality Assurance
- Microbiology & Biochemistry of Cheese Manufacture & Aging

* in development

# Cornell Dairy Foods Extension Certificate Program

## *Curriculum & Requirements*

### Fluid Milk Processing for Quality & Safety Certificate

Curriculum & Requirements:

- Required Prerequisite - Basic Dairy Science & Sanitation Course (3 days)
- HTST Pasteurization (2.5 days) or Vat Pasteurization Course (1.5 days)
- HACCP for Dairy (2.5 days)
- Fluid Milk Processing for Quality & Safety (2 days)
- Written Test

### Yogurt and Fermented Dairy Products Certificates

Basic Curriculum & Requirements:

- Required Prerequisite - Basic Dairy Science & Sanitation Course (3 days)
- HTST Pasteurization (2.5 days) or Vat Pasteurization Course (1.5 days)
- Cornell's Basic Cultured Products Workshop (2.5 days)

Advanced Curriculum & Requirements*:

- Must Complete the Basic Certificate Requirements
- Proven Experience with Fermented Milk Products (2+ years)
- Cornell's Advanced Cultured Products Workshop (3 days)
- Written Test & Oral Review

* in development

### Cheese and Cheese Products Certificates

Basic Curriculum & Requirements:

- Required Prerequisite - Basic Dairy Science & Sanitation Course (3 days)
- HTST Pasteurization (2.5 days) or Vat Pasteurization Course (1.5 days)
- Cornell's Basic Cheese Making Workshop (2 days)

Advanced Curriculum & Requirements*:

- Must Complete the Basic Certificate Requirements
- Proven Experience with Cheese Products (2+ years)
- Cornell's Advanced Cheese Products Workshop (3 days)
- Written Test & Oral Review

* in development

*To obtain a Dairy Foods Extension Certificate, candidates must successfully complete all curriculum requirements and tests. All training courses offered by the CU Dairy Foods Extension Program may be taken as a stand-alone programs.*

### Cornell University Dairy Foods Extension Certificate Program

*For more detailed information or to enroll in the program contact*:

Janene Lucia
jgg3@cornell.edu
607-255-2892

Department of Food Science
Stocking Hall
Ithaca, NY 14853

This Certificate Program is offered by the Cornell University Department of Food Science Dairy Foods Extension Team. The program is designed to provide trained personnel for the dairy industry and is open to all interested parties.

April 25, 2013