Traceability for Foods: An Industry Perspective

10th CSL/JIFSAN Symposium
Methods and Systems for Tracking, Tracing and Verifying Foods
University of Maryland
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Grocery Manufacturers Association
Why Traceability?
Why Traceability?

• Trace Backs
  – Goal to quickly identify source of an outbreak
  – Trace FORWARD to other products which might be implicated
Why Traceability?

- Trace backs
- Troubleshooting/Lessons Learned
Why Traceability?

• Trace Backs

• Troubleshooting/Lessons Learned
  – Eg. Almonds
    • Role of nuts in foodborne illness
    • Importance of process validation
    • Development of new treatments
Why Traceability?

- Trace Backs
- Troubleshooting/Lessons Learned
- Part of a Robust Food Safety System
Consumer Confidence is DOWN

- Recent events have exposed weaknesses in our food safety net and shaken consumer confidence in the safety and security of the food supply both domestically produced and imported.
Consumer Confidence in Food Safety is Down

- The number of consumers "completely" or "somewhat confident" in the safety of supermarket food declined
  - 82 percent in 2006
  - 66 percent in 2007

FMI Consumer Trends 2007, January 2007 survey
Consumer Confidence in Food Safety is Down

• 38 percent of consumers stopped purchasing certain foods in the past 12 months (vs 9% in 2006)
  – spinach (71 percent),
  – lettuce (16 percent),
  – bagged salad (9 percent) and
  – beef (8 percent).

FMI Consumer Trends 2007, January 2007 survey
Consumer Confidence

• Compared to 2 or 3 years ago, would you say you are MORE or LESS concerned about foods produced in the U.S.

  – 52% MORE CONCERNED
  – 4% LESS CONCERNED
  – 44% NO CHANGE
Consumer Confidence

• Compared to 2 or 3 years ago, would you say you are MORE or LESS concerned about imported foods

  – 68% MORE CONCERNED
  – 3% LESS CONCERNED
  – 28% NO CHANGE
  – 1% DON’T KNOW
How to **WE** Maintain Food Safety and Improve Confidence?
Supply Chain Management
Supply Chain Management

- What is “Supply Chain Management?”

Due diligence to assure that products received from suppliers meet required regulatory, legal, and contractual standards of safety.
Importance of Supply Chain Management in Food Safety

• Legal Considerations
  – Regulatory compliance
Importance of Supply Chain Management In Food Safety

• Legal Considerations
  – Regulatory compliance
  – Liability
Importance of Supply Chain Management in Food Safety

• Legal Considerations

• Financial Considerations
  – Price vs Quality
    • “Cheaper” ≠ less expensive!
Importance of Supply Chain Management in Food Safety

• Legal Considerations

• Financial Considerations
  – Price vs Quality
  – Value of Brand
    • Commercial brand
    • Reputation of exporting country
Importance of Supply Chain Management in Food Safety

• Legal Considerations
• Financial Considerations
• Consumer
  – EXPECT and ASSUME food to be safe
    • Put responsibility and blame on both product AND exporting country
Supplier Programs in Food Supply Chain Handbook

- Hazard Analysis and Critical Control Points (HACCP)
- GMPs/GHPs
- GAPs and GAqPs where applicable
- Employee training
- Environmental monitoring
- Allergen control
- Foreign material control
- Label control programs
- **Product and ingredient tracing**
- Product testing/hold and release
- Recall/crisis plans
- …
Key Concept

Preventing production of contaminated foods is much more effective than reliance on detection of contaminated goods in distribution and corrective actions.
What to Trace?
What to Trace?

• Final Product
  – Consumer units
    • Cans of soup
    • Boxes of cereal
    • Carton of eggs
What to Trace?

• Final Product
  – Consumer units
  – Relatively Easy!
What to Trace?

• Final Product

• Bulk shipments
  – Pallets of consumer product
  – Rail cars of grain
What to Trace?

• Final Product
• Bulk shipments
  – Relatively Easy!
What to Trace?

• Final Product
• Bulk shipments
• Components
  – Food ingredients
  – Direct additives (eg. salt, vitamins)
  – Indirect additives (eg. packaging components)
A Multinational Loaf


INGREDIENTS:
• Wheat gluten
• Honey
• Calcium propionate
• Guar gum
• Flour enrichments
• Beta-carotene
• Vitamin D₃

Source: Sara Lee
A Multinational Loaf


- Wheat gluten – France, Poland, Russia, Netherlands, Australia
- Honey – China, Vietnam, Brazil, Uruguay, India, Canada, Mexico, Argentina
- Calcium propionate – Netherlands
- Guar gum – India
- Flour enrichments – China
- Beta-carotene – Switzerland
- Vitamin D₃ – China

Source: Sara Lee
2.1 Million U.S. Farms

30,000 U.S. Processing Sites

19,000 Domestic Packers/Repackers

94,000 Foreign Processing Sites

87,000 Foreign Packers/Repackers

224,000 Retail Food Stores

935,000 Retail Food Outlets

Courtesy of Shaun Kennedy, NCFDP
2.1 Million U.S. Farms

30,000 U.S. Processing Sites

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94,000 Foreign Processing Sites

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935,000 Retail Food Outlets

224,000 Retail Food Stores

? Million Foreign Farms

Courtesy of Shaun Kennedy, NCFDP
Supply Chain Complexity

- Unknown millions of foreign farms
  - Many very small (1 hectare or less)
- 94,000* foreign processing facilities
- 87,000* foreign packers/repackers
**Supply Chain Complexity**

**One Burger Contains:**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>baking soda</td>
<td>作为膨松剂使用。</td>
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<tr>
<td>wheat gluten</td>
<td>作为面团成分。</td>
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<tr>
<td>calcium propionate</td>
<td>作为防腐剂使用。</td>
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<tr>
<td>enzymes</td>
<td>作为酵母的成分。</td>
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<td>mono- and diglycerides</td>
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<td>diacetyl tartaric acid esters</td>
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<td>ethanol</td>
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<tr>
<td>sorbitol</td>
<td>作为甜味剂使用。</td>
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<tr>
<td>polysorbate 20</td>
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<tr>
<td>potassium propionate</td>
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<td>sodium stearoyl lactylate</td>
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<tr>
<td>corn starch</td>
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<td>ammonium chloride</td>
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<td>ammonium sulfate</td>
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<td>calcium peroxide</td>
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<td>ascorbic acid</td>
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<tr>
<td>azodicarbonamide</td>
<td>作为增氧剂使用。</td>
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<td>Milk</td>
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<tr>
<td>Water</td>
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<td>sodium citrate</td>
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<tr>
<td>sodium phosphate</td>
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<td>polysorbate 20</td>
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<tr>
<td>artificial color</td>
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<tr>
<td>acetic acid</td>
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<tr>
<td>Enzymes</td>
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<td>Special Sauce</td>
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<td>Soybean oil</td>
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<td>distilled vinegar</td>
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<td>egg yolks</td>
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<td>sugar</td>
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<td>spice extractives</td>
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<td>xanthan gum</td>
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<td>hydrolyzed proteins</td>
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<tr>
<td>caramel color</td>
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<td>paprika</td>
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<td>EDTA</td>
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<tr>
<td>Grill Seasoning</td>
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<tr>
<td>Salt</td>
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<td>Pepper</td>
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<td>lettuce</td>
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<td>dehydrated onions</td>
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<tr>
<td>USDA inspected beef</td>
<td>作为牛肉原料。</td>
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<td>Cucumbers</td>
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<td>water</td>
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<tr>
<td>Vinegar</td>
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<tr>
<td>Salt</td>
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<tr>
<td>Alum</td>
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<tr>
<td>natural flavorings</td>
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<tr>
<td>polysorbate 80</td>
<td>作为乳化剂使用。</td>
</tr>
</tbody>
</table>

Courtesy of Shaun Kennedy, NCFDP
What to Trace?

- Final Product
- Bulk shipments
- Components
  - NOT so Easy or Simple!
Necessity for Tracing ALL Components at ALL points in the Supply Chain?
Necessity for Tracing ALL Components at ALL points in the Supply Chain?

• Goal-protect consumers?
  • Get products off the shelf!!
  • Notify consumers
Necessity for Tracing ALL Components at ALL points in the Supply Chain?

• Goal-protect consumers?

• Are ALL components of equal importance
  – “Sensitive” ingredients
    • Those ingredients that have highest risk of contributing to illness or injury
Necessity for Tracing ALL Components at ALL points in the Supply Chain?

• Goal-protect consumers?

• Are ALL components of equal importance
  – “Sensitive” ingredients
  – Economically important ingredients
    • Protein (eg. melamine)
    • Counterfeiting (eg. exotic juices)
Welcome to the FMI PRODUCT RECALL PORTAL powered by GS1 US Collaboration Zone

A comprehensive product recall communication tool for grocery retailers, wholesalers and suppliers

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Challenges and Questions
Challenges and Questions

• Actual Impact on food safety?
Challenges and Questions

- Actual Impact on food safety?
- Data Management
  - Security
  - Storage
  - Privacy and Commercial/confidential information
Challenges and Questions

• Actual Impact on food safety?
• Data Management
• Cost vs benefit
Summary

• International Trade in Foods and Agricultural Products Will Continue to Increase
Summary

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• The complexity of the supply chain makes traceability a technical, logistical, and financial challenge
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• The complexity of the supply chain makes traceability a technical, logistical, and financial challenge

• There ARE elements of traceability that can improve food safety and benefit both consumers and the food industry
Summary

• International Trade in Foods and Agricultural Products Will Continue to Increase
• The complexity of the supply chain makes traceability a technical, logistical, and financial challenge
• There ARE elements of traceability that can improve food safety and benefit both consumers and the food industry
• Traceability must be tailored to specific situations
Questions ???