Losing Track!

Do you really know where your food comes from?

For National Council for Food and Agricultural Research (NCFAR)
Lunch and Learn Seminar
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Agenda

- Introductions
  - who are we and why are we here?

- Challenges
  - why we are losing track!

- Opportunities
  - what is the role of public funding?

- Success stories
  - examples of positive impact on food and ag research
Introductions:
Institute of Food Technologists (IFT)

Introduction to IFT

- For more than 75 years, the Institute of Food Technologists (IFT) has unlocked the potential of the food science community by creating a dynamic global forum where members from more than 100 countries can share, learn and grow.

- More than 18,000 members worldwide

- Members come from industry (80%), academia (15%), and government (5%)

- 18% of IFT members are international in more than 100 countries
Introductions:
Global Food Traceability Center (GFTC)
GFTC Vision
To become the global resource and authoritative voice on food traceability.

GFTC Mission
A program to serve the agriculture and food sectors, by providing applied research, objective advice, and practical expertise about data collaboration and food product traceability for business benefit and public good.

Public Private Partnership Model

GFTC Sponsors

[Logos of various sponsors are shown here]
Introductions:
Traceability

Defining Traceability

Trace“ability”  T“race”ability  Traceab“ility”
Defining Traceability

- “Traceability”

- Traceability is NOT just recall
  - How do you find points of convergence when much is unknown?

- A single company doesn’t have whole-chain traceability – but is a critical piece of the puzzle!

Introduction to Traceability: The Big Picture

- Food Protection • Holistic Approach
- Food Defense • Intentional Contamination
- Food Safety • Unintentional Contamination
- Food Sustainability • Food productivity
- Food Security • Food accessibility

Food Traceability
Introduction to Traceability: Role in Food Safety and Defense

- Causality
- Trust
- Visibility
- Agility

Food Safety and Defense

Prevention
Preparedness
Recovery
Response

Challenges in Traceability
The Complexity of the Food System

Dig into this pizza and see why food traceability throughout the food system, from farm to fork, is critical to ensuring a safe and abundant food supply.

**Tomatoes**
While the U.S. produces the most tomatoes, Mexico accounts for 71% of tomato imports, and Canada accounts for 27%.

**Cheese**
14% of the raw buffalo milk used for mozzarella is made in Italy while 36% of buffalo milk is produced in Asia.

**Mushrooms**
China produces 47% of our mushrooms across the globe, followed by the U.S. which produces only 11%.

**Spices**
11.5% of India’s spices are exported to United Arab Emirates, the U.S., the EU, and Malaysia.

**Peppers**
95% of unprocessed peppers are exported through India, China, and the U.S.

**Beef**
2.5 billion pounds of beef were exported this year to top markets like Canada, Japan, Mexico, South Korea, and Hong Kong.

Globalizing the Cheeseburger

**Vinegar**
Argentina
Australia
Austria
Belgium
Brazil
Canada
China
Chile
Colombia
Denmark
France
Germany
Greece
Hong Kong
Israel
Italy
Japan
S. Korea
Lebanon
Peru
Poland
Portugal
Russia
S. Africa
Singapore
Spain
Sweden
Turkey
Taiwan
U.K.

**Garlic Powder**
Brazil
Canada
China
Germany
India
Israel
Japan
S. Korea
Mexico

**Tomatoes**
Belgium
Brazil
Canada
Colombia
Costa Rica
Guatemala
Israel
Morocco
Mexico
Netherlands
New Zealand
Poland
Spain

**Beef**
Australia
Canada
Chile
Costa Rica
Honduras
Japan
Mexico
Nicaragua
New Zealand
Uruguay

**Wheat Gluten**
Australia
Belgium
Canada
China
Czech Rep.
France
Germany
Kazakhstan
Lithuania
Netherlands
Poland
Russia
Sweden
Switzerland
Thailand
U.K.

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Traceability Challenges

- Consumers being more vocal
  - Demand ready access to reliable and relevant information
  - More sensitive to issues of waste, nutrition, and the environment
Traceability Challenges

- Overlapping and conflicting demands from national regulators

Traceability Challenges

- Lack of unifying requirements
  - Changing regulatory demands around the world
  - Multiple proprietary requirements
  - Terminology
Traceability Challenges

- **Lack of records**
  - Data is simply not available, or is difficult to collect
  - Is the data
    - Reliable?
    - Relevant?
    - Rapidly accessed?

- **Lack of technology**
  - Technology is not the problem but it can be a solution
  - Lack of common ‘blueprint’ weakens interoperability & drives up costs
  - The need for a traceability architecture
Traceability Opportunities

Role of Public Funding

Key Stakeholders

Government
- FDA
- CDC
- EPA

Industry
- Farmers
- Processors
- Wholesalers

Academia
- Education
- Extension
- Centers of Excellence

Others
- USDA
- DHS
- Ingredient Suppliers
- Distributors
- Retailers

Research
Bioterrorism Act of 2002

- Established recordkeeping requirements
  - Manufacturers/processors
    - Record shipment and receipt information
    - Capture incoming lot numbers as possible
    - Link ingredients to finished product to extent practical
  - Non-manufacturers
    - Contact information for who it came from and went to
  - Exemptions at supply chain ends
- “1 up / 1 down” redundant system
- Form of recordkeeping not specified
  - Combinations of paper and electronic records (even within a facility)

Food Safety Modernization Act of 2011:
Key Traceability Provisions/Sections

- Section 103: Hazard Analysis and Risk Based Preventive Controls
- Section 105: Standards for Produce Safety
- Section 106: Protection Against Intentional Adulteration
- Section 204: Enhancing Tracing and Tracing
- Section 301: Foreign Supplier Verification Program
- Section 302: Voluntary Qualified Importer Program
- Section 303: Import Certifications for Food
- Section 304: Prior Notice of Food Shipments
- Section 307: Accreditation of Third Party Auditors
Success Stories

Positive Impact on Food and Ag Research

Comparison of Global Food Traceability Regulations and Requirements

Funded by the Public Private Partnership GFTC in collaboration with the University of Guelph in Canada
Benchmarking Study

1. Specific regulations on domestic products
2. Specific regulations on imported products
3. Responsible regulatory agencies
4. Voluntary industry practices
5. Commodities being regulated
6. Types of identifiers and technologies
7. Use of standards
8. Availability of standards
9. Electronic traceability
10. Consumer awareness
IFT FDA FSMA Traceability Pilots

Funded by the US Food and Drug Administration

FSMA Pilots: Stakeholder Outreach

- Product tracing contact list of over 750
- Presentations at over 22 national and international venues seeking input
- 41 written and 39 oral comments received

<table>
<thead>
<tr>
<th>Outreach Efforts</th>
<th># Individuals / Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentations at various venues</td>
<td>1108</td>
</tr>
<tr>
<td>Food industry</td>
<td>308</td>
</tr>
<tr>
<td>Technology Providers</td>
<td>189</td>
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<tr>
<td>Stakeholder Input Sessions</td>
<td>107</td>
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<td>Academics (global)</td>
<td>88</td>
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<tr>
<td>Consultants</td>
<td>81</td>
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<td>Trade Associations</td>
<td>49</td>
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<tr>
<td>Government representatives (global)</td>
<td>49</td>
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<tr>
<td>Allied organizations</td>
<td>32</td>
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<tr>
<td>Small businesses</td>
<td>25</td>
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<tr>
<td>News media</td>
<td>22</td>
</tr>
<tr>
<td>Consumer Groups</td>
<td>13</td>
</tr>
</tbody>
</table>

Stakeholder Input Session Attendee Type

- Technology Provider
- Food Industry
- Consultant
- Academia
- Trade Association
- Government
- Consumer Organization
### FSMA Pilots: Baseline Study

Many issues were the same for FDA and state/local traceback investigators

<table>
<thead>
<tr>
<th>Less Complicated Investigations</th>
<th>More Complicated Investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiated within one day</td>
<td>Initiated in 1-5 days</td>
</tr>
<tr>
<td>Duration of up to 2.5 weeks</td>
<td>2 months or more in duration</td>
</tr>
<tr>
<td>4-20 hours required</td>
<td>8-240 hours required</td>
</tr>
<tr>
<td>Clear epidemiological link</td>
<td>Poor consumer recall; multiple potential items</td>
</tr>
<tr>
<td>Longer shelf life product</td>
<td>Shorter shelf life product</td>
</tr>
<tr>
<td>Label/bar code information captured*</td>
<td>No label or bar code; reuse of boxes*</td>
</tr>
<tr>
<td>Records kept on-site</td>
<td>Records stored off-site</td>
</tr>
<tr>
<td>Legible, English records*</td>
<td>Records illegible, not English*</td>
</tr>
<tr>
<td>Good internal tracing*</td>
<td>No record of ingredients used in finished products or record of cases shipped within the distribution center*</td>
</tr>
<tr>
<td>Shipping/receiving information captured*</td>
<td>Invoices do not reflect change in orders; use of undocumented “fill-in” product*</td>
</tr>
<tr>
<td>*Electronic records</td>
<td>Paper records; errors in data entry*</td>
</tr>
</tbody>
</table>

* were assessed in the pilots.

### FSMA Pilots: Cost-Benefit Study Findings

<table>
<thead>
<tr>
<th>Case Study YR</th>
<th>Max. Illnesses Prevented (%)</th>
<th>Avg. $ Impact / Day</th>
<th>50% ↓ Traceback Time</th>
<th>Maximum $ Benefit (100% ↓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peppers and tomatoes 08</td>
<td>790 (55)</td>
<td>$277,275</td>
<td>$12M</td>
<td>$14M</td>
</tr>
<tr>
<td>Cantaloupe 08</td>
<td>1 (2)</td>
<td>1,053</td>
<td>$18K</td>
<td>$18K</td>
</tr>
<tr>
<td>Alfalfa sprouts 09</td>
<td>73 (31)</td>
<td>$23,758</td>
<td>$806K</td>
<td>$1.3M</td>
</tr>
<tr>
<td>Red &amp; black pepper 10</td>
<td>47 (17)</td>
<td>$16,496</td>
<td>$573K</td>
<td>$841K</td>
</tr>
<tr>
<td>Unspecified Mexican 10</td>
<td>2 (3)</td>
<td>$1,377</td>
<td>$0</td>
<td>$36K</td>
</tr>
<tr>
<td>Shell eggs 10</td>
<td>120 (3)</td>
<td>$268,500</td>
<td>$1.1M</td>
<td>$2.1M</td>
</tr>
<tr>
<td>Ground turkey 11</td>
<td>17 (13)</td>
<td>$16,016</td>
<td>$125K</td>
<td>$304K</td>
</tr>
<tr>
<td>Cantaloupe 11</td>
<td>28 (19)</td>
<td>$153,440</td>
<td>$384K</td>
<td>$767K</td>
</tr>
</tbody>
</table>
Food Defense, Traceability and Technology

Funded by the Department of Homeland Security (DHS) through University of Minnesota’s Food Protection and Defense Institute (FPDI)

Food Traceability and Food Defense

- Food Product Tracing Technology Capabilities & Interoperability
  - 2.5 year study
  - Funded by Department of Homeland Security (DHS) through University of Minnesota’s Food Protection and Defense Institute (FPDI)

- Goals & Objectives
  - Compare and contrast the capabilities of traceability solutions
  - Opportunities and challenges to interoperability

- Participants & Stakeholders
  - Food industry including meat, produce, dairy, seafood
  - 9 technology solution providers
  - Academia, others
Project Results

Study - Time Metrics

Number of Days

Solution Provider ID

- Data Entry
- Response to Scenario 1
- Response to Scenario 2

Conclusion

- **Enhanced Traceability is a Win-Win-Win**
  - Industry
    - Reduced costs
    - Increased profits
    - Viable industry
  - Regulators
    - More harmonized regulations
    - Reduced impact of outbreaks
  - Consumers
    - Better informed decision-making
    - Encourage safe food practices
Conclusion

- A list of cliché’s
  - “the future is coming”
  - “nothing is permanent but change”
  - “surprise is inevitable, being unprepared is not”

- Drivers of innovations
  - Regulatory funding
  - Industry innovations
  - Technology transformations

- Future of Traceability
  - In a revolutionary phase
  - Much more than keeping track of foods
  - Collaborative ubiquitous artificially intelligent system of systems

Thank You!

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