Achieving Traceability from Farm to Fork with use of Technology, Standards and Best Practices

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GS1 India

• A Standards body, set up by the Min. of Commerce, Govt. of India, and the following:
  - Ministry of Commerce
  - CII
  - FICCI
  - ASSOCHAM
  - FIEO
  - Spices Board
  - BIS
  - IMC
  - IIP
  - APEDA

• Affiliated to GS1, Brussels, Belgium along with 110 GS1 organisations worldwide
What is Traceability

Traceability is the ability to track forward the movement through specified stage(s) of the extended supply chain and trace backward the history, application or location of that which is under consideration

*ISO 9001:2000 Definition*

Tracking and tracing the physical product as well as the data that follows:
Full supply chain visibility

- Identifying products
- Labelling and capturing data
- Recording data
- Sharing data

**WHAT**

**WHY**

**WHEN**

**WHERE**
Lack of Traceability Exposes Food Companies to Huge Risks

E.Coli contaminated spinach

Then it spread to lettuce

China Milk Recall

...became a criminal investigation

E.Coli contaminated spinach

A major California grower is linked to a virulent strain of bacteria that has killed one person and sickened 94 others across 20 states.

A California grower has voluntarily pulled all of its prepackaged fresh spinach off the shelves after the product was linked to a potent strain of E. coli bacteria that by Friday had

...became a criminal investigation

Spinach Recall Becomes Criminal Investigation

20 Days Ago - October 5, 2006 by vitabite.com

Topics: food e. coli, nutrition, fda and outbreak

The ongoing search for the source of a deadly E. coli outbreak in spinach has become a criminal investigation, as federal agents raid two California produce companies.

Agents from the Food and Drug Administration (FDA) and FBI have begun searching for evidence as part of a probe, sanctioned by the federal Food, Drug and Cosmetic Act, which makes

China Milk Recall

HEALTH

Lettuce company retrieves nearly all suspect greens

POSTED 8:13 p.m. EDT, October 6, 2006

SAN FRANCISCO, California (AP) – The company that recalled its lettuce after irrigation water tested positive for E. coli confirmed Monday it locales 259 remaining cartons of the greens, which could be scattered across seven Western states.

On Sunday, Nuine Co. recalled more than 8,500 cartons of green leaf lettuce grown on one farm in the Colusa Valley, the area officials said had the center of the
Why Traceability

A regular pizza may have over 35 ingredients

Ingredients are sourced from all over the world

How long would it take to find out who processed a contaminated ingredient?

And how would you know where all the contaminated ingredient has been sold?
Traceability: A necessity for all trading partners

- Recall readiness
- Consumer safety
- Fight counterfeiting
- Regulatory requirements

Added strategic advantages:
- Logistics efficiency
- Support marketing strategies
Driven by Regulatory Requirements

**EU Regulation 931/2011**

In accordance with Articles 10 to 35 and subject to the exceptions contained in this Chapter, indication of the following particulars shall be mandatory: (a) the name of the food; (b) the list of ingredients; (c) any ingredient or processing aid listed in Annex II or derived from a substance or product listed in Annex II causing allergies or intolerances used in the manufacture or preparation of a food and still present in the finished product, even if in an altered form; (d) the quantity of certain ingredients or categories of ingredients; (e) the net quantity of the food.

**EU Regulation 404/2011**

Requires lot-based traceability of fisheries and aquaculture products. Products shall be traceable from catch or harvest to the final stage of production, processing and distribution from catch or harvest.

**EU Regulation 1169/2011**

In accordance with Articles 10 to 35 and subject to the exceptions contained in this Chapter, indication of the following particulars shall be mandatory: (a) the name of the food; (b) the list of ingredients; (c) any ingredient or processing aid listed in Annex II or derived from a substance or product listed in Annex II causing allergies or intolerances used in the manufacture or preparation of a food and still present in the finished product, even if in an altered form; (d) the quantity of certain ingredients or categories of ingredients; (e) the net quantity of the food.

**EU Directive 2009/48**

Distributors who consider or have reason to believe that a toy which they have made available on the market is not in conformity with the relevant Community harmonisation legislation shall make sure that corrective measures necessary to bring that toy into conformity, to withdraw it or recall it, if appropriate, are taken.

**EU Regulation 178/2002**

For the scope of food & feed requests to have an orderly systems for receipt of incoming goods that make it possible to identify, and keep relevant records pertaining to, direct suppliers (“one step up”), and orderly systems for handling outgoing goods that make it possible to identify, and keep relevant records pertaining to, direct commercial purchasers (“one step down”).

**EU Directive 2001/95**

Article 5 (2) general product safety. Moreover, within the limits of their respective activities, they shall participate in monitoring the safety of products placed on the market, especially by passing on information on product risks, keeping and providing the documentation necessary for tracing the origin of products, and cooperating in the action taken by producers and competent authorities to avoid the risks.

**EU Directive 2009/48**

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**Food Safety Modernization Act**

(http://www.fda.gov/Food/FoodSafety/FSMA/ucm34120.htm)
Benefits to All Stakeholders and Sectors
Full Supply Chain Visibility
Challenges of Traceability: Interdependency

Multiple stakeholders across the supply chain

Traceability is only as strong as its weakest link
Challenges of Traceability: Information Flow

- Unstructured and non-standardized data formats used by different stakeholders
- Ability to link information flow to physical flow
Challenges of Traceability: Interoperability

Interoperability is possible only when information is shared in a standard format overcoming geographical, jurisdictional and language limits.
Challenges of Traceability: Access to Data

Ability to access accurate and reliable data in a timely manner among the various stakeholders
GS1 Standards for Traceability

**IDENTIFY**
The right product levels & parties involved
Common universal identification by all stakeholders

**CAPTURE**
Various data carriers for traceability applications
Through barcode and RFID using structured and standardized data within them

**SHARE**
Managing data & links between input & output
Seamless data sharing between stakeholders electronically using Standards
GS1 Standards

Global Traceability Standard (GTS) (Process)
Global Recall Standard (messaging)
Checklist of the Global Traceability Programme (control points and compliance criteria)
GS1 Global Traceability Standard (GTS)

Application Standard

Business Rules
Minimum Requirements

The framework for interoperability
GS1 Traceability Solution – Components

Standards

Guidelines

Global Traceability Assessments

Implementation Support

Best practices

Deployment
Designing a Traceability System
Evaluating a Traceability Solution

<table>
<thead>
<tr>
<th>Assess Needs and Benefits</th>
<th>Costs</th>
<th>Performance criteria</th>
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<tbody>
<tr>
<td>• Size of Market: supply chain, safety, quality control and marketing attributes</td>
<td>• Required Amplitude</td>
<td>• Breadth: the amount of information the traceability system records</td>
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<tr>
<td>• Value of Product: safety and quality control</td>
<td>• Complexity and number of transactions</td>
<td>• Depth: how far upstream or downstream in the supply chain the system tracks</td>
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<tr>
<td>• Probability of Security and Quality faults: safety and quality control</td>
<td>• Accuracy Level: number and precision of traceable items</td>
<td>• Precision: the degree of assurance with which the system can pinpoint a particular product’s movement or characteristics</td>
</tr>
<tr>
<td>• Value of Fines for Security and Quality Faults: safety and quality control</td>
<td>• Transformation level of product: system complexity</td>
<td>• Access: the speed with which track and trace information can be communicated to supply chain members</td>
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<tr>
<td>• Variation of Expected Product Value: marketing attributes</td>
<td>• Technological difficult to tracing</td>
<td>• Interoperability: the compatibility with other systems</td>
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<td></td>
<td>• Number of new segregations or activities to keep the product identity</td>
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Minimum Requirements

Effective traceability solutions and managing product recalls efficiently need:

- **Unique identification**
  - Global product identification number
  - Lot/batch number or serial number (unique number at the unit level)
- **Data capture**
  - Bar coding or radio frequency identification (RFID)
- **Links management**
  - Managing identification from the point-of-manufacture to the point-of-sale/point-of-care
- **Data communication**
  - Associate the physical flow of products with the information flow
  - Different information sharing models
Unique Identification

- **Shipment**: UNIQUE → GSIN
- **Logistic Unit**: UNIQUE → SSCC
- **Trade Item**:
  - Not crossing POS: GENERIC → GTIN + Batch/Lot
  - Crossing POS: SPECIFIC → GTIN + Serial Number
Links Management

Companies/ Entities
- Global Location Number (GLN)

Location
- Global Location Number (GLN)

Product
- Global Trade Item Number (GTIN)
- Serialized Global Trade Item Number (SGTIN)

Logistics Unit
- Serial Shipping Container Code (SSCC)
- Global Shipment Identification Number (GSIN)
- Global Identification Number for Consignment (GINC)

Services
- Global Service Relation Number (GSRN)

Documents
- Global Document Type Identifier (GDTI)

Assets
- Global Individual Asset Identifier (GIAI)
- Global Returnable Asset Identifier (GRAI)
Data Communication

Physical movement of goods throughout the supply chain

**Business data shared between trading partners:**

**Master data:** Information about the product, such as composition and date of manufacturing, manufactured by etc. Synchronised with GS1 GDSN

**Transaction data:** Such as order, dispatch advice, invoice. Exchanged automatically with GS1 eCom

**Physical event data:** Information about the movement of a trade item or logistical unit – shared with GS1 eCom or GS1 EPCIS
Various Information Sharing Models

- One step up, one step down
- Cumulative tracking
- Single Source Database
- Distributed information source
Information Sharing Model 1

One step up, one step down

- Point-to-point information sharing for day-to-day operations
- Other data on request when necessary to previous actor

Information flow:
- Manufacturer → Distributor → Provider

Physical flow:
- Manufacturer → Distributor → Provider
**Information Sharing Model 2**

**Single Source Database**
- Point-to-point information sharing for day to day operations
- Duplication of data in a central data base held by a 3rd party
- Requests sent to central data base (security, authorization...)

![Diagram showing the flow of information and physical flow between Manufacturer, Distributor, and Provider with a central data base managed by a 3rd party.](image-url)
Information Sharing Model 3

Cumulative Tracking
“Chain of Custody” or “Chain of Ownership”
• Point-to-point information sharing of cumulated product history information
• No request or discovery is supposed to be performed
Information Sharing Model 4

Distributed Information Source (Real time)
- No point-to-point information sharing
- All data on request based on traceable item identifier

Physical flow: Manufacturer → Distributor → Provider

Repositories for data search

Information flow: Manufacturer → Distributor → Provider
The Traceability Process

1. Plan and Organize
2. Align Master Data
3. Record Traceability Data
4. Request Trace
5. Use Information
Features of an Efficient Traceability Solution

- Establish linkage between physical items and information flow
- Include unique & universal identification of products and supply chain partners (stakeholders)
- Easy to implement by every stakeholder irrespective of organization size
- Establish an open, global relationship between independent partners irrespective of industry & sector
- Be cost efficient
- Be flexible and thorough
- Facilitate efficient recall management for food safety & security
- Based on global standards & best practices
- Comply with global regulatory requirements (existing & emerging)
- Not pose any trade barrier
Case Studies
Traceability for Exported Grapes: India

APEDA built an internet based, traceability system using GS1 Standards to integrate all the Grape export industry stakeholders on a single platform for full chain visibility.

Benefits:

- Farmers earned 40% more value per carton exported
  - FOB realization rose from 6 Euro to 9.5 Euro per carton of 5 kg
- Enhanced brand equity of India and APEDA due to the quality of Grapes exported
- Protected current export markets and provided opportunity to expand to new highly quality conscious and stringent markets like Japan
- APEDA received the National Award for its GrapeNet implementation
Al Shams Agro Group is a leading Egyptian company in the food industry

- Developed an automated traceability system to track its oranges from the packing house until its final destination

Benefits:
- Strengthen position as one of the highest quality citrus producers in the Mediterranean
- Reduced customer complaints by 75%
- Compliance with the Egyptian traceability agency requirements, EU and other international standards
- Return on investment was achieved in two exporting seasons
Traceability leading to global recognition: Croatia

GS1 Standards helped Koestlin to develop and implement the National Electronic Catalog (eCROKAT)

- Today it is used in trade and synchronisation of master data with business partners

Benefits:
- Koestlin has a robust traceability system and effective control over the use of raw materials and packaging
- Koestlin has seen a growth in its sales of over 300%
- GS1 GTC programme helps them be competitive and globally recognised in many markets across the world
Deploying traceability for native producers: Peru

Herb producers in Peru, realize 50% increase in exports as a result of the traceability process implemented with GS1 Standards

- A traceability solution was built for over 615 aromatic herb producers in Arequipa, Peru
- GS1 traceability guidelines and templates were used to identify each point of their supply chain

Benefits:
- 80% time savings when extracting upstream information
- 50% increase in herbs from Peru
- Similar traceability projects were conducted in Piura for organic coffee and brown sugar
Summary

- Traceability is tracking & tracing the physical product as well as the data that follows
- Look at the cost-benefit and performance criteria of the company
- Links between traceability data and the product must always be maintained
- A decentralized model based on information network could be an optimum way for end to end traceability
- Leverage the Global Traceability Standards, using GS1 Standards to implement a traceability solution
- Follow guidelines and Industry best practices
Thank You