



Counsel for  
regulatory  
compliance and  
product recalls



## IDENTIFICATION SYSTEMS IN FOOD TRACEABILITY

by Mark A. Kinzie

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### Overview

The tracking mechanism for food products in the supply chain must be reliable, manageable, dynamic, and cost-effective. Identifying the origin of food ingredients and food sources is of prime importance to consumers, particularly where food products may be faulty and risk consumer protection. Traceability enables consumers with targeted and accurate information about food products during different stages from processing to distribution and facilitates the withdrawal of food from the market during a recall or quality audit.

Existing regulations in the European Union have required food and feed operators to implement special traceability systems to identify their products upstream and downstream paths and to provide this information to authorities quickly and at any point in the supply chain. New legislation in the United States seeks to establish a similar system by expanding the tracking capabilities of the U.S. Food & Drug Administration (“FDA”) and by giving the FDA mandatory recall authority. Ultimately, however, the success of tracing the origin or upstream path of a food product and its ultimate recipient depends on the data, technology, and quality system available for implementation by the food industry.

Information flow throughout the supply chain may make food products inherently safe. Below are developments in the law and in the methods available that seek to bring about this identification system.

### Laws and Legislation Governing Food Traceability

#### *European Union.*

The EU’s General Food Law is directive EC/178/2002, which defines traceability as the ability to track any food, feed, food-producing animal, ingredient, or substance through all stages of production, processing, and distribution.<sup>1</sup> The directive contains compulsory provisions for traceability that covers all business operators of food and feed to specific sectors such as beef, fish, and genetically modified organisms. Importers are similarly regulated as they are required to identify from whom the product was exported in the country of origin. Unless the regulation makes specific traceability requirements of a certain food or its supply chain, the general requirement is limited to ensuring that food businesses chain are able to identify the immediate supplier of a food product in question and the immediate subsequent recipient, except for retailers and final consumers. This is the one step up-one step down system.<sup>2</sup>

Member State authorities and the EU have clearly defined roles and responsibilities that allow them to respond appropriately when a risk to food is identified. The 2002 directive enhanced the Rapid Alert System for Food and Feed (RASFF), which had existed since 1979 and had established an early warning system for health risks presented by food traded, shipped, and sold across European countries.<sup>3</sup>



Today, RASFF participants are the 27 EU Member States, plus Iceland, Liechtenstein and Norway. RASFF members each have a designated contact point responsible for creating and communicating notifications to the European Commission, which manages the RASFF system and facilitates the transmission and handling of its notifications.<sup>4</sup> These notifications create a rapid information flow whenever a risk to food or feed safety is identified, which may originate from food or feed inspections at the border to samples received and tested in a laboratory. If a member of the network becomes aware of a qualified potential risk, it notifies the European Commission, which immediately transmits this information to the other members so that corrective action may be implemented. This system allows food and feed products to circulate freely between EU Member States as long as each implements and enforces the requirements of the traceability system.

Additional information about traceability and food law in the European Union may be found here:

- DG SANCO , FOOD SAFETY:  
[http://ec.europa.eu/food/index\\_en.htm](http://ec.europa.eu/food/index_en.htm)
- THE RAPID ALERT SYSTEM FOR FOOD AND FEED:  
[http://ec.europa.eu/food/food/rapidalert/index\\_en.htm](http://ec.europa.eu/food/food/rapidalert/index_en.htm)
- THE GENERAL FOOD LAW, EC/178/2002:  
[http://ec.europa.eu/food/food/foodlaw/index\\_en.htm](http://ec.europa.eu/food/food/foodlaw/index_en.htm)
- IMPLEMENTATION OF TRACEABILITY:  
[http://ec.europa.eu/food/food/foodlaw/guidance/index\\_en.htm](http://ec.europa.eu/food/food/foodlaw/guidance/index_en.htm)
- TRADE CONTROL AND EXPERT SYSTEMS (TRACES):  
[http://ec.europa.eu/food/animal/diseases/animoindex\\_en.htm](http://ec.europa.eu/food/animal/diseases/animoindex_en.htm)
- FOOD STANDARDS AGENCY (UNITED KINGDOM):  
<http://www.food.gov.uk>

### *United States.*

Legislation has been pending in the U.S. Congress that will establish traceability requirements in food products as a matter of law. The Food Safety Enhancement Act of 2009, H.R. 2749, was passed by the House of Representatives on July

30, 2009. The bill was then given to the U.S. Senate where it has been read twice but no further action was taken. A similar bill, S. 510, the FDA Food Safety Modernization Act, was voted out of Committee and to the full Senate on December 18, 2009, but no further action has been taken on this legislation.<sup>5</sup>

Both bills expand the authority of the FDA over the national food supply and food provides by implementing traceability in industry and to imposing the mandatory recall of unsafe food products. Both bills increase the frequency of inspections, extend oversight authority by the FDA, and require the implementation of risk-based controls that prevent food hazards.<sup>6</sup> In a way similar to the Consumer Product Safety Improvement Act of 2009, both pieces of proposed legislation seek provisions for certifying third-party laboratories to perform sampling and testing, increase inspections of food imports, and tighter record-keeping requirements.<sup>7</sup>

Also pending in the U.S. Senate is the Food Safety and Tracking Improvement Act, S. 425, which proposes to establish a national traceability system under FDA jurisdiction at all stages of manufacturing, processing, packaging, and distribution of food products.<sup>8</sup> The legislation would require

[e]lectronic records identifying each prior sale, purchase, or trade of the food and its ingredients, and establishing that the food and its ingredients were grown, prepared, handled, manufactured, processed, distributed, shipped, warehoused, imported, and conveyed under conditions that ensure the safety of the food. The records should include an electronic statement with the date of, and the names and addresses of all parties to, each prior sale, purchase, or trade, and any other information as appropriate.<sup>9</sup>



All food safety legislation seems to be pending in the U.S. Senate without significant movement at this time. It is not known when any of these proposed bills will become active again.

### **Mechanisms for Food Traceability**

#### *Good Traceability Practice.*

Generally, traceability is the ability to follow the history, application, or location of an entity by means of recorded identification.<sup>10</sup> Where food products are considered, this is ability to follow the movement of a food product, including feed and food-producing animals, through the specific stages of production, processing, and distribution.<sup>11</sup>

The US is about to give serious consideration to its food traceability protocol. Industry studies suggest that available approaches are becoming more advanced because pending legislation and industry solutions have leveraged the research, experience, and practical application given to the identification systems that currently exist in other countries. Very simply, industry and government have been willing to take a look at existing systems and laws before making new systems and laws.<sup>12</sup> This includes possible technical solutions derived by analyzing assessment criteria used to study alphanumeric codes, bar codes, and radio frequency identification devices (RFID), as well as updates to existing laws that already require a traceability method, such as the EU's General Food Law.<sup>13</sup> Also, the food industry has some limited experience implementing traceability systems in seafood,<sup>14</sup> mineral water,<sup>15</sup> honey,<sup>16</sup> and chicken.<sup>17</sup>

A few available approaches to identification systems are noted below.

#### *One-Step-Up, One-Step-Down.*

The one-step-up, one-step-down method denotes a business process in which each member of the supply chain must know the full ancestry of the product before it reaches them and must communicate the product's full pedigree to the next supply chain entity

downstream. This process is embodied in the EU's General Food Law directive. Supply chain entities are responsible for their function in the supply chain and must organize themselves internally to ensure the system's integrity.

This, however, is not a robust system. If only one link in the supply chain fails to properly execute the method, the remainder of the chain may not be located. Further, the process depends on similar execution by all members of that particular supply chain. Finally, intentional conduct in the chain cannot be removed because it is unlikely that such conduct is recorded, although it might be captured by the self-policing feature of the system. If one-step-up, one-step-down could be coupled with electronic data and a monitoring feature in that data, it may prove to be more robust.<sup>18</sup>

#### *Electronic Solutions.*

The U.S. FDA's Center for Food Safety and Applied Nutrition recently directed the Institute of Food Technologists (IFT) to examine the current practices and technologies used to trace food products. The IFT evaluated other industries to determine the best practices available for traceability, the technology platforms that supported those practices, and the costs necessary to implement an effective identification system.<sup>19</sup> Product traceability data was obtained from several industry sectors and a number of supply chain functions, including food service, produce, packaging, processed ingredients, distribution, retail, animal processing, and animal feed.<sup>20</sup>

Many of the evaluated entities acknowledged the importance of an accurate and rapid tracking system. The IFT did find identification systems available to track products, but these systems were dissimilar across industries and across supply chain functions because they ranged from manual recordkeeping to sophisticated electronic data gathering. In particular, the IFT noted variability among the actual tracing mechanisms between various segments of the food supply chain, which yielded an inconsistency in data



collection methods, data types, designation of lots or batches.

Similarly, a Japanese research center evaluated that country's methods for transmitting and storing data in the supply chain for food products, including paper documents, bar codes, two dimensional codes, and electronic tags.<sup>21</sup> They also found dissimilar systems in that each had their own technical limitations and associated cost. No one system offered a workable or comprehensive solution for the entire food supply chain.<sup>22</sup>

Also, a recent EU project purported to integrate traceability into the entire food supply chain via information technology through a comprehensive system.<sup>23</sup> This project, TRACEBACK, sought to synchronize product flow with information flow, and they reported some success with industries that have used model systems. Still, some in the food industry have been hesitant about this system because, short of proposed regulatory requirements, no compelling need for tracking the food supply chain has presented itself, at least not one that proposes to establish such a system on the front end following the product rather than on the back end dealing with a food recall and a food safety issue.

## How To Go Forward

To develop an effective product traceability system, the supply chain entities in the food industry must set concise objectives for tracking food products. A food traceability system must be simple, intuitive, generally accepted by the food industry, and make use of consistent or standardized reference points and where they typically appear in the supply chain. Each supply chain entity must be able to identify critical tracking events, record key data elements for each tracking event, provide key data elements to the next entity in the supply chain and to the FDA within 24 hours. Before such a system can exist, an identification system must be standardized so that key data has been given consistent language, identification features, recording criteria, and tracking events. This standardization does not exist at this time.

Implementing an effective identification system will likely have an economic cost to the food industry. Still, it may also produce residual benefits beyond safety, including social benefits and cost reductions to industry. These benefits may include improved supply chain management, inventory control, access to markets, and targeted, effective recalls, and lower costs associated with the recall of faulty food products. Further, supply chain entities may benefit by protecting their brand name, protecting the consumer, maintaining consumer confidence, and reducing liability claims, especially where product tracking may exclude an entity from an investigation. These are worthwhile benefits for an identification system originally intended to implement safety in the supply chain.

Mark Kinzie is a principal at Averture and works with supply chain entities in product problems that present recalls, regulatory compliance issues, litigation, and hazards that require warnings and instructions. Most recently, he has worked with recall issues for several manufacturers, including food processors. He has a background as national coordinating counsel in mass tort lawsuits and currently represents product manufacturers before federal regulatory agencies in compliance disputes.



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<sup>1</sup> EC/178/2002 *General principles and requirements of food law* (28 January 2002), EU Food Directive.

<sup>2</sup> EC *General Food Law Regulation 178/2002 : Guidance Notes on the Food Safety Act 1990 (Amendment) Regulations 2004 and the General Food Regulations 2004*. European Community ed. 178/2002, 2004.

<sup>3</sup> See Articles 50, 51, and 52, EC/178/2002, *scope and procedures of RASFF*.

<sup>4</sup> See Article 50, EC/178/2002.

<sup>5</sup> See H.R. 2749, *Food Safety Enhancement Act of 2009, A bill to amend the Federal Food Drug, and Cosmetic Act to improve the safety of food in the global market, and for other purposes* (introduced August 3, 2009; passed by the House of Representatives, July 30, 2009); S. 510, the *FDA Food Safety Modernization Act, A bill to amend the Federal Food, Drug, and Cosmetic Act with respect to the safety of the food supply* (introduced March 3, 2009; reported from Committee to Senate, December 18, 2009).

<sup>6</sup> See R. Johnson, *Food Safety: Selected Issues and Bills in the 111<sup>th</sup> Congress, Agricultural Legislation* (August 19, 2010).

<sup>7</sup> *Id.*; Also pending in the U.S. House of Representatives is the *SAFER Meat, Poultry, and Food Act of 2009*, H.R. 815, (introduced February 3, 2009 and referred to House Committees on Energy and Commerce, and Agriculture on April 23, 2009). This bill seeks to require notification to the Secretary of Agriculture when a meat or poultry product has been adulterated, misbranded, or becomes a threat to the public health. The acronym "SAFER" is the "Safe And Fair Enforcement and Recall" of food products. See also *Positively Assured Traceability White Paper*, H.R. 2749 and *NAIS-The Confusing Tale of Two Food Safety Policies*, Tracegrains, Inc. and HCL (2009).

<sup>8</sup> See S. 425, the *Food Safety and Tracking Improvement Act, A bill to amend the Federal Food, Drug, and Cosmetic to provide for the establishment of a traceability system for food, to amend the Federal Meat Inspection Act, the Poultry Products Inspections Act, the Egg Products Inspection Act, and the Federal Food, Drug, and Cosmetic Act to provide for improved public health and food safety through enhanced enforcement, and for other purpose* (introduced February 12, 2009, referred to the Senate Committee on Agriculture, Nutrition, and Forestry).

<sup>9</sup> S. 425.

<sup>10</sup> ISO 8402:1994 *Quality Management and quality assurance*; see also ISO 9000:2000 *Quality Management Systems*. Other general standards and policies on traceability exist. See also National Institute of Standards and Technology (NIST) *Policy on Traceability*, NIST Administrative Manual, Subchapter 5.16.

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<sup>11</sup> EC 178/2002 *General principles and requirements of food law* (28 January 2002), EU Food Directive.

<sup>12</sup> See Regattieri, A., Gamberi, M. and Manzini, R. *Traceability of food products: General framework and experimental evidence*. *Journal of Food Engineering*, Vol. 81; 347-356 (2007).

<sup>13</sup> *Id.*; see also EC 178/2002, amended 01 January 2005, and EU Funded Projects added: FoodTrace (2002) and TRACE project (January 2005).

<sup>14</sup> See GTP established via ISO/DIS 12875 "Traceability of fish products, ISO TC234 WG1.

<sup>15</sup> See GTP established via TRACE, European Commission, Sixth Framework Programme, Food Quality and Safety Priority, Paul Brereton, Coordinator, Food and Environment Research Agency, United Kingdom.

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> Also, beginning the first step of one-step-up with basic, accurate data about the raw materials in a product would further support this method because the first step in the process would have been verified. Further, this data—similar to material safety data sheets for industrial products—would result in fewer non-compliances, less waste, and better customer relationships.

<sup>19</sup> *Task Order No. 7 Final Report: Revised Tracing Systems: An Exercise Exploring Data Needs and Design*, McEntire, J., Ph.D., Institute of Food Technologists (IFT), Analysis and Review of Topics in Areas of food Safety, Food Security, Food Processing, and Human Health (December 01, 2009).

<sup>20</sup> See also *Tactics for Improving Food Traceability*, IFT, Food Technology (November 1, 2009), <http://www.ift.org/food-technology/past-issues/2009/november/features/tactics-for-improving-food-traceability.aspx>.

<sup>21</sup> *Handbook for Introduction of Food Traceability Systems (Guidelines for Food Traceability)*, March 2007 (Second edition), Food Marketing Research and Information Center.

<sup>22</sup> *Id.* at Appendix A, *Indicating form of transmitting information and its storage media used in the food traceability system*.

<sup>23</sup> TRACEBACK refers to the "Integrated System for a reliable traceability of food supply chains," which is an integrated project of the European Union Sixth Framework Programme of Scientific and Technological Research, Priority 5 "Food Quality and Safety." See <http://www.traceback-ip.eu/index.php>.