DIGITAL INDUSTRIES SOFTWARE

Tackling new food safety challenges with digital solutions

How to build efficiency into food safety from farm to fork

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Changes to both our planet and human well-being are spawning a surprisingly broad set of implications for the food and beverage industry regarding product safety. For example, severe weather events brought about by climate change have in a few short years spread the destructive fall armyworm from the tropical and subtropical regions of the Americas to Africa, India, southeast Asia and Australia, and also to American regions previously too cool to support them. To preserve their corn crops against this resilient pest, farmers in many new global regions are introducing pesticides and other measures – which means that food producers in newly infested regions must ensure that their incoming corn supply does not carry any new risks to the safety of their finished products.

Within a complex and evolving food production landscape, F&B companies must safeguard their products against both perennial and new risks. Vigilance against persistent forms of contamination has markedly reduced product safety issues and the costly recalls associated with them – but recent recalls illustrate the need for even greater safety. A quick search on the internet reveals that recent recalls of food and beverages have occurred due to the presence of listeria, salmonella, cronobacter, E. coli, and more.

Two new and growing factors in food safety demand particular attention. First, both the occurrence and intensity of foodborne diseases appear to be increasing due to climate-related changes, including invasive alien species like the fall armyworm and the spread and proliferation of toxin-producing microorganisms. Second, food allergies are on the rise. As much as 10% of the global population suffers from food allergies today. Each year in the U.S.A. alone, about 200,000 people receive emergency medical care for an allergic reaction to food.

Further complicating food safety efforts are incidents in which the safety measures themselves backfire, like when a beverage producer's clean-in-place (CIP) process leaves sanitizing agent in the line. One recent incident resulted in the hospitalization of 20 children.

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New food safety goals

As food and beverage risks continue to evolve, F&B companies have redefined safety program goals, in some cases prompted by new regulatory and retailer mandates. These goals can be encapsulated in one requirement: *to be able to open the doors of the factory to an unscheduled audit at any time.* To continuously meet this requirement, F&B producers must manage and document compliance with regulatory requirements and best practices across their value chain. This includes:

- **Incoming material quality and safety** – Producers must know where materials come from and how they have been treated. They should obtain certificates of analysis with each delivery, then perform any incoming safety testing specified by the most up-to-date best practices and regulatory standards.

- **Safe production operations** – Producers must isolate allergens and prevent cross-contamination by keeping up with the latest best practices and regulatory requirements. These are continually evolving, placing new demands on production personnel, production schedules, warehouse management, and more.

- **A clean and safe production environment** – Producers must be concerned not only about raw materials and semi-finished products but also about proper storage, cleaning of production lines, a hygienic environment, and more. It is essential to regularly take and analyze swabs from equipment, walls, floors – anywhere pathogens might proliferate.

- **Safe delivery practices** – When producers ship products, they must ensure safe logistical practices. Products must be transported within the right temperature range, under appropriate hygiene, avoiding cross-contamination with allergen-containing products, and more. This means vegetables and chocolate, for example, must be in separate compartments of a multi-compartment truck, or in separate trucks.

Siemens' F&B customers also tell us that it has become critical to promote a culture of food safety. Well-conceived digital systems make it much easier and more efficient to manage and document food safety; but your personnel must also believe in and be motivated to follow compliance and best-practice protocols. They must be encouraged to report – without reproach – any events that place food safety at risk, then follow up with risk mitigation measures.

The efficiency of digital assurance

From our discussion so far, it may appear that food safety is and always will be a costly proposition for the food and beverage industry. But forward-looking companies recognize, first of all, that the cost of food safety efforts remains considerably lower than costs associated with contaminated products that make their way into the marketplace. Second, they are adopting digital food safety management solutions that contribute not only to food safety but also to production efficiencies that lower operational costs.

A modern research, development and laboratory (RD&L) solution is the foundation of a robust food safety management solution. RD&L capabilities help ensure and document product safety within F&B facilities – from inbound to outbound. Additionally, an RD&L solution integrated with other digital systems – primarily enterprise resource planning (ERP), manufacturing execution system (MES), and supply chain management (SCM) – extends food safety management end-to-end – from farm to fork.

Modules of an RD&L solution critical to food safety include a *specification management system*, which offers a single repository that maintains up-to-date details for all raw materials, semi-finished goods, finished goods and packaging materials; and a *laboratory information management system (LIMS)*, which seamlessly supports all laboratory activities.

Here is how digitally managed food safety offers producers a comprehensive and efficient approach from farm to fork. As each sales order is processed, specification management is the starting point of product safety. This system not only centralizes but also ensures the accuracy of data on all materials and products, including current information on all raw material suppliers. The system coordinates with MES or ERP to assign to each order an accurate, up-to-date bill of materials (BOM) and proper labeling for the final product.

As soon as a purchase order is triggered for raw materials to be delivered, RD&L creates a notification for a sample to be taken. LIMS orchestrates correct analysis of the sample and delivers a usage decision to the MES or ERP. As production processes transform the raw materials to finished products, LIMS manages production sampling and testing and also coordinates with maintenance management to ensure a clean production environment.

Proper packaging materials are then verified through specification management, including confirmation that supplier certifications are up to date. Supported by

specification management data, the SCM orchestrates shipping from the producer to the customer, enabling both transport efficiency and product safety. Finally, rapid testing enabled by LIMS also means that clean-in-place operations can be quickly followed by testing to ensure that cleaning solutions have been removed from all production equipment before the next production run.

Explore Opcenter RD&L
Risks to the safety of our food and beverages are evolving over time and from region to region, across our communities and across our planet. Producers want to be sure they have the right systems in place to assure and demonstrate food safety in an efficient way – both today and into the future. Opcenter RD&L has been designed not only with powerful food safety management features needed in the present but also with the agility to support product safety as your company grows and evolves to meet tomorrow's challenges. We encourage you to investigate Opcenter RD&L today.

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